BACK TO BASICS: UNDERSTANDING THE NUMBERS BEHIND COVID-19

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INTRODUCTION

15 March 2020, South Africa's President Cyril Ramaphosa declared a National State of Disaster, invoking emergency measures to curb the spread of COVID-19. Travel bans from high-risk countries, closing of air-traffic, closing of land ports, and banning of gatherings of more than 100 people were enforced[1]. A day earlier, 114 South African citizens were repatriated from Wuhan, the epicentre of the COVID-19 outbreak, and placed in quarantine at a Government facility in Limpopo[1]. On 23 March 2020, President Cyril Ramaphosa announced that South Africa will enter an initial 21 day lockdown beginning on 27 March 2020, and on 9 April 2020 this was extended by another 14 days[1]. The swift and comprehensive action taken by the South African Government was highly commended by the World Health Organisation (WHO)[2].

The first death in South Africa due to COVID-19 was recorded on 27 March 2020, and by 10 April 2020, the number of individuals testing positive for COVID-19 surpassed 2000[1]. Despite the commendations by the WHO, the near-real time and 24 hour delayed information communication on dashboards, what did this information indicate for individuals and organisations? How was South African performing in comparison to other countries? How could individuals make sense from all this information?

ORGANISATIONAL CONCERNS AND BEYOND

The COVID-19 pandemic had forced many organisations to reflect on their organisational strategies, and to some extent display agility in the ability to pivot in the short to medium term. The decisions that were being made during this period would determine the future of organisations. However for decision-makers of organisations, they could only deal with what they knew, and an incomplete understanding of COVID-19 could have had dire consequences. The COVID-19 pandemic was not an impossible occurrence rather improbable, and that improbable occurrences may have dire consequences on even the most successful organisations[3]. This was evident in more recent history of the 2008/2009 global financial crisis.

Lockdown in the context of South Africa's government response is an emergency protocol which required South Africans to stay at home except for essential purposes, such as purchasing of groceries, collection of social grant payments and visiting healthcare facilities, while all non-essential activities were suspended.

Beyond the organisational concerns, COVID-19 was becoming front and centre of attention of almost every person on earth, grappling to understand what this meant for them and what information on the spread of the virus indicated. The virus was spreading at an exponential rate[4], countries were locking-down, death rates were increasing, stimulus packages by governments were being implemented and global stocks were in rapid decline among many more problems.

Much of the information that individuals were consuming were displayed on seemingly intuitive dashboards in near-real-time or on a 24-hour delay (Exhibit 1,2,3), and often widely debated on social media channels, WhatsApp groups, and dinner table discussions. Despite the real-time nature of the information being presented, differences in numbers of total confirmed cases were evident, with the confirmed cases an indicator of those individuals that were infected with COVID-19, testing positive. Debates on the number of individuals tested was being debated, and the correct proportion of testing, yet what was apparent is the lack of debates centered on the accuracy of the tests, with no consistency in the medical literature[4] either, over and above an interrogation of the what was being presented.

There was no robust debate on the sensitivity and specificity of the tests. But was it realistic to expect non-technically orientated individuals to engage in this? Or was it the role of those explaining the results to ensure clarity? Individuals were relying on accurate information and consequences of these to be clearly communicated. Regardless of the technical nature of some of the questions, the dilemma was that individuals were consuming this information in any form and through any channel presented to them. In many cases individuals were creating linkages to impact on their personal lives and the economy, and debating decisions of the government on the timing of the lockdown and length of the lockdown.

Individuals employed by organisations were concerned about the impact of COVID-19 on their health and broader organisational decisions taken as a consequence of the pandemic – "how will I support my family with no income", "How will I repay my loans" among many others. The wide spread effect of the COVID-19 pandemic clearly indicated how interconnected the relationships between various components were in any environment- an integrated system. The information was the starting point, and without interrogation of what it

meant, consumption of different data points and populist views on what the data indicated could have far reaching consequences for organisations and individuals alike.

