



SOUTH AFRICAN MEDICAL RESEARCH COUNCIL ANNUAL REPORT 2020 | 2021

RESILIENCE IN A TIME OF COVID-19



ANNUAL REPORT ²⁰²⁰/₂₀₂₁

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www.samrc.ac.za**OUR VALUES**

Pioneering



Partnering



Excellence



Respect



Integrity



Citizenship

OUR MANDATE

The mandate of the South African Medical Research Council (SAMRC), in terms of the MRC Act 58, 1991 (as amended), is to improve the health and quality of life of South Africans. This needs to be realised through research, development, and technology transfer.

WHO WE ARE

The SAMRC was established in 1969 and is dedicated to improving the health of people in South Africa, through, inter alia, research, innovation, development, and technology transfer. The scope of research includes laboratory investigations, clinical research, and public health studies.

We address South Africa's quadruple burden of disease: maternal, newborn and child health, HIV/AIDS and TB, non-communicable diseases, and interpersonal violence. Our work is to acquire evidence-based information to inform health policy and practice and improve the quality and health status of people in South Africa.

We are the largest local funder of health research and innovation, medical diagnostics, medical devices, and therapeutics. We support and develop pioneers in cutting edge medical innovations focusing on genomic research, the development of novel treatment regimens, vaccine development, diagnostic tools, and developing new drugs and devices.

Transformation remains an integral part of building sustainable health research capacity in South Africa, through Self-Initiated Research (SIR) grants, Mid-Career Scientist programme, the Bongani Mayosi National Health Scholars Programme, and other programmes and platforms, the SAMRC will continue to address gender, racial, institutional and geographic parity. As a custodian of health research, the SAMRC is building a healthy nation through research, innovation and transformation.

OUR VISION

Building a healthy nation through research, innovation and transformation.

OUR MISSION

To advance the nation's health and quality of life and address inequality by conducting and funding relevant and responsive health research, capacity development, innovation, and research translation.

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RESILIENCE IN
A TIME OF COVID-19

A NOTE FROM THE BOARD CHAIRPERSON

Resilience in a time of COVID-19

The World Health Organization declared SARS-CoV-2 infections as a Public Health Emergency of International Concern on the 31st January 2020. This was the exponential phase of the pandemic and with increasing outbreaks, we faced one of the greatest health challenges since the 1918 influenza pandemic, which infected over 500 million people and caused 50 million fatalities globally.

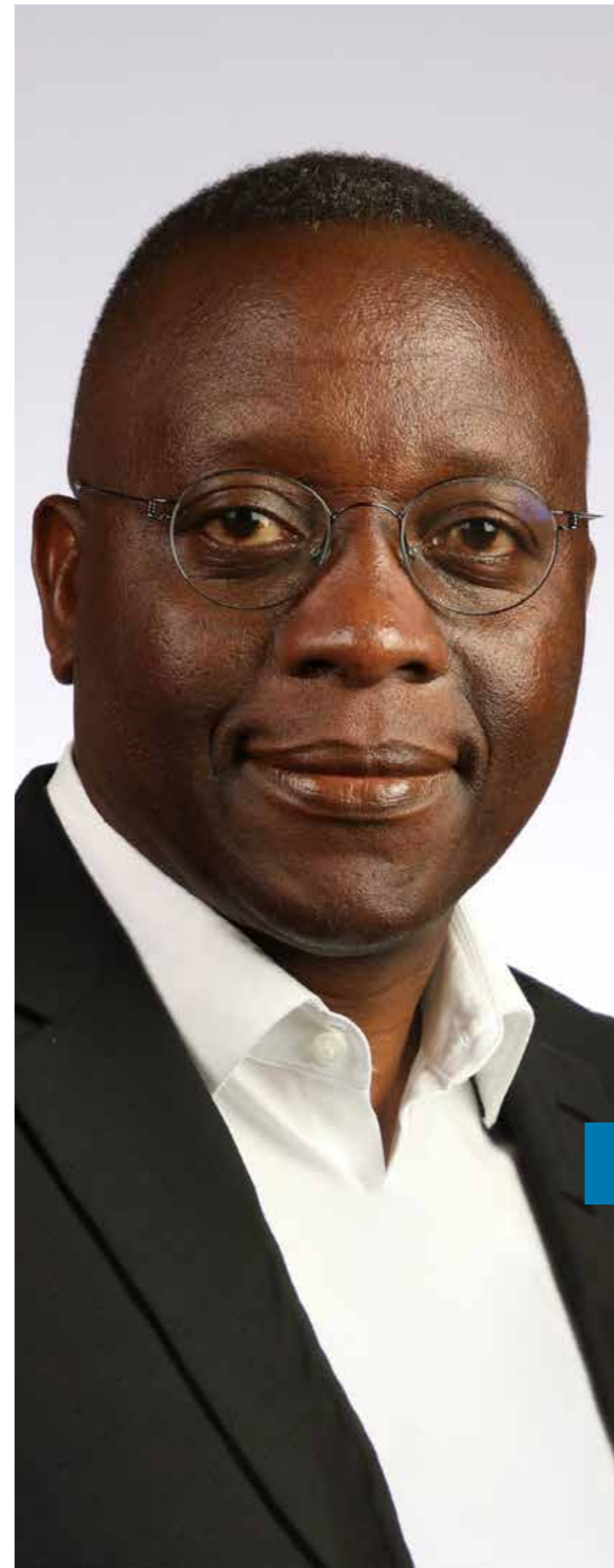
Since the advent of the SARS-CoV-2 pandemic, there has been tremendous international efforts to find multiple vaccine candidates to protect against infection and subsequent development of COVID-19 disease. The biggest vaccination campaign in history is underway with millions of doses around the world administered including in South Africa, where the SAMRC and its Centres of Excellence have been intensely involved.

The SAMRC has been responsive by leading research, innovation, and development with government, particularly the National Department of Health, public and private sector partners and academia, to find medical interventions and encourage socio-behavioural change on preventive measures against COVID-19.

I am pleased that amidst the challenges brought on by a new normal in how we operate, the SAMRC Board has continued to function efficiently even with shifting deadlines and priorities. A great deal of adaptability and understanding was required to ensure that the SAMRC can fulfill their mission of conducting excellent research, and deliver impactful health interventions, to support the National Department of Health specifically, and broadly health outcomes on the continent and globally.

As a public entity focused on research for health, the SAMRC's response is aligned to their Strategic Plan 2020/21 – 2024/25. It was an opportune moment with the SAMRC celebrating 50 years of existence to reimagine the organisation by developing a new Strategic Plan. This set the course to reflect on the past and craft a new direction to further strengthen health research impact and outcomes, including setting the national research agenda, attracting financial and human resources, training a diverse cadre of the next generation of researchers, and aligning research programmes and activities to the health priorities and needs of the country.

The Board commends the SAMRC President and CEO, Professor Glenda Gray who has remained one of the key people in South Africa's national response to the pandemic. Professor Gray was the Chair of the Research Committee of the Ministerial Advisory Committee on COVID-19 and has been instrumental in securing doses of the Johnson and Johnson single dose COVID-19 vaccine, to provide early access through the Sisonke research study to health care workers, as part of South Africa's three-phased National COVID-19 Vaccine Rollout Strategy.



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The reporting period has been a trying time and has tested our endurance and will to adapt while staying responsive to national health needs. The performance and achievements highlighted in this report would have not been possible without the support of our Board, the SAMRC Executive, our talented scientists, research support and field teams. We remain grateful to the National Department of Health for its trust in the SAMRC and the work that we do and the millions of South Africans who support the mission of the SAMRC.

Let's stay resilient!

A handwritten signature in black ink, appearing to read 'Johnny Mahlangu'.

Sincerely

PROFESSOR JOHNNY MAHLANGU
BOARD CHAIRPERSON

A NOTE FROM THE PRESIDENT AND CEO

A responsive science council focused on national health priorities

The 2020/21 reporting period attests to how the SAMRC provides leadership in medical research in South Africa, in support of the National Department of Health, and a vision of a healthy and long life for all South Africans.

Like other countries and territories, the country has been affected by the COVID-19 pandemic and the SAMRC has been responsive by leading research, innovation, and development with the support of government and partners in South Africa and globally.

Over R260M has been raised and allocated to more than 50 COVID-19 research and development projects, including 30 projects that are supported with Department of Science and Innovation (DSI) funds. The SAMRC, in partnership with the DSI and Technology Innovation Agency (TIA), is funding several COVID-19 diagnostic product development projects and has co-funded the participation of South Africa in vital global studies on COVID-19 treatment and prevention, including the Solidarity Trial, the CROWN Coronation study and several vaccine studies.

Since the start of the pandemic, the SAMRC has supported studies on COVID-19 surveillance and epidemiology that have laid the foundation for enhanced infection control practices in health care settings, contributed to community surveillance initiatives and improved understanding of the pandemic in South Africa.

Through the Sisonke Study, we have enabled government to make the Ad26.COVS COVID-19 vaccine (JnJ vaccine) immediately available to health care workers using a research programme. As part of Phase 1A of the vaccine programme, up to 480 000 health care workers were

vaccinated by May 2021. The call was also extended to other unvaccinated health personnel in anticipation of the third wave of infections. Phase 1B (post Sisonke phase), which includes all patient-facing workers in other health care facilities and establishments, also included vaccinees who were part of a sub study led by the SAMRC.

The SAMRC and DSI are supporting the spatial and genomic monitoring of COVID-19 cases by the Network for Genomics Surveillance in South Africa, which led the discovery and identification of the SARS-CoV-2 501Y.V2 variant. This has had policy and research implications for the globe, especially relating to vaccine development. This work has also set an international precedent in COVID-19 Genomic Surveillance and NGS-SA has extended its services to assist the African CDC to understand the continental outbreak.

