Publication: Daily Maverick
Date: Saturday, December 18, 2021
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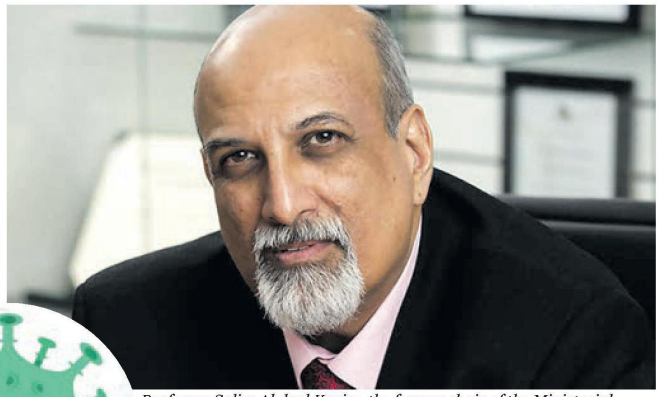
The virus hunters: tracking

South Africa's scientists are building on the knowledge they gained in their fight against HIV and

By **Estelle Ellis**

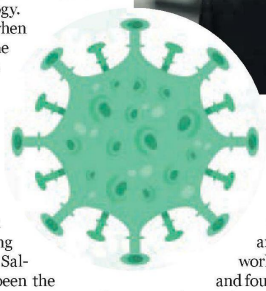
Professor Salim Abdool Karim



Professor Salim Abdool Karim, the former chair of the Ministerial Advisory Committee on Covid-19. *Photo: Dean Demos*

When Covid-19 hit South Africa it found a dedicated scientific front line of scientists who already knew how to find a virus and its variants, and figure out what its next move might be.

SA's ability to find viruses and their variants, and sequence their genomics, was built initially as part of LifeLab (now the Technology Innovation Agency) – with a lab in the Durban city centre funded by the Department of Science and Technology.



"This lab was struggling when Prof Tulio de Oliveira came along and he then set up sequencing capabilities in the Africa Centre but shortly thereafter created a separate unit, merged the LifeLab genomic sequencing platform into his unit and this led to the creation of the KwaZulu-Natal Research Innovation and Sequencing Platform (KRISP)," says Prof Salim Abdool Karim, who has been the chairperson of the steering committee of KRISP since its inception.

"KRISP was an instantaneous success largely because of Tulio's energy, drive and skill as a bioinformaticist. KRISP was created to provide genomic sequencing principally for HIV research – one of its most impactful studies was published in *The Lancet HIV*, which provided a rigorous analysis showing that age-disparate sex was principally driving the HIV epidemic in South Africa.

"KRISP sequenced thousands of HIV so that we could identify the clusters, i.e. people infected with the same or similar virus. We then analysed the clusters to work out who infected who and found that teenage girls were often in the same cluster as men in their early thirties, but there was also a woman in her early thirties in the cluster. Using genetic sequencing of HIV, we derived the 'Cycle of HIV Transmission'... In South Africa, breaking the cycle of HIV transmission is the number-one objective of our national Aids control plan... This study explained the age differential in HIV prevalence, i.e. why girls had such high rates of infection while boys had very low prevalence of HIV.

"A second major use of sequencing was to track HIV drug resistance – given that we have the largest ART (antiretroviral) programme, we need to monitor ART resistance and so virology labs across the country set up this capability.

> "The entire country's virology gene sequencing capabilities were built for HIV"

"These two major uses of gene sequencing in HIV is just an illustration of how HIV gene sequencing was being used to understand and track HIV. So, when SARS-CoV-2 came along, the same sequencing capabilities were put to use.

"Tulio started sequencing SARS-CoV-2 in April 2020 and would come to my office once a month or so to show me the monthly changes in the virus. It was quite amazing to see how stable this virus is – there would be just one or two mutations each month, until November when he found the Beta variant. The entire country's virology gene sequencing capabilities were built for HIV. Given the scale of HIV and its treatment programme in SA, we needed quite substantial viral sequencing capability.

"Incidentally, the first person to do HIV sequencing in South Africa was Prof Carolyn Williamson – she published a study in the 1990s in *The Lancet* showing the HIV epidemic in gay men in SA was completely different from the HIV epidemic in the heterosexual population in SA as the viruses in each of these epidemics was a different subtype," he said. **DM168**

Dr Waasila Jassat

Every hospitalisation, intensive and high care admission and death because of the Covid-19 pandemic crosses the desk of Dr Waasila Jassat. She sees all of them. And she tries to make sense of it all.

While her colleagues are hunting for the shape-shifting, mutating Sars-CoV-2 virus, she looks for and at its victims. Every day. For the past 18 months.

As South Africans became hungry for information on the impact of the new Omicron variant she was the one who appeared on screens around the country and the world, calmly explaining, detailing. Cool, calm, composed.

Jassat studied medicine at the University of the Witwatersrand and graduated in 2000. "I had always been interested in public health, as a student and a young intern. After a stint working in the United Kingdom, I returned to SA and enrolled at Wits, and achieved a Public Health Medicine Specialist qualification and MMed (Community Health) in 2010.

"I am currently completing my PhD with the University of the Western Cape, and hope to graduate next year. My PhD focuses on the gap between health policy and its implementation, using the drug-resistant TB Decentralisation policy as a case study.

"When the first cases were reported in SA, I was concerned about our national Covid-19 response, particularly hospital preparedness, given what we were seeing in the media from other countries. There were images and stories of hospitals being overwhelmed and healthcare workers experiencing immense pressure. I spoke to my PhD supervisor, Prof Helen Schneider, about taking some time off from writing my thesis, and volunteering at the National Institute for Communicable Diseases (NICD). She understood that it was important to me to make a contribution and not stand on the sidelines in the midst of a global pandemic. I contacted my long-time mentor Prof Lucille Blumberg and offered to help. I arrived on 26 March 2020 and was immediately put to work, to help to realise Prof Blumberg's vision of a hospital surveillance system. I was offered a position at NICD and have been here ever since.

"I was part of a small team that developed the Datcov Covid-19 hospital surveillance system in late March 2020. We managed to initially get a few public hospitals to submit data to the system, then all private hospital groups and the Western Cape government came on board. Within a few months, the National Department of Health adopted Datcov as the national hospital surveillance system for Covid-19 and we worked hard to get all hospitals to submit data by October 2020.

Dr Waasila Jassat. *Photo: Supplied*

"We also obtained funding for additional studies, including the Long Covid study...

"I lead a small, dedicated, passionate team including data analysts and epidemiologists, and we monitor hospital trends and provide insights and reports to senior leaders of our national and provincial Covid-19 response. We have also collaborated with local researchers to do additional analyses and modelling; and with international organisations including the World Health Organization...

"In the very early days of setting up Datcov, my team and I would reflect on each life lost as it came across our daily data submissions. It's so easy to just dive into numbers and statistics, and forget the human cost. We tried to always be conscious of what our data meant. What motivated us was that we had the opportunity to contribute to the country's understanding of this disease.

"I also don't believe in doing research and surveillance just for the purpose of publishing reports and papers. As Prof Blumberg always says: 'It's about true impact not impact factor [of a journal]'. I make sure that I take every opportunity to share data, reports and insights with the national and provincial departments of health, and through the print and news media with the public. I am most interested in what the data mean for people out there and how they can inform their decision-making.

"I have found it becoming increasingly difficult to manage the surveillance on the one hand, but at the same time to experience the

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