

# The Columbus Dispatch

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Opinion

## Column: The number that will end COVID-19 pandemic

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We have all heard many numbers about the new coronavirus epidemic that quantify cases and deaths, test kit and ventilators shortages, stimulus checks and unemployment claims, and the size of the government bailout.

All of these are important, but there is another key concept called the reproduction number: the average number of people to whom an infected person transmits the disease.

A reproduction number greater than one means an epidemic is growing. If the reproduction number is two and 100 people are infected, those infected individuals will transmit the infection to 200 other people who will then transmit to 400 people, and so on. A reproduction number less than one means an epidemic is slowing down and will eventually end. If the reproduction number is 0.5 and 100 people are infected, they will transmit to 50 other people who will then transmit to 25, and so on until there are no more new cases.

Factors influencing the reproduction number include how contagious a virus is, how many people are susceptible and what we do to limit spread. We know from other countries that the coronavirus responsible for COVID-19 is very contagious. Because it is a new virus, all of us are likely to be susceptible. More importantly, our interactions with others play a key role in increasing or decreasing the reproduction number.

Gov. Mike DeWine, like many other governors, has closed schools, banned large gatherings, required people to work from home and urged us to practice social distancing. Observing these isolation measures is not simply a way to protect yourself from getting sick. The main goal is to lower the reproduction number across an entire population by making it harder for the coronavirus to spread.

Are these measures working? My colleague Douglas Gunzler, PhD, a statistician, used data on cases compiled by the New York Times and found that Ohio's reproduction number decreased from 2.3 to 1.2 over the last two weeks. This sizeable decline suggests that we are making progress but still have some way to go before getting to a reproduction number below one (and even better as close to zero

as possible). It also means we are not yet ready to relax restrictions and resume our normal social and economic activities. Doing so prematurely will result in an increase in the reproduction number, a surge of new cases and an undoing of all the work we have done so far.

Many cases, particularly asymptomatic and mild ones, are not reported to public health departments, so our calculation may underestimate the actual reproduction number. In addition, the number of people tested has increased greatly in recent days as testing kits have become more available. This would be expected to increase COVID-19 diagnoses and therefore the reproduction number. It is encouraging that we found a reduction in the reproduction number despite increased testing.

Many individuals with coronavirus infection have no or only mild symptoms but are still capable of transmitting to others. Coronavirus can also be transmitted during the several-day incubation period between virus exposure and onset of symptoms. There is no practical way to know if someone has an asymptomatic infection, has a mild infection or is in an incubation period before symptoms appear.

So all Ohioans, regardless of how well they feel, have to do their part to limit the spread of the new coronavirus. DeWine and Director of Health Dr. Amy Acton can't lower the reproduction number by themselves. Hospitals, physicians and nurses can't lower it by themselves. Families, neighborhoods and businesses can't do it by themselves. We will only be able to lower the reproduction number if we all work together.

Remember that when you are working from home, going to the grocery store only once every other week and staying 6 feet away from others. You are helping to lower the reproduction number. We are not where we need to be yet and must keep plugging away. Only then can we resume our previous lives and focus on numbers that we used to enjoy: the number of touchdowns scored by the Buckeyes, the number of roller coasters at Cedar Point and the number of flavors at our favorite ice cream shop.

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