Given the significant implications of the SARS-CoV-2 501Y.V2 and other variants, the SAMRC and DSI have invested more than R40M in a portfolio of research projects aimed at uncovering the dynamics behind and impact of this viral variant dominating the South African COVID-19 pandemic. The investment will help us understand the transmissibility of the new viral variant, the clinical severity of disease and the susceptibility of vaccinated individuals to this and other variants. Furthermore, we have tailored our screening methods to identify and diagnose patients infected with the new variant, as well as looking at host genetic variation of African populations in relation to COVID-19 susceptibility.

As the country's medical research council, it is our fiduciary responsibility to ensure that we dedicate most of our financial resources towards core research. During the reporting period, the SAMRC stayed within our 20% target for administrative costs, and the total travel budget was reduced by R10 million. This is against a backdrop of 8 clean audits out of the last 9, including 2020/21.



The pandemic has been a challenge in how we operate but it has required that we remain nimble, along with the challenges it did present opportunities. The SAMRC established a wastewater-based early warning system for COVID-19 in various parts of the country. Tracking of wastewater plays a key role in the development of early warning systems (EWS) for various enteric viruses. Since the start of the COVID-19 pandemic, SARS-CoV-2 RNA has been successfully isolated and quantified in the wastewater of a growing number of countries. The EWS although currently focused on COVID-19, has broader application to develop an early warning system for diseases such as Hepatitis A, measles, and Norovirus.

As the pandemic continued to advance across the globe, the SAMRC has been part of efforts to find multiple vaccine candidates against infection, and today the world is engaged in one of the biggest vaccination campaigns in history. Even if early results have found some vaccines to be safe and effective, continuing to conduct trials may bring further benefits for society. The SAMRC and DSI provided R10 million funding into the first South African Covid-19 vaccine trial, the South African Ox1Cov-19 Vaccine VIDA Trial that was announced in June 2020. We are supporting the ChampAd vaccine study in South Africa, and working with HIV Vaccine Trials Network for extension of COVID-19 vaccines into the country.

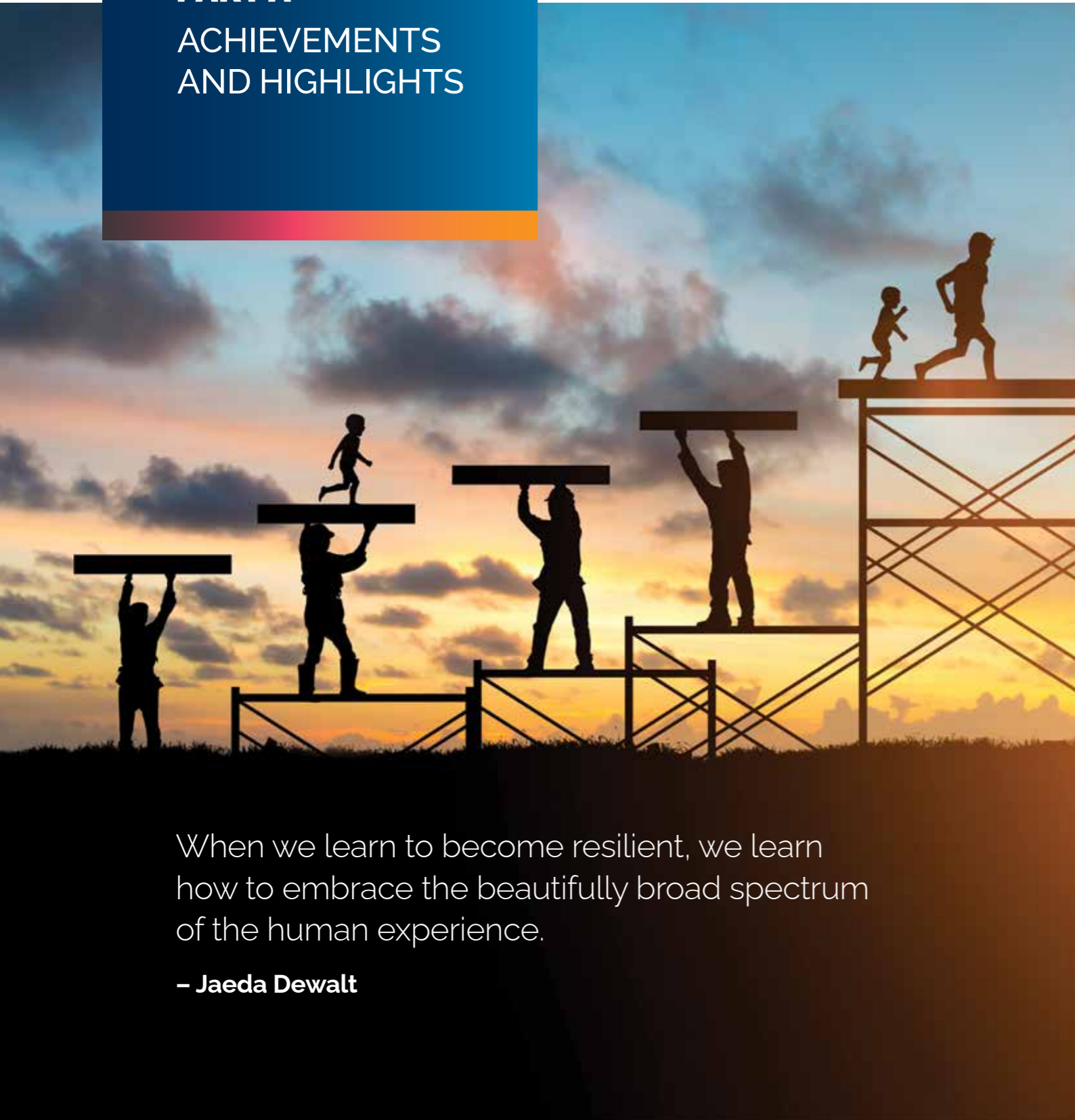
Evidently, it was our steadfast focus on key strategic pillars, which guided our teams of scientists and support staff to help us in enabling the Department of Health, to deliver on their commitment and promise of a long and healthy life for all South Africans. I would like to express gratitude to the SAMRC Board, the Executive team, scientists, research support, field workers, and the many South Africans who have entrusted us with this important task.

We remain resolute in our commitment!

A handwritten signature in black ink, appearing to be 'G. Gray', written over a white background.

PROFESSOR GLENDA E GRAY
PRESIDENT & CEO: SAMRC

PART A ACHIEVEMENTS AND HIGHLIGHTS



When we learn to become resilient, we learn how to embrace the beautifully broad spectrum of the human experience.

– Jaeda Dewalt

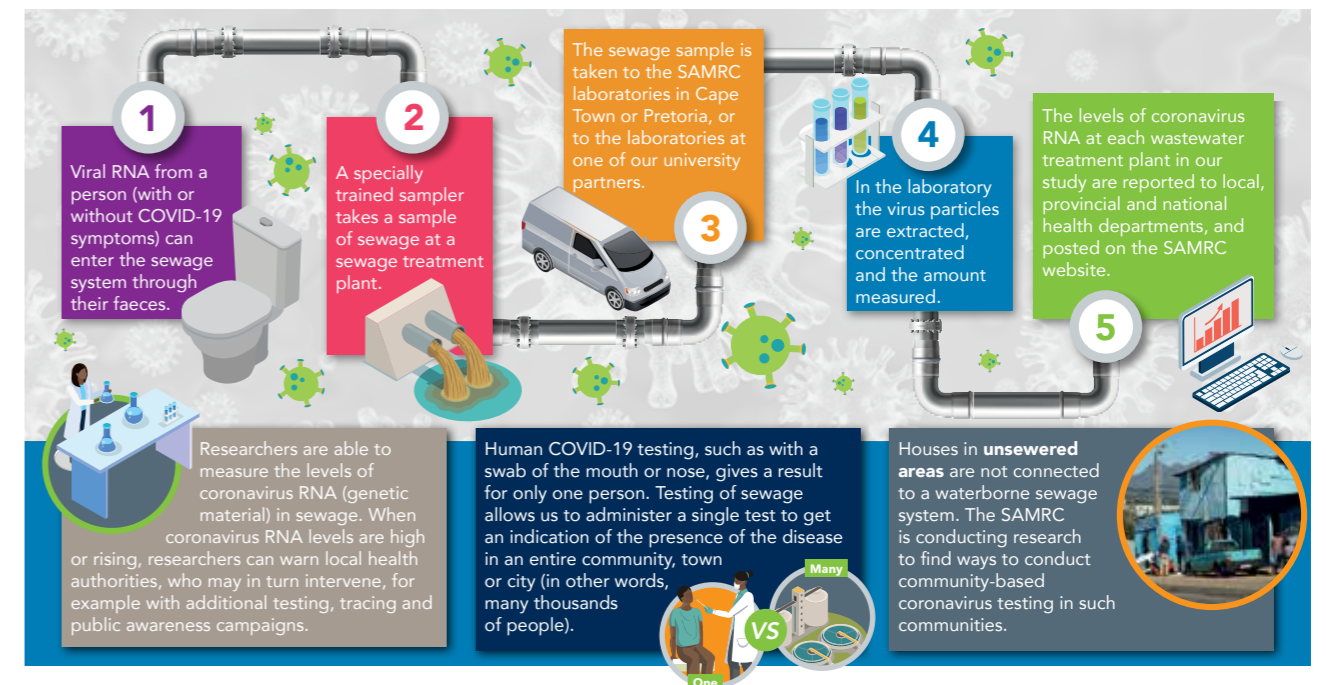
WASTEWATER SURVEILLANCE FOR SARS-CoV-2

At the start of the COVID-19 pandemic wastewater scientists discovered that they could detect the RNA (the genetic material called ribonucleic acid) from SARS-CoV-2 in wastewater around one to two weeks before increases in cases of COVID-19 were usually revealed through community testing. Recognising a timely and valuable opportunity for a possible wastewater-based early warning system for COVID-19, the SAMRC initiated a wastewater surveillance programme in May 2020, as one of a suite of research interventions to combat COVID-19. Within a month of conception, the SAMRC wastewater surveillance

programme established and validated a real-time quantitative polymerase chain reaction (RT-qPCR) method able to detect and quantify SARS-CoV-2 viral loads in South African wastewater. The SAMRC wastewater surveillance system is now operational in four provinces and provides valuable lead time in which local health authorities may implement campaigns encouraging the public to become more stringent about wearing masks, physical distancing, avoidance of gatherings and optimal hand hygiene, as well as prepare facilities for a possible risk in COVID-19 cases.