Confusion in the interpretation of the information:

A key metric observed was the number of individuals infected, cumulatively the numbers globally continued to rise and no plateau in sight (exhibit 3). The exponential rise in the number of individuals would plateau as the number of new infections equalled the number of recoveries at some point in the future. Similarly, as the number of new infections continued to rise, the number of deaths globally continued to rise as well.

In South Africa, daily releases of the number of tests conducted, number of positive cases identified, the number of total recoveries, total deaths and number of new positive cases daily were being published by the National Department of Health across various communication channels such as Twitter. But what did this information communicated indicate? Citizens of countries globally were looking to their governments for explanations – but all governments knew, better information was needed to guide their decisions – whether this was to inform disease modelers or the enforcement of social distancing; and globally, there was no just no way to accurately know how many individuals have been infected by COVID-19, limited and differential testing policies globally resulted in failing to capture the infections by a factor of 1 or a factor of 100 or 300. There was uncertainty.

The prevalence rate could assist in understanding the spread of the virus, but this needed to be based on a random sample of a population and then have the ability to be repeated over a number of time intervals that were predetermined and regular[5]. But the reality was:
At present, the data did not exist, and when faced with uncertainty – the best may be to prepare for the worst. Was this the reason for some of the lock-down measures that various governments put in place? What was the evidence that these measures in any shape or form actually work? Some governments kept schools open[6] while others closed – would keeping schools open be catastrophic? There was just no data available to provide any insights.

Digging deeper: More confusion?

Numerous articles were being published in the popular press – all making forecasts. The South African Covid-19 Modelling consortium estimated the number of deaths in South Africa could be 40,000 by November 2020 as the best case, while up to 48,000 could

South African COVID-19 Modelling consortium: A group of scientists advising the South African government under the guidance of the National Institute of Communicable Diseases. These individuals collectively advised the South African government on the projections to inform policy. See Exhibit 4 for South African government users.

be the worst case[7]. One death due to the virus was always going to be one death too many. The number of confirmed cases was projected to grow from approximately 17,200 as at 19 May 2020 to approximately 30,000 by the end of May 2020. Could these projections be true, when dealing with large amounts of uncertainty (Exhibit 5). Was South Africa following any other countries virus growth rate and rates of change for new infections and death rates in the least? The data modelling provided by the South African Covid-19 Modelling consortium indicated the following in comparison to the rest of the world:

- Model forecasts for deaths approximately 18 times the world average death rate;
- South Africa would account for 6% of the global deaths; and
- South Africa would account for 25% of the active cases despite only having approximately 0,75% of the world's population.

The only way to start making sense was to go back to basics.

BACK TO BASICS

To make sense of the barrage of information being presented, analysing the raw data may allow for better sense-making - moving away from the noise that has been created by the bombardment of information through various channels and forms. Raw data on COVID-19 was publicly available from various agencies, one such being the European Union Open Data Portal (EU ODP). Going back to basics required a sequential approach, specifically when dealing with publicly available data:

1. Establish credibility of the data-source;
2. Understand the measurement scale;
3. Generate descriptive statistics;
4. Conduct inferential analysis; and
5. Report

COUNTRY COMPARSIONS:

To understand if indeed the actions by the South African government were effective, a country comparison would be needed. Looking even at a single metric such as number of positive cases may assist in gaining some insights for individuals as well as organisations. However, *comparability,* would be required between countries.

Countries are different by market structure, government, and population structure among other attributes, however in the absence of all factors being equal, leveraging a broad definition of emerging markets to understand if there were differences between the number of COVID-19 positive was a good start. Then leveraging the known population sizes allowed for the calculation of the number of positive cases per million, doing this allowed for more robust comparability.

CONCLUSION

COVID-19 was a pandemic that had gripped the world. Everyone person was affected either directly or indirectly by the pandemic, and making sense of the information was central to individual sense-making as well as organisational decision-making. The barrage of information from various sources did not allow to understand what the information meant, or how successful South Africa's response was. Going back to basics with publicly available raw data allows for insight generation and understanding, but needs to be sequential.

