COVID-19 data: What the numbers mean and how to tell if the coronavirus is spreading

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Months into the COVID-19 pandemic, the public is used to seeing a cavalcade of numbers and charts that show how the coronavirus that causes COVID-19 is spreading or how it's affecting a given place.

This data is crucial for informing decisions about how to respond to the crisis and keep ourselves and others safe.

But the more numbers floating around, the more potential for misinterpretation—especially when epidemiological concepts such as R0 were unknown to most people before 2020.

We're here to help. Below, you'll find explanations of common virus stats and what they tell us—individually and in combination with one another—about the state of the pandemic.

The total cases

These are the data points you may be most accustomed to hearing about: the number of cases (people who have tested positive) and deaths confirmed each day, and the total cases that have occurred in your county or state.

Keep in mind that these numbers are influenced by how many people are being tested. If a place is reporting few cases but also is barely testing anyone, the low numbers could be due to a lack of testing and don't necessarily mean the virus isn't present. Some people who have the virus don't show symptoms, which makes it hard to get an accurate case count if a place is only testing people who feel sick—as many parts of the United States were doing early in the pandemic because test kits were hard to come by.

Daily counts and cumulative totals are graphed separately. On a chart of total cases or deaths, look at how steeply the line is moving upward. The steeper the slope, the faster the total is increasing.

When charts show cases and deaths per day, look for a line that shows the overall trend. Each point on this line represents the average daily

count from the previous 14 days. This average helps us more easily understand how things are trending over time, without our perception being muddled by one day here or there when the count was especially high or low.

The number of cases includes people who have died. Epidemiologists look at what percentage of infected people have died to see how lethal a disease is, but spotty testing has made this hard to do accurately with COVID-19.

How to compare areas

Places with bigger populations are likely to have more cases, simply because more people live there. So to compare one place to another, get the rate by looking at the number of cases per 100,000 residents rather than looking only at totals.

This number is important because it's one of the ways Washington state determines whether counties are ready to move forward in Gov. Jay Inslee's four-phase Safe Start reopening plan. When Secretary of Health John Wiesman decides whether a county can move to the next phase, he generally wants the county to have had 25 or fewer new infections per 100,000 residents over the past two weeks. (The magic number was originally 10 cases per 100,000, as recommended by the U.S. Centers for Disease Control and Prevention, but was later relaxed to 25.)

Two kinds of tests

There are two types of tests involving COVID-19: molecular (viral) tests and antibody (serology) tests.

A molecular test is used to diagnose whether a person has an active

infection. It's typically administered with a long swab, which takes a sample that is then processed at a lab. The results are reported to local and state health departments.

An antibody test, which is done with a blood sample, detects whether someone has been infected in the past and developed antibodies to the virus.

While antibodies might provide some immunity, it isn't yet known how long COVID-19 antibodies last in the body or how effective they are at preventing another infection from this coronavirus.

Washington state's Department of Health has struggled to share accurate test information with the public.

At the end of March, DOH's disease reporting system was flooded with case data, which temporarily stopped the state from publicly reporting the number of new COVID-19 cases.

In mid-June, the agency revealed it had been reporting incorrect COVID-19 testing numbers for eight weeks by overcounting the number of people who tested negative. The state COVID-19 dashboard was mistakenly including negative antibody tests with negative molecular tests, showing 13% more people testing negative than actually had. This miscalculation made it appear as though a smaller proportion of the state's population was infected.

How many tests vs. how many positive

The positive test rate or% positive shows how many of all tests administered have come back positive for infection. Watching changes to this number can help us understand whether the virus is spreading more rapidly.

But there are caveats. An extremely high positivity rate could indicate that a county, state or nation is only testing the sickest people, or those who are receiving medical attention. The more people get tested, the more accurate the positivity rate is for a population.

Look at bed capacity

The number of COVID-19 patients sick enough to require hospitalization has been a key indicator for understanding the severity of this disease and the pandemic's impacts on the health care system.

Lots of people may contract the illness, resulting in soaring daily case counts. But for hospitals managing finite resources of staff, beds and equipment such as ventilators, the big concern is the number of people who require their care.

The state Department of Health and the Washington State Hospital Association track the number of hospitalizations here. But overall statewide numbers don't tell the whole story. As case counts and hospitalizations soar in one area, patients might be transported from an overburdened hospital to one that has more resources.

Spreading the virus

The basic reproduction number, expressed as R0 ("R-naught"), shows how much an infected person is spreading the virus. If each infected person gives the virus to more than one other person, that can indicate that an outbreak is getting worse.

Officials watch this number to see whether preventive measures such as stay-home orders are slowing the virus down.

The state wants a county to have an R0 of no more than 1 before it moves to a new phase of the Safe Start reopening plan.

Is it proportional?

Demographic data is important because it shows how the virus could be having an outsized impact on specific portions of a population.

It was obvious early on in the pandemic that COVID-19 was affecting older people and those with underlying health conditions more than the general population.

Like many diseases, COVID-19 has also affected Black people and Latinos disproportionately compared to their share of the population. For example, as of mid-June, people of color in King County are getting COVID-19, and being hospitalized for it, at higher rates than white residents. They are also, largely, more likely to die from the disease than their white counterparts.

Seattle Times staff reporter Hal Bernton contributed to this report.