THE ROLE OF THE SAMRC IN THE DETECTION OF CORONAVIRUS RNA IN SEWAGE

(an early warning system for COVID-19 infections)



Since May 2020, the SAMRC wastewater surveillance project has rapidly grown to currently include more than 60 sample collection sites in the Eastern Cape, Gauteng, Limpopo, and Western Cape provinces. Samples are collected at all participating wastewater treatment plants on Monday mornings and delivered to the SAMRC and partner university analytical laboratories by midday for

RNA extraction. After analysis by real-time quantitative polymerase chain reaction (RT-qPCR) and quality control checks, results are distributed to health departments on Wednesdays and also posted on the dedicated SAMRC SARS-CoV-2 Wastewater Surveillance Dashboard in the form of graphs and maps.



Wastewater Treatment Plant

GENOMICS

To investigate the evolution of the SARS-CoV-2 strains in wastewater samples from various wastewater treatment plants from across the Western Cape, we are using whole genome sequencing. The Genomics Centre receives quality-checked wastewater samples RNA samples from the SAMRC's Biomedical Research and Innovation Platform. Of the 129 samples received, 126 passed further quality control checks and are currently undergoing an enrichment process using an MGI-Tech enrichment kit (AtopPlex™), prior to sequencing.

HIGHLIGHTS:

- More than 1400 wastewater samples analysed;
- Wastewater results provided to local health authorities, on a weekly basis;
- Correlations found between SARS-CoV-2 RNA levels in wastewater and local COVID-19 cases;
- Three papers published in peer-reviewed, scientific journals (others in preparation);
- Three historically disadvantaged institutions are key partners (University of Venda, University of Fort Hare and Sefako Makgatho Health Sciences University);
- The project has become an important vehicle for research capacity development.



SAMRC scientist collecting/extracting wastewater sample

- The SAMRC wastewater surveillance project is generating an increasingly rich dataset which scientists are able to analyse to help gain a deeper understanding of the patterns of SARS-CoV-2 RNA signals in urban and rural communities, as well as special locations such as public beaches, around the country.

funding agencies are critical to the success of the SAMRC wastewater surveillance project. To date more than 1400 samples have been analysed, and health authorities are kept abreast of results, with the aid of a dedicated, publicly available SAMRC Wastewater Surveillance Dashboard.

Multiple partners, sectors, and disciplines, as well as

SAMRC WASTEWATER SURVEILLANCE PARTNERS AND FUNDERS

ANALYTICAL LABORATORY PARTNERS	COORDINATION & ANALYSIS	MUNICIPAL PARTNERS	ACADEMIC PARTNERS	KEY FUNDING INSTITUTIONS
<ul style="list-style-type: none"> • SAMRC Biomedical Research & Innovation Platform (National reference laboratory) • University of Venda • University of Fort Hare • Sefako Makgatho Health Sciences University • Nelson Mandela University • SAMRC Genomics Centre • SAMRC Tuberculosis Platform 	<ul style="list-style-type: none"> • SAMRC Environment & Health Research Unit • SAMRC Biostatistics Research Unit 	<p>Eastern Cape</p> <ul style="list-style-type: none"> • Gqeberha • East London • Alice & surrounding villages <p>Gauteng</p> <ul style="list-style-type: none"> • City of Tshwane <p>Limpopo</p> <ul style="list-style-type: none"> • Selected towns in Vhembe District • Selected towns in Mopani District <p>Western Cape</p> <ul style="list-style-type: none"> • City of Cape Town • Towns in Breede Valley • Towns in Theewaterskloof 	<ul style="list-style-type: none"> • University of Stellenbosch • HIV Vaccine Trials Network • Fred Hutchinson Cancer Research Center (USA) • Bangor University (UK) • University of Bath (UK) • University of Nigeria • University of Lagos 	<ul style="list-style-type: none"> • South African Medical Research Council • Michael & Susan Dell Foundation • Solidarity Fund • Confédération Suisse • UK Research and Innovation

Five SAMRC Research Units and Platforms play key roles within the wastewater surveillance project.



Environment & Health Research Unit



Biomedical Research and Innovation Platform



Biostatistics Research Unit



Genomics Centre



Tuberculosis Platform

The SAMRC works to acquire the most accurate health information for evidence-based health care decision making, to inform policy and practice. Highlights include:

- SAMRC representation on the Ministerial Advisory Committee: Professor Glenda Gray, SAMRC President and CEO, Chair of Research Committee on COVID-19, bringing together scientific evidence and experience to the Minister of Health and the National Coronavirus Command Council. Prof Gray helped plan and shape the country's way out of the pandemic after her appointment to the Ministerial Advisory Committee. Its membership consisted of some of the most esteemed medical scientists in South Africa.
- SAMRC representation on the Ministerial Advisory Committee: Professor Jeffrey Mphahlele, SAMRC Vice President for Research, appointed by the Minister of Health to serve on its newly formed Ministerial Advisory Committee on Vaccines. Prof Mphahlele joined a group of eight other well-known scientists from across the country with vast expertise and experience in different aspects of public health.
- SAMRC representation on the Department of Science and Innovation Research and Innovation Committee.
- SAMRC part of the Solidarity Fund Technical Task Team.
- SAMRC key in the development of a National Strategic Plan on GBV and Femicide.

Membership of International Advisory

- Professor Charles Shey Wiysonge, Director of the SAMRC Cochrane SA Centre is a member of the African Scientific, Research and Innovation Council Advisory Board on COVID-19 (African Union), African Taskforce for Novel Coronavirus (Africa CDC), African Advisory Committee on Health Research and Development (WHO).

Regional Policy Support

Professor Arvin Bhana, Chief Specialist Scientist at the SAMRC Health Systems Research Unit, is part of a team assisting the KZN Provincial Directorate of Mental Health to develop specific mental health intervention elements targeted to Community Health care Workers who are part of the WOBOT teams, and frontline primary health care staff as well as ensuring mental health plans in the immediate, medium and long-term plans.

LINKAGES WITH GOVERNMENT

- Prepared slides for the Director General for Health Dr Sandile Buthelezi for Cabinet meeting on alcohol burden in South Africa (June 2020).
- Prepared memo for Department of Social Development on a road map for addressing alcohol and slides on alcohol use and harm for the National Coronavirus Command Council (June 2020).
- Supported MAC (and the National Coronavirus Command Council) through on modelling of trauma admissions that could be averted with a second alcohol sales ban in preparation of an advisory (July 2020).
- Presented to Health Portfolio Committee on alcohol/ COVID-19/trauma (July 2020).
- Submitted a written submission to RSA Parliament on 2020 Road Traffic Amendment Bill (Nov 2020).
- Support for National Department of Health, CoGta & Presidency in responding to legal action around alcohol: Cases with SAB, SA Agri Initiative, Chef's Warehouse (3 affidavits).
- Presenting to parliamentary committee on Road Traffic Amendment Bill (March 2021).
- Throughout lockdown the SAMRC has given inputs through phone conversations, media engagements, emails, written articles in Daily Maverick (x2), Business Day, Bhokisisa Health (x2), Tech Financials on how alcohol sales could be permitted after lifting the ban in a way that might reduce likelihood of undermining the COVID-19 responses and create a healthier way forward for alcohol in South Africa.

TOBACCO AND COVID-19

- Study on Newspaper reports on cigarette ban during COVID-19 lockdown (ongoing)
- Scoping review on smoking and COVID-19 (ongoing)
- Sent through preliminary data collected on Smoking and COVID-19 to Chair of COVID-19 Ministerial Advisory Committee
- Video response to Newzroom Afrika aired during The Pulse on why the ban on cigarette sale during the lockdown was necessary to protect South Africans
- Voice clip for SABC radio Smoking and COVID-19
- Presented at a webinar on Smoking and COVID-19: "The Science of Smoking and COVID-19"
- Affidavit prepared by Dr Egbe from the SAMRC's Alcohol, Tobacco and Other Drugs Research Unit

PROJECTS

- SAMRC and DSI have committed R1 million contributions for the SOLIDARITY and CORONATION trials. See below for details These are global WHO trials to test treatment regimens for Covid-19.
- SAMRC has dedicated R7.5M to support two projects working in a collaborative network seeking to provide national and international support for COVID-19 surveillance. The Lead Investigators are Tulio'd Olivera (KRISP/UKZN) and Simon Travers (Hyra BioSciences).
- Supporting the NHLS to develop local reagents and testing kits for PCR testing.
- We have assisted several local companies to optimize serological diagnostics kits.
- CROWN CORONATION: Chloroquine Repurposing to healthWorkers for Novel CORONAVIRUS mitigation: Trial This is an international, multi-site, randomised, double-blinded, placebo- controlled platform clinical trial undertaken in up to 200 sites internationally from USA, Canada, Ireland, UK, South Africa, Zambia, Malawi, Zimbabwe, Kenya, Uganda, Australia, New Zealand, to determine the effectiveness (and minimum effective dose schedule) of chloroquine/hydroxychloroquine prophylaxis in preventing symptomatic COVID-19 in healthcare workers with repeated exposures to SARS-CoV-2.
- SOLIDARITY Trial: The aim of this core protocol is to compare the effects on major outcomes in hospital of the local standard of care alone versus the local standard of care plus one of four alternative anti-viral agents. The primary objective of this large international randomised trial is to provide reliable estimates on any effects of these anti-viral treatments on in-hospital mortality in moderate and in severe COVID. It will include up to 15 sites in South Africa and is being driven and funded by the WHO.
- The Department of Science and Innovation (DSI), the South African Medical Research Council (SAMRC) and the Technology Innovation Agency (TIA), a DSI entity made seven funding awards to local companies, organisations and researchers in order to ramp up the country's ability to produce locally developed reagents and test kits for COVID-19.
- Investigating the link and impact of COVID-19 to GBV, mental health, and livelihoods amongst selected population groups.
- Sexual and Reproductive Health and Rights of Young Women in eThekweni.

