

Publication: Daily Maverick - SpecialReport

Reach:
25000

Title: The virus hunters: tracking Scandals that blew up in 2021 have led the SAPS to a crossroads: it now either gets cleaned up, or the country sinks further into lawlessness

AVE:R
354723.36

Publish date: 18 Dec 2021

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Page: 14



The virus hunters: tracking

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

Professor Salim Abdool Karim

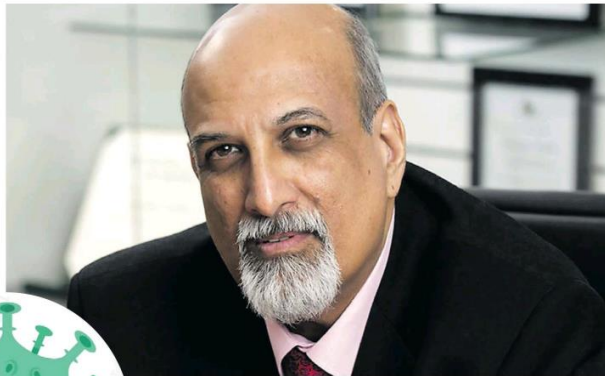
When Covid-19 hit South Africa it found a dedicated scientific front line of scientists who already knew how to find a virus and its variants, and figure out what its next move might be.

SA's ability to find viruses and their variants, and sequence their genomes, 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.

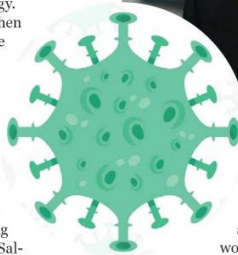
"This lab was struggling when Prof Tulio de Oliveira came along and he then set up sequencing capabilities in the Africa Centre but shortly thereafter created a separate unit, merged the Life-Lab genomic sequencing platform into his unit and this led to the creation of the KwaZulu-Natal Research Innovation 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



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



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”



By Estelle Ellis

"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 DatoCov 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 DatoCov as the national hospital surveillance sys-



Dr Waasila Jassat. Photo: Supplied

tem for Covid-19 and we worked hard to get all hospitals to submit data by October 2020.

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

"I lead a small, dedicated, passionate team including data analysts and epidemi-

ologists, 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 DatoCov, 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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429459.98

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down the universal enemy

are today keeping a sharp eye and keen mind on SARS-CoV-2 and its evolving variants

Dr Michelle Groome

As head of the Division of Public Health Surveillance and Response (DHPSR) of the National Institute for Communicable Diseases (NICD) Dr Michelle Groome and her team follow the footprints of the rapidly spreading SARS-CoV-2 virus – an enemy that they no longer think will go away anytime soon.

“While it may be exciting from a viral evolution point of view, at this point, I think most scientists have worked tirelessly over the past 20 months and would be happy for less excitement,” she said.

“However, we have seen the South Africa scientific communities draw closer and work more collaboratively than ever during the pandemic. This will assist with other public health challenges in the future,” she said.

“It is very unlikely that we will be able to eradicate this virus. As more people develop immunity, either from natural infection or following vaccination, or both, we should see lower levels of infections and especially severe disease like hospitalisation and death. We should slowly be able to get back to normal as the virus continues to circulate among an increasingly protected population.

“I must admit that, very early on, I was not very concerned, as the disease seemed to have limited distribution and didn’t cause as severe disease as the original SARS virus. But it soon became apparent that we were dealing with a totally different virus, one that could spread asymptotically, and while it only caused severe disease in a relatively small proportion of people, this had the potential to overwhelm our health systems.

“Seeing events unfold in European countries with better-equipped health systems



Head of the Division of Public Health Surveillance and Response, Dr Michelle Groome.

was alarming, and I soon realised just how much our country may be impacted once it reached our shores... Little did we know that, 20 months later, we would be battling a fourth wave of infections caused by yet another variant...

“Experiencing a pandemic unfolding firsthand is definitely interesting from a scientific, clinical and epidemiological point of view. But each and every person has felt the impact of this pandemic on a personal level... It is great to be able to use science to answer pertinent questions about Covid-19 and use trusted public health interventions like vaccination to limit the impact of the virus...

“We had hoped for a longer respite before seeing another surge in cases, but the SARS-CoV-2 virus has proved to be very good at refining itself and the Omicron variant seems

“Vaccination is one of the most effective and cost-effective public health prevention measures we have”

to be both more transmissible and able to evade some of our immune responses.

“The pressure for information has been particularly intense for this fourth wave, as the rest of the world is looking to us for early answers. It has been important to highlight what we know and what we don’t yet know both to the scientific communities and the public...”

In Groome and her team the virus certainly has some formidable opposition.

“I lead a wonderful team, composed of health professionals, epidemiologists, data and administrative staff.

“At the heart of the DHPSR is the notifiable medical conditions surveillance system, through which we monitor conditions of public health importance... We work closely with the disease-specific Centres at the NICD and provide expert advice to the National Department of Health and to the public concerning communicable diseases.

