The virus hunters: tracking

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

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. Its ability to find viruses and their variants, and sequence their genetics, was built initially as part of LifeLab (now the Technology Innovation Agency) - 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 then he set up sequencing in the Africa Centre but short-lived. Then a separate unit, purified the LifeLab genomic sequencing platform in 2019. It was on this unit that led to the creation of the Khusela SARS-CoV-2 Research Innovation and Sequencing Platform (KRSIP), says Prof Salim Abdool Karim, who has been the chairperson of the steering committee for KRSIP since its inception.

KRSIP was an instantaneous success largely because of Tulio's energy, drive and skill as a virologist. KRSIP was created to provide genomic sequencing primarily 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.

KRSIP 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. 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 (anti-retroviral) programme, we need to monitor ART resistance and our virology labs across the country set up this capability.

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 virus sequencing capability.

"Incidentally, the first person to do HIV sequencing in South Africa was Prof Carryn 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. DM108

Dr Waasis Jassat

Every hospitalisation, intensive and high care admission and death because of the Covid-19 pandemic crosses the desk of Dr Waasim 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. Everyday. For the past 18 months.

As South Africans became hungry for information on the impact of the new Omicron variant on 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 2002. "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 worked 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 Schuster, about taking some time off from writing my thesis, and volunteering at the National Institute for Communicable Diseases (NICD). I 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 she offered to help. I arrived on 26 March 2020 and was immediately put to work, to help realise Prof Blumbergs 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 Datou 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 Datou as the national hospital surveillance sys
**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

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**Dr Michelle Groome**

A 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 spilling SARS-CoV-2 virus – an enemy that they no longer think will go away any time soon.

"While it may be exiting 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." "However, we have seen the South African scientific communities close 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, we will see fewer infections 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 severe disease as the original SARS virus. But it is very concerning that severe disease is accumulating in different areas, one could spread asymptomatically, and while it only causes severe disease in a relatively small proportion of people, this had the potential to have global implications.

"Seeing events unfold in European countries with better-equipped health systems epidemic along with everyone else, having lost people we know or observed a rise in deaths during the waves. I must admit that I have..." said 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. It is associated with severe disease in 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 4 months now, and produced the data, presented at media briefings, and shared what we were seeing with the media and 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 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-outlined 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 waves,” she said.

"You should continue to wear masks consistently and correctly wherever you are out. I know we all have 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. We need to all 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 get vaccinated and then gets infected and succumbs to Covid-19. Sadly, I have seen and read of this happening and it really upsets me. I take 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