- Proposed study on Femicide and child homicide and COVID-19 in South Africa.
- Community stakeholder knowledge, perceptions, beliefs, behavior and responses to COVID-19 in South Africa.
- Prevalence, clinical characteristics, immunologic responses, and outcomes of children with suspected or confirmed COVID-19.
- The impact of the COVID-19 lockdown on access to SRH services, interventions, and commodities.
- SAMRC and DSI-funded epidemiological study on COVID-19 transmission and natural history in KwaZulu-Natal.

SURGE TESTING SOLIDARITY FUND

- Award of R88M to conduct 158,678 tests
- 38,638 tests conducted from June 2020 in seven labs
- 96.7% of tests were conducted in TAT of 48 hours or less
- Surge testing largely ceased in September 2020, except for 1 week of testing by two labs in Jan 2021 – due to: Reduced overall demand for testing, lack of demand from NHLS (increased own capacity), Regulation 178: Department of Health revised minimum guidelines for COVID-19 testing – all labs had to undergo the registration and auditing process facilitated between NHLS and Department of Health – seven labs received approval but no higher education institutions (HDIs).
- SAMRC built infrastructure capacity at three HDIs (UniVEN; SMU; WSU) but they never conducted testing because of not receiving R178 approval. However, HDI funds used to fund additional research grants at Univen and WSU for COVID-related projects that will utilize the new infrastructure, including support for wastewater surveillance.
- March 2021 – Solidarity Fund reallocated the remaining funds at the SAMRC (R21.2M) + additional R28.8M from remaining allocation to Sisonke study – total R50M.

IMPACT

- Multiple SARS-CoV-2 epidemiological outbreak investigations undertaken, e.g. St Augustine's Hospital that laid the foundation for enhanced infection control practices in health care settings.
- Trained Community Health Care workers to undertake door-to-door SARS-CoV-2 education and screening and referral to hospitals or isolation facilities that was the basis for the National active case finding household survey.



- The Network for Genomics Surveillance in South Africa (Prof Tulio de Oliveira, KRISP) led the discovery and identification of the SARS-CoV-2 501Y.V2 variant, which has had far reaching policy and research implications for the globe, especially relating to vaccine design.
- The South African component of the ChAdOx1 SARS-CoV-2 vaccine trial (Astra Zeneca vaccine), led by Prof Shabir Madhi, showed the reduced efficacy of the vaccine on the local variants. This changed the country's immediate vaccine strategy, resulting in a move to the Johnson and Johnson vaccine and the design and implementation of the Sisonke study by the SAMRC.
- A project at the University of the Witwatersrand, led by Prof Bवेश Kana, has been instrumental in developing controls for the COVID testing platforms which allows for standardization of the assays. It has now been deployed in the SA healthcare system, as well as several African countries, through the NHLS
- South Africa participated in the global Solidarity Trial, with co-funding from SHIP, which demonstrated that the Remdesivir, Hydroxychloroquine, Lopinavir and Interferon regimens tested on a total of 11,266 adults had little or no effect on hospitalized COVID-19, as indicated by overall mortality, initiation of ventilation and duration of hospital stay
- The SAMRC, in partnership with the DSI and TIA, is funding several product development projects aimed at developing local reagents and/or kits for the gold standard COVID-19 diagnostics as well as novel, rapid, point-of-care tests for the presence of the virus. Several of these are applying for regulatory approval with SAHPRA.
- Hyrax is supporting the South African COVID-19 response through the deployment and utilisation of a SARS-CoV-2 sequence data solution within the Exatype platform, previously developed with SHIP funding. The platform was fully operational and launched within 3 months (<https://sars-cov-2.exatype.com>) and can support all versions of the ARTIC protocol. It is offered for free to any researcher and laboratory technician to remove the complexity and hands-on burden of analyzing NGS data.

VACCINE NATIONALISM

- Virtual conference on framework for fair, equitable and timely allocation of COVID-19 vaccines in Africa held.
- Received funding from Open Society Foundation for South Africa to look at equitable access to COVID-19 vaccines in the African Region.
- Established Bio-Ethics Advisory Panel.
- Working with the AU and Africa CDC.

DEVELOPMENT OF A NATIONAL STRATEGIC PLAN ON GENDER-BASED VIOLENCE AND FEMICIDE

On 1 August 2018 South African women marched to the Union Buildings under the banner of the #TotalShutdown movement to submit 24 demands to have the government acknowledge and address gender-based violence and femicide as national crises.

President Cyril Ramaphosa accepted the 24 demands document and subsequently called for the GBV and Femicide summit to take place on 1-2 November 2018. This kickstarted a collaborative preparatory process that involved relevant government departments, civil society organisations, intergovernmental organisations, development partners and research institutions including the Gender and Health Research Unit of the SAMRC (GHRU).

The GHRU was invited to initial meetings to develop the agenda and priorities of the summit, became part of the Prevention pillar task team and much of the GHRU's work contributed to the base document on GBV prevention. Prof Naeemah Abrahams also led the deliberations on Prevention at the Summit. A Declaration against Gender-Based Violence and Femicide was issued after the Summit, in which President Ramaphosa also committed the country to the development of a National Strategic Plan on Gender-Based Violence and Femicide and the establishment of a Gender Based Violence and Femicide Council.

The interim steering committee (ISC) was set up to coordinate the preliminary work to achieve the Declaration commitments prior to the establishment of the council. The ISC was hosted from the Office of President from January 2019 to April 2020, with two co-chairs, the Social Policy Advisor in the Presidency, Prof Olive Shisana, and the #TotalShutdown representative, Adv Brenda Madumise-Pajibo.

Membership was made up of government departments and civil society organisations, and a technical advisory team that included the GHRU represented by Dr Nwabisa Shai. The GHRU has made an indelible mark in the process of developing the NSP, promoting the use of science to inform the country's understanding of the extent of and drivers of GBV and femicide, and the evidence-based solutions needed for effective prevention and response programmes and services.

As a member of the Technical Advisory Team for the NSP, a few staff members of the GHRU, namely Prof Rachel Jewkes, Prof Abrahams, Dr Nwabisa Shai and Dr Bianca Dekel helped in different aspects of the NSP particularly the theory of change and co-drafting sections of the NSP. Prof Jewkes was also invited by the ISC to develop a R1.2 billion budget of the President's emergency response action plan announced in Parliament in September 2019. 30 April 2020 marked the launch of South Africa's first-ever National Strategic Plan to address and respond to GBV and femicide.

View the complete Gender-based Violence and Femicide National Strategic Plan: (<https://www.samrc.ac.za/sites/default/files/files/2020-05-11/NSPGenderBasedVF.pdf>)



THE ROLE OF THE 4IR AND WHAT THE SAMRC IS DOING

The Fourth Industrial Revolution (4IR) has been defined as technological developments that blur the lines between physical, digital and biological spheres, it integrates systems, Internet of Things (IoT), big data, Artificial Intelligence (AI) and robotics, among others.

The SAMRC as a responsive science council recognises the role of the 4IR and has been involved in a range of activities.

- Genome Mapping and Research.
- Technological advances for Diagnostics.
- Precision Medicine and Drug Safety.
- Drug Formulation and Discovery.
- Big Data and Bioinformatics.
- AI/machine learning
- Regulatory, legal, and ethical framework for gene editing.

SAMRC-BGI WHOLE GENOME SEQUENCING PLATFORM

There is an exponential increase in genomic projects and approximately R100M of SAMRC funded projects involve genomic sequencing at some stage.

There is a massive surge in BRICS country collaborations with the SAMRC in this area: SA-India; Grand Challenges – Africa, India, Brazil; BRICS – vaccine, TB; TB REPOrt – US, India, SA, Brazil; HELTI – Canada, China, India, SA; Trans border collaborations.

The SAMRC established a Genomic Centre and other Specialised Facilities, which is perfectly placed to be custodian of South African-related data health/disease and to integrate data towards improving health care of South Africans.

In July 2019, the SAMRC Genomics Centre officially opened its doors. During the first phase of our implementation strategy, the genomes of six individuals were sequenced to test our workflows. In 2020, through our collaboration with the KwaZulu-Natal Research and Innovation Platform (KRISP) we embarked on a pilot project to sequence the genomes of 120 individuals. This process allowed us to scale-up our workflows and to understand the complexities of providing an effective and efficient next generation sequencing service. Since the completion of this pilot project, the output at the Genomics Centre has increased

significantly. By word of mouth, media engagements and the publication of our first article (in January 2021), which detailed the quality of data generated at the Genomics Centre, the number of researchers using our services has significantly increased. During the reporting period, we sequenced 196 human genomes, 50 animal (African wild dog) genomes, 4 whole human Exomes, 362 transcriptomes and 10 whole genome methylomes, with several more sequencing projects still in the pipeline. The high demand for our services has led to the acquisition of additional equipment. A grant from the Michael and Susan Dell Foundation provided capital to purchase an MGI-Tech DNBSEQ-G50 sequencer which is capable of sequencing small genomes (viral and Bacterial) and two additional automated sample preparation systems, the MGI SP-960 and MGISP-100. In addition to this, the Genomics Centre also negotiated for the placement of another sequencer, the DNBSEQ-G400. This sequencer is capable of sequencing large genomes and transcripts. The acquisition of these instruments has increased our productivity and shortened turn-around-times for client projects. Additionally, it allowed the Genomics Centre to commit to more sequencing projects as we are now able to sequence 32 whole genomes and 128 transcriptions per week.