Exhibit 1: Dashboard as at end October 2020 (Source: Authors Own)

Exhibit 2: Logarithmic graphs Dashboard as at end October 2020 (Source: Authors)

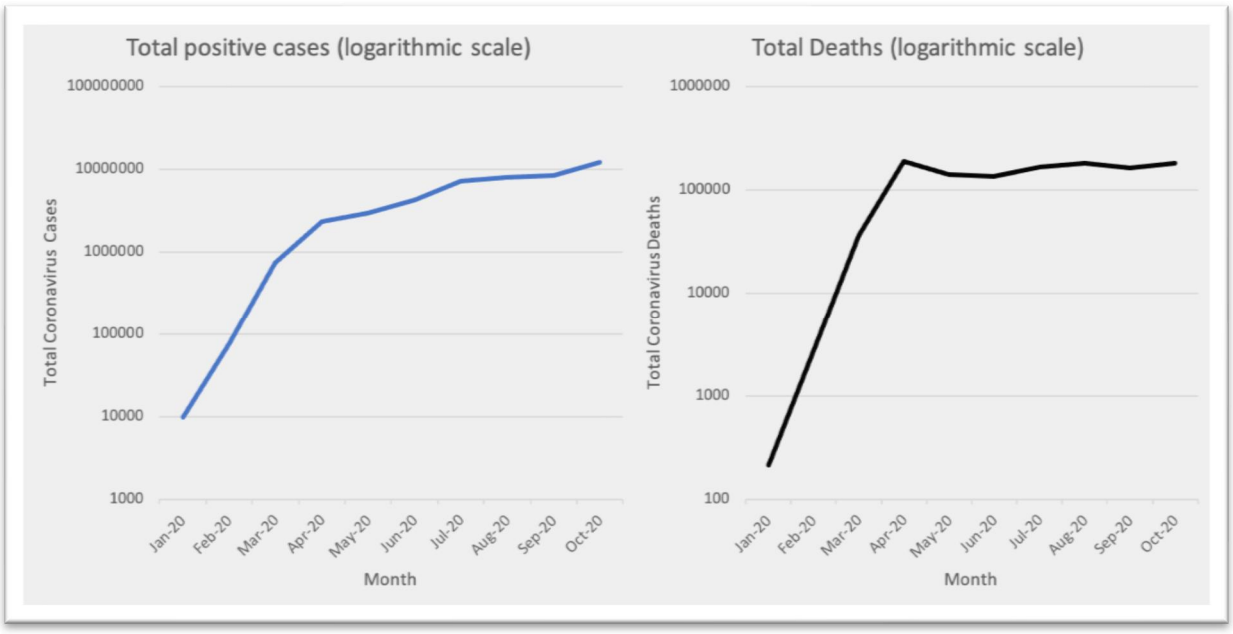


Exhibit 3: Dashboard as at end October 2020

Exhibit 4: South African Modelling consortium users of model outputs[7] (adapted from Silal et al., 2020).

