

## **COVID-19: Is the president over reacting? What do the numbers say?**

Trying to project the spread of the virus on the South African population is very difficult. In this article, we illustrate the potential trajectory of the virus without intervention, and why the robust steps taken by our government are necessary and compliance by each citizen is essential.

This article is certainly not intended to cause panic. It merely sets the case for the steps that need to be taken.

The most important number is the loss of life. Scientists are still trying to work out what the probability of death is. It is easy to know how many have passed. However, how many were infected is more difficult to establish. South Korea tested all persons from an early stage. Italians were slower. Those countries later to respond have tested only those visibly showing symptoms. For this reason, the number of deaths per persons infected varies based on the response in that country.

We are still in the early stages of the spread of the virus and, at 24 March, President Cyril Ramaphosa's announcement of the lockdown, are yet to have a fatality in South Africa. This makes our projection of the effect more difficult (as we do not have a handle on the true infection rate). We must assume that, in our country where there is a higher HIV, tuberculosis and diabetes existence, the mortality rates are likely to be higher.

As we have been relatively slower to respond, the information from the countries mentioned above is more instructive. It is estimated for each tested infected person, there are nine others, who have mild symptoms or who have the virus, are able to transmit it but are unaware of this. This is because the virus takes up to 14 days for the symptoms to present themselves. Of importance with this number is how many people you unknowingly interact with.

At 23 March, there were 402 reported positive tests. This implies that the true number of infections at this date is about 4 000. However, to keep the numbers manageable, let's deal with only the reported cases, bearing in mind we could multiply these by 10.

The next key metric is the rate at which infections grow. It seems that the average response has let the number of infected double every three days. This means that in a month, the infection rate will double roughly 10 times ( $2^{10} = 1024$ ). Let's keep the number at 1000 to keep the maths easier. This implies we will have 400 000 infected in a month's time (with a large number still in incubation).

From preliminary experience, roughly 15% to 20% of those infected need hospitalisation. That implies 60 000 additional hospital beds are needed.

On the assumption that our hospitals can treat those infected needing attention, the mortality rate is somewhere between 1% and 2%. This implies 8 000 deaths from those

infected in the coming months (assuming we are on the higher bound of mortality). The mortality in Wuhan was 4%, due to close living conditions.

This sharp increase in infections will become limited, as we may run out of persons to infect. It also assumes that we take no steps to slow the infection rate. Over time, it is predicted that 60% to 70% of the population may get infected. In a population of 60 million, this would be 36 million infected and 720 000 deaths. This is a truly staggering number. This estimation seems very unlikely, as certainly behaviour must change. But every three days the problem doubles. We don't have the population density to reach these levels of infection and, consequently, in most worse-case scenarios, the estimation is around 200 000 deaths.

This is exactly why government is taking draconian steps to try to curb the spread of the virus. We need to get the infection rate down from doubling every three days and to do this, we need to:

- Make sure those who suspect they are infected (the nine in 10) self-isolate to make sure they do not pass it on
- Practice regular hygiene (hand washing and avoid contact with the face) and social distancing to reduce the doubling rate of the infection
- Make sure the total number of persons infected remains at a manageable level (the often-spoken-about flattening of the curve) so our hospitals and medical staff can tend to those who need treatment.

When circumstances change, people change their behaviour. It is therefore critical that we stop the spread of the virus. China has successfully managed to have number of those cured exceeding those getting infected.

A summary of the key points from last night's address are:

- Reiterate that most effective way to help infection is to change basic behaviours
- Staying home, cancelling gatherings and avoiding people help curb the spread of the virus
- An enforced lockdown from midnight on 26 March 2020 until 16 April (may be extended) with essential workers exempted
- Those who can operate remotely, must do so, and shopping will be limited to food only
- The defense force will be deployed to help police
- A public health management programme to perform screening with the initial focus being on high-density and high-risk areas
- Centralised treatment for severe cases
- Decentralised treatment for mild cases

While the measures taken may seem extreme and are having significant economic consequences, not addressing the problem would lead to a devastating loss of lives.

Each one of us needs to act responsibly and play our part to help reduce the spread of infection. We need to give as much support as we can to those who are ill and salute those who will be called upon to keep health, order and provisions running for all of us.

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