Next Generation Sequencing (NGS) produces a large amount of data that needs to be processed, stored, and transferred to the researchers and/or clients. To facilitate this, the Genomics Centre entered a collaboration with



the Centre for High Performance Computing (CHPC). This collaboration allows for the secure transfer of all sequencing data from the data storage servers at the SAMRC to servers at the CHPC for processing and short-term storage. This arrangement gives clients access to their data via secure file transfer protocol servers. Finally, all the activities in the laboratory are monitored and recorded on a state-of-the-art laboratory management information system (LIMS). The first phase of the LIMS implementation was completed during the last reporting period. During this reporting period, funding from DIPLOMICS allowed for the second phase of the LIMS installation.

The Genomics Centre recently joined the large SAMRC intramural collaborative study doing wastewater surveillance for the presence of SARS-COV-2. The Genomics Centre is currently setting up the sequencing of the genomes of SARS-COV-2 in wastewater samples collected from various treatment plants from across the country. This will allow for the early detection of new, emerging SARS-COV-2 variants.

New Genomics and Bioinformatics Centre at UKZN

- KRISP: KZN Research Innovation & Sequencing Platform Laboratory facilities with 4IR robotic equipment.
- KRISP is hosted in a ZAR100 million building together with CAPRISA & AHRI at UKZN.
- Genomic Data generated in South Africa published in top scientific journals (Nature) to solve HIV and TB outbreaks.

LAUNCH OF EXATYPE™

South African start up launches novel, cost effective HIV drug resistance testing.

With more than 4 million South Africans currently on ARV (Antiretroviral) treatment, nearly 10% will not respond adequately to the first line drugs given to them. In order to prevent treatment failure, it is important to detect resistance to HIV drugs early on. Hyrax Biosciences launched their new HIV resistance testing software, exatype™, which enables this testing to be faster, more accurate and importantly cost effective. The DNA of the virus is sequenced using Next Generation Sequencing (NGS) technology and the results uploaded to the web-based system. The data is analysed using exatype™ to produce quickly and accurately an easy to interpret report showing the clinician which drugs would be most effective for that individual patient

STAKEHOLDER ENGAGEMENT ON PRECISION MEDICINE

A national stakeholder meeting took place to develop a precision medicine research agenda. 64 delegates joined this meeting from across the country representing, the National Department of Health, Department of Science and Innovation, National Health Laboratory Service (NHLS), National Institute for Communicable Diseases (NICD), Centre for Scientific and Industrial Research, academia, industry and civil society awareness groups (such as Rare X and The Smile Foundation).

The objective was to develop a White Paper to develop the Precision Medicine research agenda. Africa CDC will be working with us as well as the NICD and NHLS.

DSI/SAMRC SOUTH AFRICAN POPULATION RESEARCH INFRASTRUCTURE NETWORK

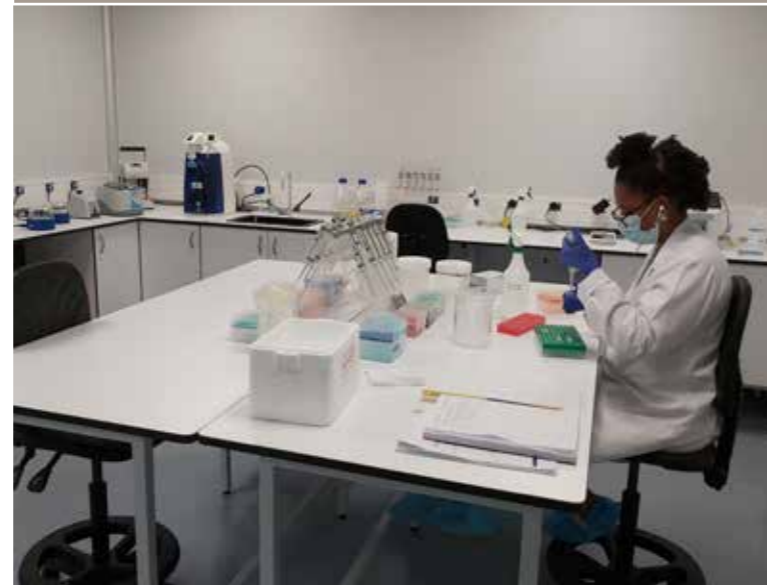
SAPRIN is hosted by the South African Medical Research Council and provides individualised and household micro-data: encompassing whole communities, information is updated on a regular basis, and it provides a platform for intervention testing and policy evaluation.

Data generated:

- Standardised, population-based data in geographically defined sections of impoverished communities
- Repeated longitudinal updates of population, health, social and economic data
- Population data linked to service utilisation data: health services, schools and civil registration
- Applications: Accurately measure trends in health, population, social and economic indicators, and causal mechanisms
- A platform for intervention research and policy evaluation
- Calibration and validation of national datasets
- Early warning system for dire population issues
- Embedding post graduate training and research career development



Hao Li and Samira GhoorL Loading DNA samples and sequencing reagents into the MGISEQ-2000RS sequencer for sequencing



Zukiswa Jiki preparing DNA samples for sequencing

PARTNERSHIPS WITH OTHER COUNTRIES

BRICS TB Research Network

The Network, established in 2017, is an endeavour to collaborate with BRICS Ministries of Health and scientists to address the problems of TB in BRICS countries and to mobilise resources to find local solutions.

- One in-person meeting was held in Geneva in March 2020 and two virtual Network meetings were held in June 2020 and October 2020. These meetings were hosted by WHO at the request of the Russian Federation.
- The SAMRC hosts the Network's website (www.brics-tb.net) and is hosting the Network's secretariat until further notice.

SA-US Programme for Collaborative Biomedical Research

The U.S.-South Africa Program for Collaborative Biomedical Research was established through a Memorandum of Understanding between the SAMRC and the US National Institutes of Health (NIH) in 2013. Phase 1 of the joint program was initiated in 2015 and enabled US and South African scientists to collaborate on biomedical research in the fields of tuberculosis, HIV/AIDS, and HIV-related comorbidities, including malignancies.

Phase 2 (2019-2024) expands on the original scientific areas of interest to also include sexually transmitted infections, parasitic infections, arboviruses and emerging/re-emerging viral pathogens, vector biology and control and the impact of alcohol use on HIV/AIDS. Phase 2 also encouraged collaboration with underrepresented scientists and Historically Disadvantaged Institutions (HDIs) in South Africa, and scientists in Kenya, Lesotho, Uganda, and Zimbabwe.

Four funding opportunity announcements (FOAs) for Phase 2 were developed and published in March 2019, with an application due date of July 27, 2019. Of the 77 applications that were received, 18 proposals were found highly meritorious and awarded funding during April – July 2020. The total funding awarded to the projects during 2020 was US \$5,760,311 to which the SAMRC contributed R45m.

BRICS STI Covid-19 Call for Projects

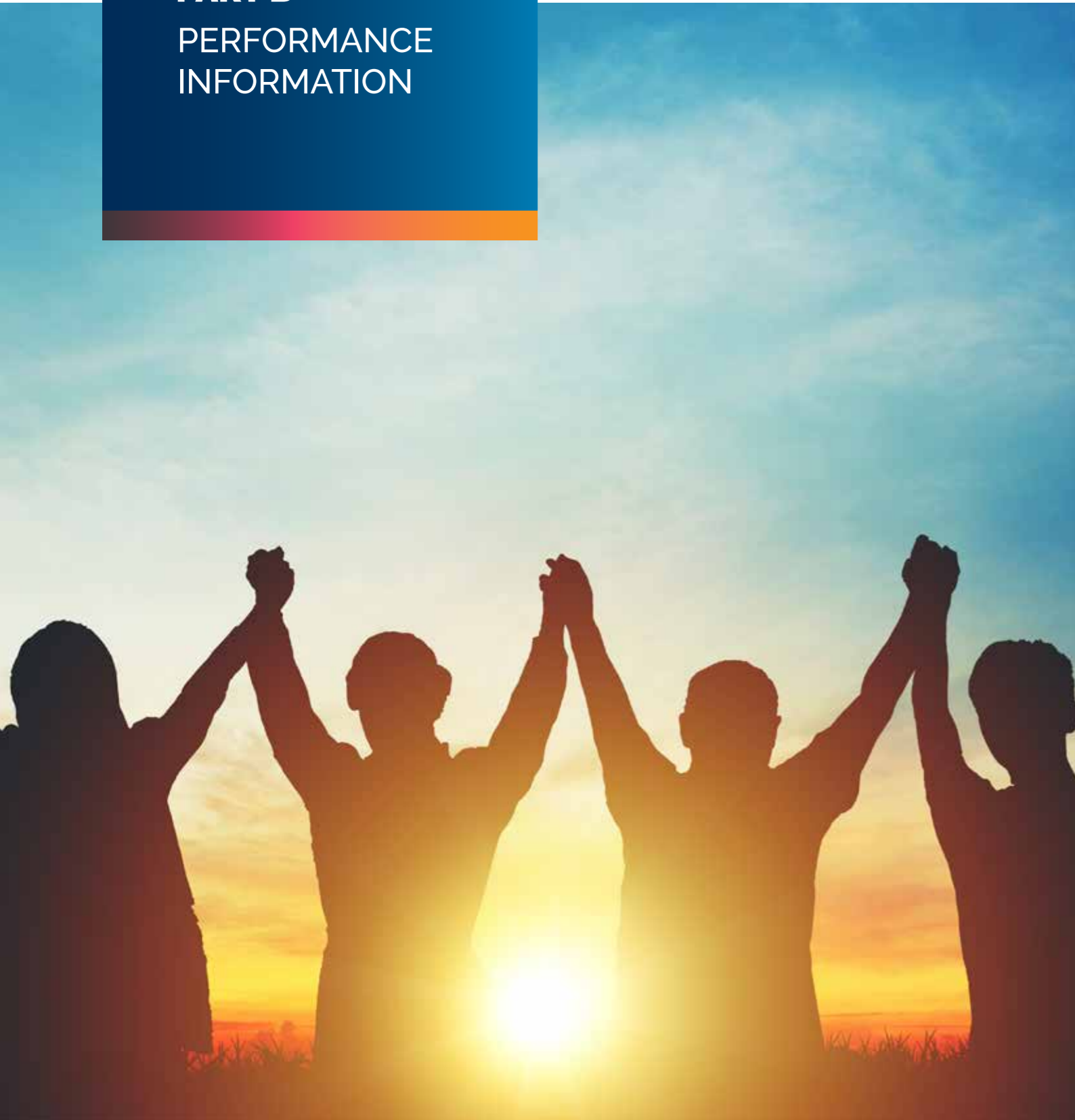
In response to the Covid-19 pandemic, the BRICS STI Framework Programme (<http://brics-sti.org/>) launched a call for multilateral basic, applied and innovation research projects in an effort to facilitate cooperation among the researchers and institutions in the five BRICS countries.