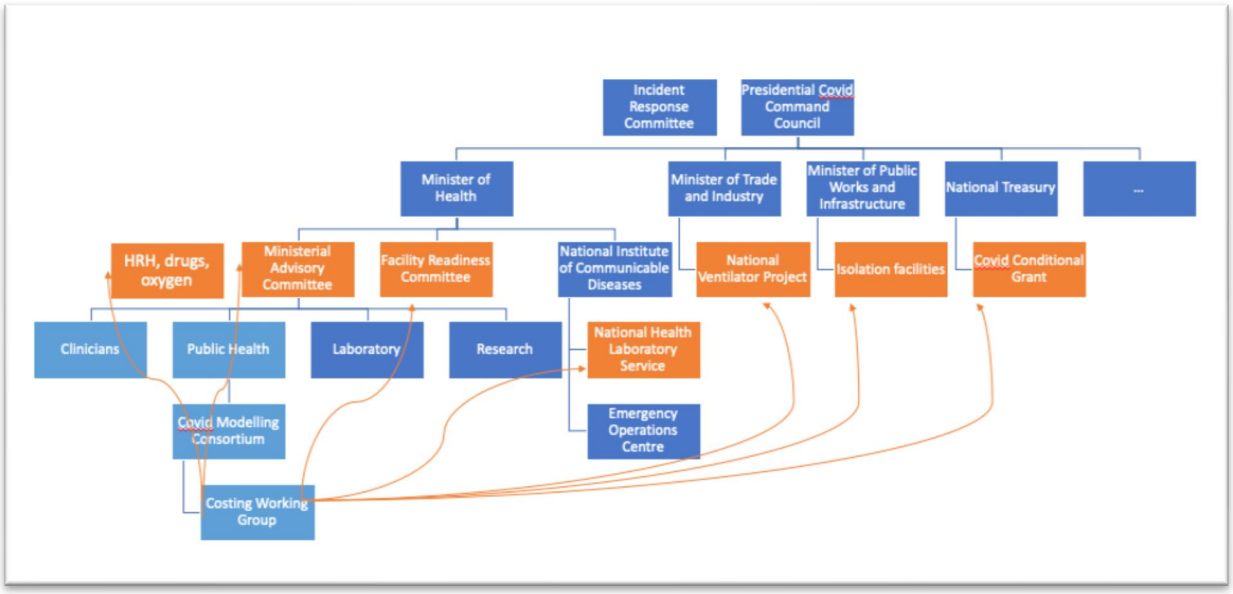


Exhibit 5: South African Modelling consortium Provincial projections[7] (adapted from Silal et al., 2020).

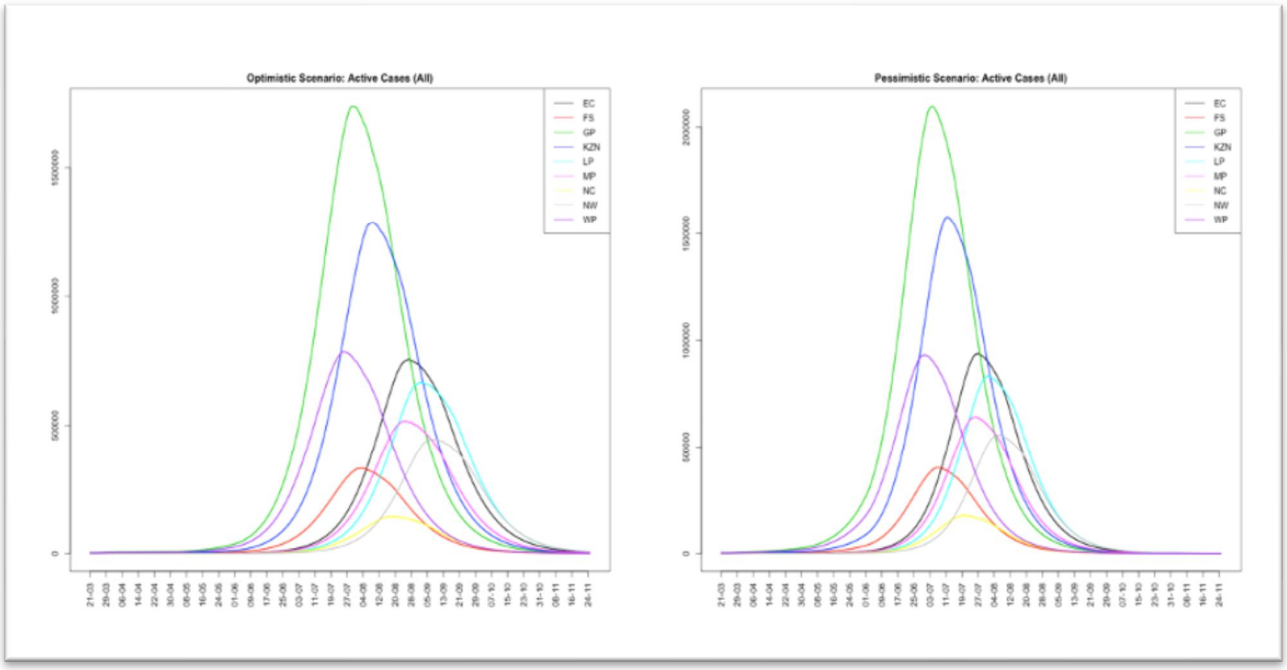


Exhibit 6: Number of positive tests in different states of the United States to November 9 2020

