

## **South Africa, a nation ravaged by HIV, is flattening the coronavirus curve.**

Written by Administrator  
Sunday, 26 April 2020 13:09 -

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<https://www.thetimes.co.uk/article/south-africa-a-nation-ravaged-by-hiv-is-flattening-the-coronavirus-curve-bp2dxhd3q>

## **South Africa, a nation ravaged by HIV, is flattening the coronavirus curve.**

Max Price – Sunday April 26 2020

South Africa has experienced the Covid-19 epidemic rather differently from many other countries and there is much interest and speculation why this might be.

It appears to be different in two ways. First, the total number of infected people presenting with illness or discovered through limited community testing is relatively low (4,220 as of April 25). Compared with the United Kingdom, or with developing countries, such as Brazil and Mexico, there are far fewer cases per million population, and South Africa finds itself in the company of countries such as Finland, Egypt and Argentina.

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The first explanation for these lower rates is simply that the initial infectious cases appeared in South Africa later than they appeared in the UK and US. One way of marking the “take-off” point would be the date on which the number of cases exceeded 100. In South Africa that was March 18. In the UK and the US, it was March 5 and 4, respectively.

The longer period of community transmission in some countries is certainly part of the explanation.

But in Brazil and Mexico the take-off dates were March 13 and 19 respectively. The fact that Mexico, at 12,800, and Brazil, at 54,000, are so much higher than South Africa even though the epidemics took off at roughly the same time, and that the number of cases in the UK and US is far greater than can be accounted for by the two-week lag, suggests that something else is at play.

This also challenges another speculative explanation — that warmer temperatures, as found in South Africa in summer, inhibit Sars-CoV-2 transmission. While other coronaviruses show marked winter seasonality, and Sars-CoV-2 might well do so too, and there is laboratory evidence that Covid-19 has decreased survival in high humidity and warmer temperatures, there is plenty of evidence that transmission may be high in warm climates.

There was initially a concern that, since most testing had been done by private laboratories accessible only to middle-class patients, with the state laboratories initially lacking the capacity to test anyone other than those with contact history and symptoms, there might be both an undercount and a bias in understanding the distribution of infection. But with the extension of

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testing to poorer communities, no hidden mass of infections has yet been discovered.

So something else has happened. This is well illustrated by the kink in the South Africa epidemic curve at March 27. This decline in the rate of new cases, maintained for the next few weeks, is most likely due to the declaration of a “state of disaster” by the government on March 15 and a strict lockdown on March 27. The lockdown, in particular, reduced the spread to townships from the middle-class areas where most business and recreational travel originates.

The second difference between South Africa and most other countries is the low death rates. Reported Covid-19 deaths per 100,000 population as of April 22 were: UK 27.3, US 14.2, Germany 6.4, Brazil 1.39, South Korea 0.46, China 0.33, Egypt 0.28 and South Africa 0.11. In other words the rate was nearly 300 times higher in the UK than South Africa.

In fact this tells us nothing, since the number of deaths are related to the number of cases, and that in turn is strongly dependent on where each country is in terms of when the first cases occurred, and how many cases (usually infected travellers) seeded the local epidemic.

More useful will be the case fatality rate (CFR), ie the cumulative number of deaths compared with the cumulative number of cases. Here too, however, it appears South Africa is an outlier. It is 1.8% compared with, for example, UK at 13.5%, Brazil at 6.4%, or South Korea at 2.2%. Expressed another way, if there were a similar number of infections in each country, for every death in South Africa, there would be 1.2 in South Korea, 2 in Germany, 4 in Brazil and Egypt, 6 in the USA and 8 in the UK.

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This confounds predictions for several reasons. It is generally thought that more vulnerable populations such as the general South African population will have higher mortality rates. South Africa has about 7.7 million people living with HIV (13% of the population) of whom about 2.5 million are not on treatment and are therefore very vulnerable to infections. Tuberculosis rates are very high, too, with about a third of a million new infections annually, and 78,000 deaths annually.

Vulnerability may also be more general, related to poverty, nutrition, overcrowding and exposure, access to health services etc. This has been amply demonstrated in the United States where, for example, while black Americans represent only about 13% of the population in the states reporting racial and ethnic information, they account for about 34% of total Covid-19 deaths in those states. In the UK, death rates per 100,000 population were 23 for white British, 27 for Asians and 43 for black people (as categorised by NHS England and the Office for National Statistics). In South Africa, with very high levels of inequality and deprivation, one might expect similarly raised death rates.

Another explanation for differing death rates is that the death rate will reflect the adequacy of the health service to treat those who become severely ill — hence the emphasis on flattening the curve to avoid the number of severe cases exceeding hospital capacity. South Africa is poorly endowed with hospital beds, personnel and ventilators but that will become a contributing factor to death rates only once the total demand on the health service exceeds its capacity, and that has not happened yet, largely because of the success in flattening the curve as a result of the early lockdown.

A further explanation might be a high proportion of the population being below 55 years old. In South Africa that proportion is 87%. In the UK it is 69%. The higher proportion of older people will result in more deaths for the same number of infections. However, compared with countries such as Egypt, Brazil and Mexico, which also have relatively young populations, this argument

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would not be sufficient. Furthermore the epidemic, thus far, has been concentrated in geographic communities that have above average age distributions. This may be expected to be a factor in the future.

One theory for the lower Covid-19 death rates in South Africa and other developing countries relates to BCG, the anti-TB vaccine. The theory is that South Africa, and many other developing countries, and also Portugal, have high BCG vaccination levels and low Covid-19 infection and death rates, whereas the reverse is true for many European countries and the US. However, the data to support this is suspect.

Many countries with low BCG rates now had compulsory BCG a few decades ago, such that almost all the population over 60 are in fact vaccinated – yet they are the most vulnerable age groups in those countries. Furthermore, at the individual level, there does not appear to be any correlation between those with severe illness and their BCG status. Moreover, there are many exceptions to the inverse correlation of country BCG rates and Covid-19 rates. Well-designed studies will still be required to see if there is any protective effect.

Probably the most important reasons for the variation in death rates, at least between countries that are similar in many relevant respects, is how widely each country has tested for the virus rather than relying only on severely symptomatic cases that come to hospital as the measure of infections. If the infections are undercounted, this will naturally appear to increase the death rate. Yet in South Africa, until the past 10 days, testing was also restricted to people who were likely to have the virus. If anything, there was been less testing here than in many other countries, which should overstate the CFR. In fact as testing has expanded, the CFR has gone up slightly.

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So we do not yet have a good enough explanation of South Africa's lower death rates. The early stage of the epidemic here is probably the most significant one; the fact that at this stage the health services are not overwhelmed is another. No doubt there might be other factors such as immunity related to prior exposure to other infections, average infectious dose exposure (often higher when people are in close quarters such as in cold weather), and genetic factors, but these remain to be demonstrated.

What may we expect ahead? President Cyril Ramaphosa has announced that the restrictions on movement and work will be eased from May 1, and will be progressively reduced or increased according to calculations based on rates of new infections balanced with economic imperatives.

We have no reason to think the rate of transmission would be any different from other countries once the lockdown is eased, and it may well be worse given the high rates of HIV and TB. We have thus far had too few cases of Covid-19 in HIV or TB patients to know how the two interact. Similarly, with only 79 deaths, and almost none in HIV or TB patients, we do not know how this will impact on the CFRs.

We can only hope that the six-week delay in the exponential rise of cases will have been enough to increase testing and field hospital capacity, the supply of protective equipment, and the inculcation of social distancing habits and lifestyle to hold the epidemic from its worst-case forecasts.

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