In June 2020, the Department of Science and Innovation (DSI) invited the SAMRC to manage the above call for project proposals in South Africa on their behalf. The Request for Applications (RFA) opened on 1 July 2020 and the application closing date was 20 August 2020.

Applicants could apply for funding in the following five (5) thematic areas:

- Research and development of new technologies/tools for diagnosing COVID-19
- Research and development of COVID-19 vaccines and drugs, including repurposing of available vaccines and drugs
- Genomic sequencing of SARS-CoV-2 and studies on the epidemiology and mathematical modelling of the COVID-19 pandemic
- AI, ICT and HPC oriented research for COVID-19 drugs design, vaccine development, treatment, clinical trials and public health infrastructures and systems
- Epidemiological studies and clinical trials to evaluate the overlap of SARS-CoV-2 and comorbidities, especially tuberculosis.

PART B
PERFORMANCE
INFORMATION



**STATEMENT OF RESPONSIBILITY FOR PERFORMANCE
FOR THE YEAR ENDED 31 MARCH 2021**



The President is responsible for the preparation of the South African Medical Research Council's performance information and for the judgements made in this information.

The President is responsible for establishing and implementing a system of internal controls designed to provide reasonable assurance as to the integrity and reliability of performance information.

In my opinion, the performance information fairly reflects the actual achievements against planned objectives, indicators, and targets as per the Strategic and Annual Performance Plan of the South African Medical Research Council for the financial year ended 31 March 2021. The South African Medical Research Council's performance information for the year ended 31 March 2021 has been examined by external auditors and their report is presented on page 240.

The performance information of the South African Medical Research Council set out on the following pages 22 to 31 have been approved by the Board.

PROFESSOR GLENDA E GRAY
PRESIDENT & CEO: SAMRC

South African Medical Research Council
31 March 2021

STRATEGIC OUTCOME ORIENTATED GOALS

The South African Medical Research Council is guided by **five strategic goals**, which are aligned with the four outputs of the health sector Negotiated Service Delivery Agreement (NSDA), a charter that commits key sectors and

partners to the delivery of identified outputs as they relate to a particular sector of Government. These strategic goals are aligned with the NSDA that contributes to outcome 2 "A long and healthy life for all South Africans".

SAMRC'S PERFORMANCE INFORMATION

Administer health research effectively and efficiently

Strategic goal
1

Impact Statement

Strengthening of corporate governance processes towards an unqualified audit opinion from the Auditor General

Outcome	Outcome indicator	Baseline SP(2015-19)	Five-year target
1.1 To ensure good governance, effective administration and compliance with government regulations	1.1.1 A clean audit opinion on the SAMRC from the Auditor-General	Clean audit	Clean Audit
1.2 To promote the organisation's administrative efficiency to maximise the funds available for research	1.2.1 Percentage of the government allocated SAMRC budget spent on administration	20%	20%

Lead the generation of new knowledge

Strategic goal
2

Impact Statement

Promote the improvement of health and quality of life (prevention of ill health, improvements in public health and treatment) in South Africa through research

Outcome	Outcome indicator	Baseline SP(2015-19)	Five-year target
2.1 To produce and promote scientific excellence and the reputation of South African health research	2.1.1 Number of accepted and published journal articles, book chapters and books by SAMRC affiliated and funded authors	3 150	3 550

Lead the generation of new knowledge

(continued)

Outcome	Outcome indicator	Baseline SP(2015-19)	Five-year target
2.1 To produce and promote scientific excellence and the reputation of South African health research	2.1.2 Number of accepted and published journal articles by SAMRC grant- holders with acknowledgement of the SAMRC	825	930
2.2 To provide leadership in the generation of new knowledge in health	2.2.1 Number of accepted and published journal articles where the first and/or last author is affiliated to the SAMRC	1 830	1 925
2.2 To provide funding for the conduct of health research	2.3.1 Number of research grants awarded by the SAMRC	750	750

Support, through funding and other mechanisms, technology development and implementation, translation of research into policy and practice, and innovations in health and technology delivery to improve health

Strategic goal
3

Impact Statement

To build an innovation community, developing life changing health solutions for South Africa, Africa and beyond

Measuring Outcomes

Outcome	Outcome indicator	Baseline SP(2015-19)	Five-year target
3.1 To support the development of new or improved innovations aimed at improving health and targeting priority health research areas of focus	3.1.1 Number of new innovation and technology projects funded by the SAMRC aimed at developing, testing and/or implementing new or improved health solutions	NEW	20
	3.1.2 Number of ongoing innovation and technology projects funded by the SAMRC aimed at developing, testing and/or implementing new or improved health solutions	NEW	150
3.2 To develop new or improved innovations aimed at improving health priority research areas of focus	3.2.1 Number of innovation disclosures made by the SAMRC intramural research and innovation	NEW	5

Build human capacity for the long-term sustainability of the South African health research

Strategic goal
4

Impact Statement

To provide research support in the form of funding and supervision to the next generation of scientists in the broad field of health

Measuring Outcomes

Outcome	Outcome indicator	Baseline SP(2015-19)	Five-year target
4.1 To enhance the long-term sustainability of health research in South Africa by providing funding and supervision for the next generation of health researchers	4.1.1 Number of awards (scholarships, fellowships and grants) by the SAMRC for MSc, PhD, Postdocs and Early Career Scientists	435	660
	4.1.2 Number of awards by the SAMRC to female MSc, PhD, Postdocs and Early Career Scientists	NEW	488
	4.1.3 Number of awards by the SAMRC to Black South African citizens and permanent resident MSc, PhD, Postdocs and Early Career Scientists classified as African	NEW	495
	4.1.4 Number of awards by the SAMRC to MSc, PhD, Postdocs and Early Career Scientists from historically disadvantaged institutions (HDIs)	NEW	368
	4.1.5 Number of MSc and PhD students graduated or completed	NEW	360

Translate new knowledge into policies and practices to improve health

Strategic goal
5

Impact Statement

To contribute to building public and policy-maker understanding of health, drivers of ill-health, and practice, interventions and technologies that can prevent ill health and strengthen health services and encouraging use of research evidence in policymaker, practitioner and public decision-making.

Measuring Outcomes

Outcome	Outcome indicator	Baseline SP(2015-19)	Five-year target
5.1 To facilitate the translation of health research	5.1.1 Number of local or international policies, reports and guidelines that reference SAMRC research	27	27
	5.1.2 Number of reports and guidelines (co)produced by the SAMRC intramural researchers	NEW	25
	5.1.3 Number of national or international bodies/committees that SAMRC employees serve on	NEW	250
	5.1.4 Number of conferences, seminars and continuing development points workshops supported by the SAMRC	NEW	50

STRATEGIC OBJECTIVES, PERFORMANCE INDICATORS, PLANNED TARGETS AND ACTUAL ACHIEVEMENTS

SOUTH AFRICAN MEDICAL RESEARCH COUNCIL 2020/21 PERFORMANCE REPORT

PURPOSE	OUTCOME	OUTPUT INDICATOR	SP TARGET 2020/21- 2024/25	FINAL 2019/20 PERFORMANCE	2020/21 PERFORMANCE TARGET	FINAL 2020/21 PERFORMANCE	VARIANCE
PROGRAMME 1 – ADMINISTRATION							
Administer health research effectively and efficiently in South Africa							
IMPACT STATEMENT Strengthening of corporate governance processes towards an unqualified audit opinion from the Auditor General	1.1 To ensure good governance, effective administration and compliance with government regulations	1.1.1 A clean audit opinion on the SAMRC from the Auditor-General	Clean Audit	Clean Audit	Clean Audit	Clean Audit	
	1.2 To promote the organisation's administrative efficiency to maximise the funds available for research	1.2.1 Percentage of the government allocated SAMRC budget spent on administration	20%	19%	20%	16%	
PROGRAMME 2 – CORE RESEARCH							
Lead the generation of new knowledge							
IMPACT STATEMENT Promote the improvement of health and quality of life (prevention of ill health, improvements in public health and treatment) in South Africa through research	2.1 To produce and promote scientific excellence and the reputation of South African health research	2.1.1 Number of accepted and published journal articles, book chapters and books by SAMRC affiliated and funded authors	3 550	1 187	800	1 261	Compliance to the Publications SOP and information sessions have increased applicable publications
		2.1.2 Number of accepted and published journal articles by SAMRC grant-holders with acknowledgement of the SAMRC	930	322	200	281	Compliance to the Publications SOP and information sessions have increased applicable publications
	2.2 To provide leadership in the generation of new knowledge in health	2.2.1 Number of accepted and published journal articles where the first and/or last author is affiliated to the SAMRC	1925	672	500	718	Compliance to the Publications SOP and information sessions have increased applicable publications
	2.3 To provide funding for the conduct of health research	2.3.1 Number of research grants awarded by the SAMRC	750	247	130	190	Due to the COVID-19 pandemic, more research grants were awarded than anticipated.