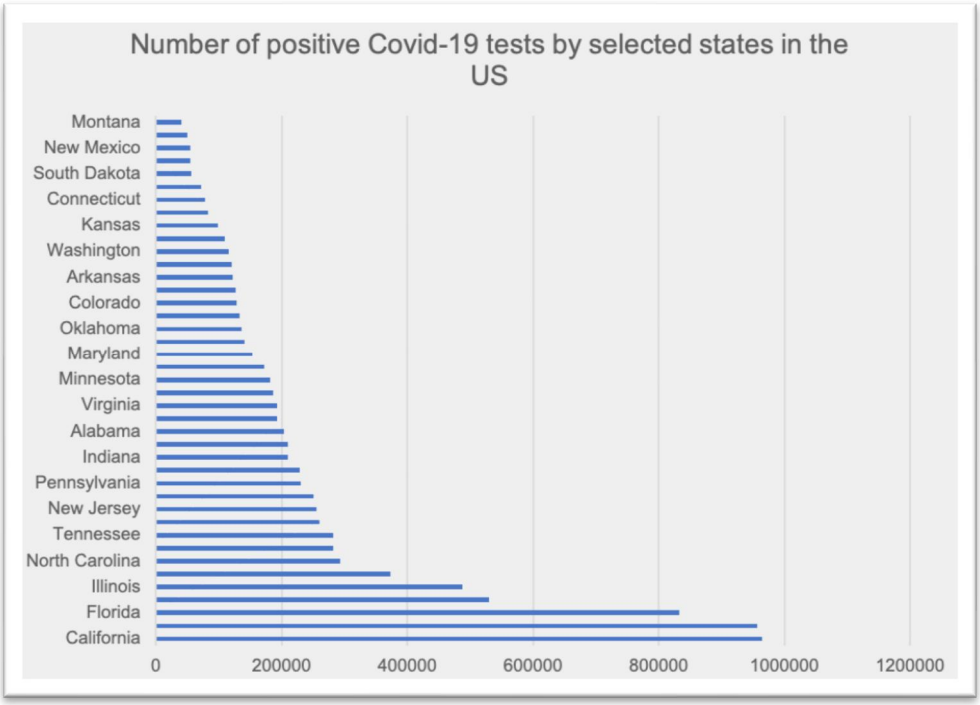


Exhibit 7: Number of positive tests and number of tests in different states of the United States to November 9 2020