“I studied medicine (MBBCh) at the University of the Witwatersrand, graduating cum laude in 1997. I completed my internship and community service here in Johannes-

burg and then spent a few years in general private practice.

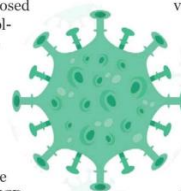
“I joined a research unit based at Chris Hani Baragwanath Academic Hospital in 2005, where I was involved in clinical vaccine trials as well as epidemiological studies on vaccine preventable diseases...”

“I completed a Master of Science in medicine (MSc Med) in the field of epidemiology and biostatistics in 2010 and began focusing on diarrhoeal diseases, especially rotavirus... I led a South Africa study which assessed the effectiveness of the rotavirus vaccine which was introduced into our childhood vaccination programme in 2009. I obtained my PhD in public health in 2016, from Wits university, which focused on rotavirus vaccination and the factors affecting how well the vaccine worked... After more than 15 years in clinical vaccine research with a public health focus, I moved to the NICD in Jan 2021 to head the DHPSR.

“Vaccination is one of the most effective and cost-effective public health prevention measures we have... Any

potential side effects of vaccines are generally very mild compared to getting the actual disease and we can protect both ourselves and those around us by being vaccinated.

“The amount of misinformation easily available on the internet and via social media is astounding. It takes a lot of time to address the inaccuracies and provide correct, reliable information but it is important to dispel the myths. Most people, once given the opportunity to hear the science explained, e.g. how vaccines work, are able to make more informed choices,” she said. **DM168**



epidemic along with everyone else, having lost people we knew or observed a rise in deaths during the waves. I must admit that I have ... cried more than a few times.

“The past few weeks have been hugely stressful for me and my team and all at the NICD. More than the previous waves, there was unprecedented spotlight and scrutiny on our surveillance data as the whole world wanted to understand how transmissible and virulent Omicron was. Is it associated with significant immune escape? We have had countless requests for data, for insights, for interviews, from every corner of the world. I am proud that we kept our heads down, kept doing what we have been doing for over 20 months now, and produced the data, presented at media briefings, and shared what we were seeing with the media and the public.

“I feel proud to be working alongside amazing scientists who should be credited for their excellent work in identifying the variant, studying its characteristics and reporting on the trends in infections and hospitalisations.

“I personally see it as a responsibility to report facts and data, to be measured in our messaging so as not to create alarm, but to also not withhold important trends. It is easy to create graphs and tables, but more difficult to tell people what this means and

“We can’t still be saying ‘It’s just a cold’ and going about our lives as usual. This is dangerous”

how it might affect us. Translating data for action is an area close to my heart,” she said.

“Covid-19 vaccinations have been proven to work and prevent severe disease. Covid-19 vaccinations are safe. The only way we can emerge from this pandemic is to ensure everyone vaccinates.

“Recently I have heard someone talk about Singapore being a ‘Covid-resilient’ country. I quite liked this term and it echoed what we have been discussing at the NICD and with our partners. How do we move beyond the pandemic towards a world where Covid is endemic, where we learn to live with it, so that it no longer has huge consequences on our health system, our economy and on our social lives?”

“I think everyone needs to bear personal responsibility for their actions, because we

are interconnected and our decisions affect those around us. I try to emphasise some important messages in all public engagements: if you have symptoms you should isolate and test and avoid spreading infection to others. We can’t still be saying ‘It’s just a cold’ and going about our lives as usual. This is dangerous and risks infecting others, especially older people who are more vulnerable to severe disease.

“During a wave, you should avoid social gatherings, including attending places of worship, visiting family and friends. I know this is hard, but I would hate to be responsible for passing on the virus to someone else, and I wish to protect myself from being infected. It’s a small sacrifice for a few weeks of the wave,” she said.

“You should continue to wear masks consistently and correctly whenever you are out. I know we have all grown tired of them but they do offer some protection and it is likely they will be with us for a while.

“We should all get vaccinated, to protect ourselves from severe disease, and to protect those around us, especially those who can’t be vaccinated (young children) and those who have been vaccinated but may not mount a good immune response (those who are older, and

those with immunocompromised states). I believe in vaccine mandates, and if you choose not to be vaccinated, you should not be able to travel, attend events, visit restaurants, malls and movies, because you are a risk to others.

“Sometimes I read these anti-vaccination messages on social media with mild amusement, but at other times I get frustrated and even angry. It is not hard to fact check something you read. It is not hard to ask a medical professional who will have more evidence to share. But to re-post and forward misinformation and lies is not right and should be called out. You never know if sharing misinformation may be the reason

a person chooses not to vaccinate and then gets infected and succumbs to Covid-19. Sadly, I have seen and heard of this happening and it really upsets me. I took it upon myself to develop a very detailed presentation on Covid-19 vaccination to ... dispel some of the myths out there. I offer to do talks for work groups, school kids and families... I feel passionate about ensuring people have the right information before they make the decision about vaccination,” she said. **DM168**