PURPOSE	OUTCOME	OUTPUT INDICATOR	SP TARGET 2020/21- 2024/25	FINAL 2019/20 PERFORMANCE	2020/21 PERFORMANCE TARGET	FINAL 2020/21 PERFORMANCE	VARIANCE
PROGRAMME 3 – INNOVATION AND TECHNOLOGY							
Support, through funding and other mechanisms, technology development and implementation, translation of research into policy and practice, and innovations in health and technology delivery to improve health							
IMPACT STATEMENT To build an innovation community, developing life changing health solutions for South Africa, Africa and beyond	3.1 To support the development of new or improved innovations aimed at improving health and targeting priority health research areas of focus	3.1.1 Number of new innovation and technology projects funded by the SAMRC aimed at developing, testing and/ or implementing new or improved health solutions	20	New indicator	4	29	The annual performance target of 4 new innovation projects was based on the assumption that a small number of new strategic projects may be added, existing projects may be extended with a new scope of work and/or an RFA run to select 2-3 new projects. The major reason for the overperformance is the unanticipated COVID pandemic, which resulted in rapid mobilization of funds and the funding of 19 new innovation-focused COVID projects. Also culminating during the FY were the award of the new Newton AMR grants and Clinical Cancer Research Centres.
		3.1.2 Number of ongoing innovation and technology projects funded by the SAMRC aimed at developing, testing and/ or implementing new or improved health solutions	150	New indicator	30	41	The annual performance target of 30 ongoing innovation projects was based on the GIPD portfolio of projects at the time of target setting. SIR grants were not included in the estimation as they change from year to year and are often not innovation focussed. When they are included, they will always result in overperformance on the target.
	3.2 To develop new or improved innovations aimed at improving health priority research areas of focus	3.2.1 Number of innovation disclosures made by the SAMRC intramural research and innovation	5	New indicator	1	1	
PROGRAMME 4 – CAPACITY DEVELOPMENT							
Build human capacity for the long-term sustainability of the South African health research							
IMPACT STATEMENT To provide research support in the form of funding and supervision to the next generation of scientists in the broad field of health	4.1 To enhance the long-term sustainability of health research in South Africa by providing funding for the next generation of health researchers	4.1.1 Number of awards (scholarships, fellowships and grants) by the SAMRC for MSc, PhD, Postdocs and Early Career Scientists	660	157	110	144	Access to more budget because of a) reconfiguration of Grant programmes (eg instead of 1 PI in an HDI, post docs and PhDs were preferred thus amplifying reportable number of awardees per institution) b) dissolving expensive international partnership of Vaccinology in preference of local partnerships, c)restructuring of the Clinician funding model allowing the Division to fund more scholars with less budget d) early exits. "The figure reported is aligned with Financial and legal profiles: thus the 86 are those who are actually receiving funding and have a funding contract in force in the reported period. However- the ones who are in the RCD register but are NOT receiving funding due to an extended period of scholarship or grantsmanship i.e. NCEs: "No Cost Extensions" have been excluded. These continue to be monitored and give reports per regular contract until the degree is delivered in the case of scholarships or a 12-month period is exhausted in the case of Grant funding."
		4.1.2 Number of awards by the SAMRC to female MSc, PhD, Postdocs and Early Career Scientists	488	New indicator	80	106	
		4.1.3 Number of awards by the SAMRC to Black South African citizens and permanent resident MSc, PhD, Postdocs and Early Career Scientists classified as African	495	New indicator	90	86	
		4.1.4 Number of awards by the SAMRC to MSc, PhD, Postdocs and Early Career Scientists from historically disadvantaged institutions (HDIs)	368	New indicator	60	38	
		4.1.5 Number of MSc and PhD students graduated or completed	360	71	70	72	

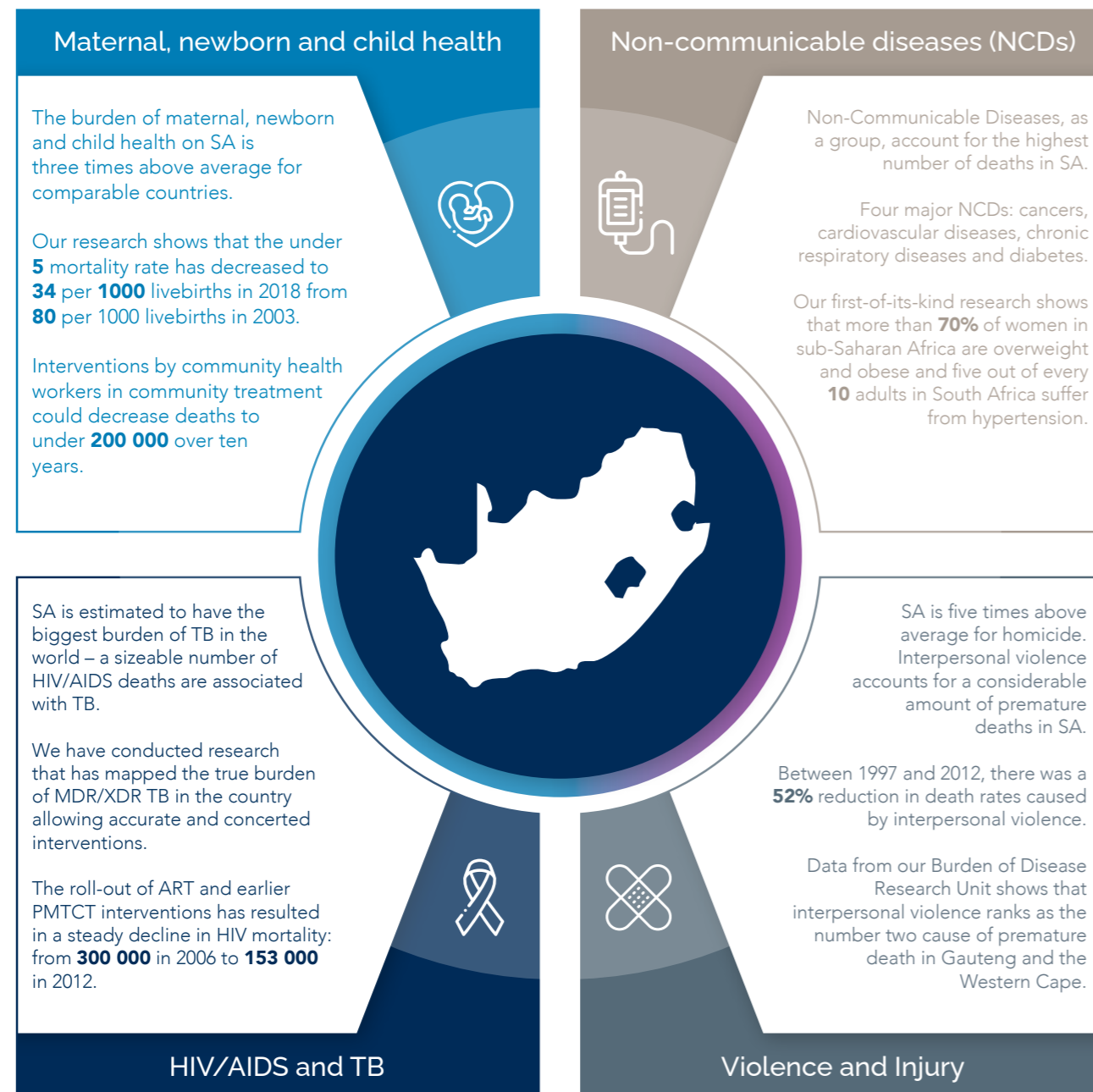
PURPOSE	OUTCOME	OUTPUT INDICATOR	SP TARGET 2020/21- 2024/25	FINAL 2019/20 PERFORMANCE	2020/21 PERFORMANCE TARGET	FINAL 2020/21 PERFORMANCE	VARIANCE
PROGRAMME 5 – RESEARCH TRANSLATION							
Translate new knowledge into policies and practices to improve health							
IMPACT STATEMENT To contribute to building public and policy-maker understanding of health, drivers of ill-health, and practice, interventions and technologies that can prevent ill health and strengthen health services and encouraging use of research evidence in policymaker, practitioner and public decision-making.	5.1 To facilitate the translation of SAMRC research into public understanding policy and practice	5.1.1 Number of local or international policies, reports and guidelines that reference SAMRC research	27	7	5	44	The SAMRC, as a world renowned science council, was approached for scientific input into finding solutions for the COVID pandemic. The input and guidance provided led to this indicator far exceeding the target set for 2020/21. The latter should level out once health solutions are found to combat or control the pandemic.
		5.1.2 Number of reports and guidelines (co)produced by the SAMRC intramural researchers	25	New indicator	5	58	The SAMRC, as a world renowned science council, was approached for scientific input into finding solutions for the COVID pandemic. The input and guidance provided led to this indicator far exceeding the target set for 2020/21. The latter should level out once health solutions are found to combat or control the pandemic.
		5.1.3 Number of national or international bodies/committees that SAMRC employees serve on	250	New indicator	50	90	The SAMRC is well sought after for its scientific expertise. This is evident in the number of committees and bodies that staff serve on. This performance will level out as most of the committees or bodies that staff serve on are on an ongoing basis.
		5.1.4 Number of conferences, seminars and continuing development points workshops supported by the SAMRC	50	New indicator	10	26	The reason for the overperformance is the unanticipated COVID pandemic. The SAMRC hosted more webinars than anticipated during this financial year. This led to this indicator far exceeding the target set for 2020/21. The latter should level out for the 2021/22 Financial Year.