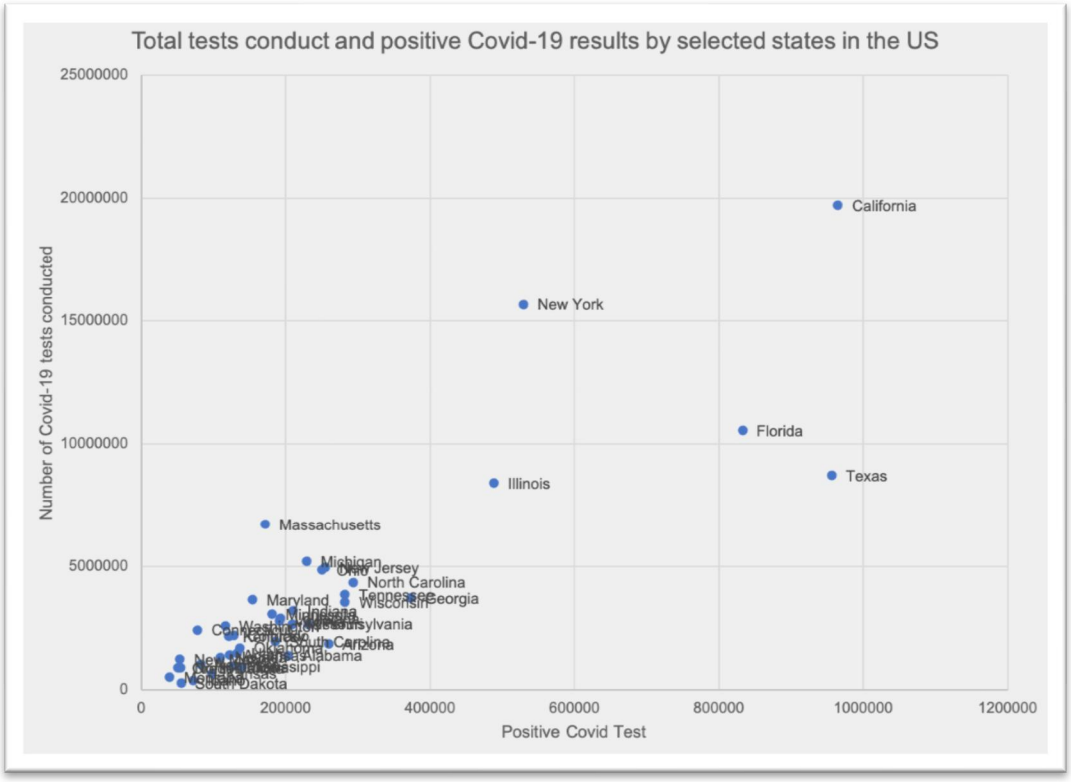
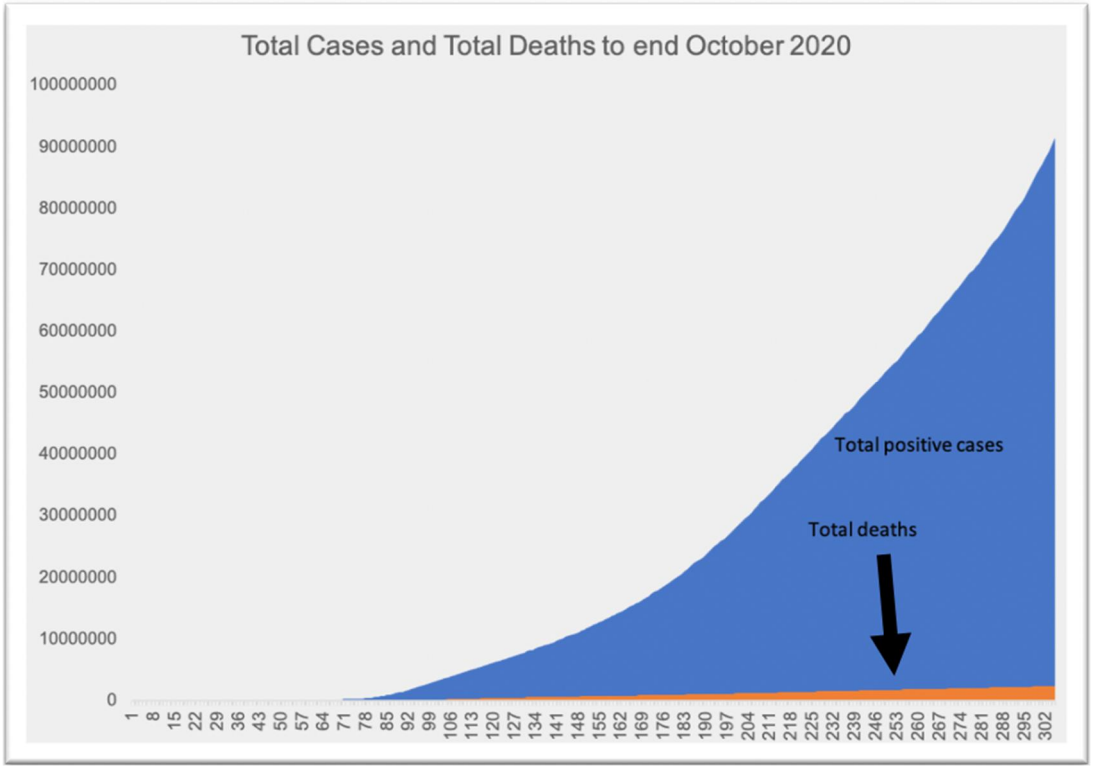


Exhibit 8: Total confirmed case and death globally to 30 October 2020



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