OUR RESEARCH PROFILE

THE BURDEN OF DISEASE IN SOUTH AFRICA

Through research, the SAMRC facilitates and supports the National Department of Health (NDOH) in implementing evidenced-based policies and programmes. The SAMRC research programmes have in the past provided research support to the NDOH programmes through task teams, commissioned research, national surveys, and ministerial committees. These have significantly contributed towards assisting the NDOH in progressively realising its set goals. Work undertaken by the SAMRC's Burden of Disease Research Unit has supported the understanding of morbidity and mortality in South Africa.

South Africa faces a huge burden of four colliding epidemics



We focus on the top ten causes of death and disability and associated risk factors. We assess how healthcare systems function to strengthen health policy, to improve the impact and efficiency of health systems and services, and provide policy makers with the tools for informed healthcare decisions.



LEADING CAUSES OF DEATH IN SOUTH AFRICA

- The **Rapid Mortality Surveillance Report 2017** derives estimates of key health status indicators primarily from data obtained from the National Population Register.
- Although **life expectancy at birth**, has continued to increase, reaching 64 years in 2017, the pace of improvement has slowed down in recent years.
- Infant and under-five mortality rates have declined to 23 and 32 per 1 000 live births in 2017, respectively. However, the neonatal mortality continues to show no improvement remaining at 12 per 1 000 live births.
- Mortality of children aged 5-15 improved over a period of five years from 11 per 1000 deaths to 6 deaths per 1000 deaths. Children between the ages: 15-24 showed an improvement from 24 deaths to 21 per 1000 children during the same period. These improvements are likely associated with the roll-out of ARTs.
- The maternal mortality ratio peaked in 2009 and has declined to 134 per 100 000 live births in 2016.
- Life expectancy at age 60 years**, an indicator of mortality experienced at older ages has remained constant at about 17 years, indicating little improvement in health care in recent years.
- Estimates of premature mortality between the ages of 30 and 70 years due to selected non-communicable diseases (NCDs) including cardiovascular diseases, cancer, diabetes and chronic respiratory diseases. The probability of a 30-year old man dying from these non-communicable diseases before the age of 70 years is 34% while the probability of a 30-year old woman dying from these diseases is 24%. The rates have shown no change between 2011 and 2016. Primary health care services need to be more vigilant with diagnosing and managing these diseases and their risk factors. Health promotion efforts to reduce the prevalence of tobacco and alcohol use, increase physical activity and healthy nutrition are essential to reduce the burden of non-communicable diseases.

MORTALITY INDICATORS	2012	2013	2014	2015	2016	2017
LIFE EXPECTANCY AT BIRTH						
Life expectancy at birth Total	61.2	62.2	62.9	63.3	63.8	64.2
Life expectancy at birth Male	58.5	59.4	60.0	60.3	60.8	61.2
Life expectancy at birth Female	64.0	65.1	65.8	66.4	66.9	67.6
YOUNG CHILD MORTALITY (0-5 YEARS)						
Under-5 mortality rate (U5MR) per 1 000 live births	11.0	8.1	7.4	7.0	6.6	6.0
Infant mortality rate (IMR) per 1 000 live births	11.9	8.9	8.4	7.9	7.5	7.0
Neonatal mortality rate (<28 days) per 1 000 live births	10.1	7.3	6.5	6.2	5.6	5.1
OLDER CHILDREN & YOUNG ADOLESCENTS (5-14 YEARS)						
Older children & young adolescents ($_{10}q_5$ per 1000) Total	11.0	8.1	7.4	7.0	6.6	6.0
Older children & young adolescents ($_{10}q_5$ per 1000) Male	11.9	8.9	8.4	7.9	7.5	7.0
Older children & young adolescents ($_{10}q_5$ per 1000) Female	10.1	7.3	6.5	6.2	5.6	5.1
OLDER ADOLESCENTS & YOUTH (15-24 YEARS)						
Older adolescents & youth ($_{10}q_{15}$ per 1000) Total	24.5	23.5	22.5	22.1	21.4	21.4
Older adolescents & youth ($_{10}q_{15}$ per 1000) Male	25.9	25.9	25.6	25.7	25.3	25.9
Older adolescents & youth ($_{10}q_{15}$ per 1000) Female	23.2	21.1	19.5	18.4	17.5	17.0
ADULT MORTALITY (15-59 YEARS)						
Adult mortality ($_{45}q_{15}$) Total	38%	36%	34%	34%	33%	32%
Adult mortality ($_{45}q_{15}$) Male	44%	42%	40%	40%	39%	38%
Adult mortality ($_{45}q_{15}$) Female	32%	30%	28%	28%	27%	26%
LIFE EXPECTANCY AT AGE 60						
Life expectancy at age 60 Total	17.6	17.4	17.4	17.3	17.4	17.4
Life expectancy at age 60 Male	15.5	15.3	15.3	15.2	15.2	15.2
Life expectancy at age 60 Female	19.2	19.1	19.1	19.0	19.1	19.1

CAUSE SPECIFIC INDICATORS	2011	2012	2013	2014	2015	2016
MATERNAL MORTALITY (15-49 YEARS)						
Maternal mortality ratio (MMR) per 100 000 live births	200	165	154	164	152	134
PREMATURE MORTALITY ATTRIBUTED TO CARDIOVASCULAR DISEASE, CANCER, DIABETES OR CHRONIC RESPIRATORY DISEASE (PEOPLE AGED 30-69 YEARS)						
Cardiovascular disease $_{40}q_{30}$ Total	15%	15%	14%	15%	14%	14%
Cardiovascular disease $_{40}q_{30}$ Male	18%	18%	17%	18%	18%	17%
Cardiovascular disease $_{40}q_{30}$ Female	12%	12%	11%	11%	11%	11%
Cancer $_{40}q_{30}$ Total	9%	9%	9%	9%	9%	9%
Cancer $_{40}q_{30}$ Male	10%	10%	11%	11%	11%	10%
Cancer $_{40}q_{30}$ Female	7%	7%	7%	8%	8%	8%
Diabetes $_{40}q_{30}$ Total	5%	5%	5%	5%	6%	5%
Diabetes $_{40}q_{30}$ Male	5%	5%	5%	6%	6%	5%
Diabetes $_{40}q_{30}$ Female	5%	5%	5%	5%	5%	5%
Chronic respiratory disease $_{40}q_{30}$ Total	4%	4%	4%	4%	4%	4%
Chronic respiratory disease $_{40}q_{30}$ Male	6%	6%	6%	6%	6%	6%
Chronic respiratory disease $_{40}q_{30}$ Female	3%	3%	2%	2%	2%	2%

Source: Rapid Mortality Surveillance Report 2017 published by South African Medical Research Council.

RESEARCH PROGRAMMES AND UNITS

Intramural and extramural research units constitute our six research programmes.

Intramural research units (IRUs) are based at the SAMRC campuses and the scientists are directly employed by the organisation. Extramural research units (ERUs) enable scientists based at tertiary institutions to conduct research funded by the SAMRC. The research programmes and units are specified as follows:

RESEARCH PROGRAMME 1

HEALTH PROMOTION AND DISEASE PREVENTION

NSDA 1: INCREASING LIFE EXPECTANCY

UNITS THAT CONSTITUTE THIS PROGRAMME

- | | |
|---|--|
| 1 Alcohol, Tobacco and Other Drugs Research Unit (IRU) | 6 Violence, Injury and Peace Research Unit (IRU) |
| 2 Anxiety and Stress Disorders Research Unit (ERU) | 7 Hypertension and Cardiovascular Disease Research Unit (ERU) |
| 3 Non-Communicable Diseases Research Unit (IRU) | 8 Microbial Water Quality Monitoring Research Unit (ERU) |
| 4 Environment and Health Research Unit (IRU) | 9 Centre for Health Economics and Priority Setting Research Unit (ERU) |
| 5 Rural Public Health and Health Transition Research Unit (ERU) | 10 Centre for Health economics and Decision Science-PRICELESS (ERU) |

RESEARCH PROGRAMME 2

MATERNAL, CHILD AND WOMEN'S HEALTH

NSDA 2: DECREASING MATERNAL AND CHILD MORTALITY

UNITS THAT CONSTITUTE THIS PROGRAMME

- | | |
|--|--|
| 1 Gender and Health Research Unit (IRU) | 3 Development Pathways Research Unit (ERU) |
| 2 Maternal and Infant Health Care Strategies Research Unit (ERU) | 4 Child and Adolescent Lung Health (ERU) |

RESEARCH PROGRAMME 3

HIV, AIDS, TB AND OTHER COMMUNICABLE DISEASES

NSDA 3: COMBATING HIV AND AIDS, AND DECREASING THE BURDEN OF DISEASE FROM TB

UNITS THAT CONSTITUTE THIS PROGRAMME

- | | |
|---|---|
| 1 HIV Prevention Research Unit (IRU) | 3 Molecular Mycobacteriology Research Unit (ERU) |
| 2 Centre for Tuberculosis Research Unit (IRU) | 4 Respiratory and Meningeal Pathogens Research Unit (ERU) |

RESEARCH PROGRAMME 4

HEALTH SYSTEMS STRENGTHENING

NSDA 4: STRENGTHENING HEALTH SYSTEM EFFECTIVENESS

UNITS THAT CONSTITUTE THIS PROGRAMME

- | | |
|---|---|
| 1 Burden of Disease Research Unit (IRU) | 4 Health Systems Research Unit (IRU) |
| 2 Biostatistics Research Unit (IRU) | 5 HIV-TB Pathogenesis and Treatment Research Unit (ERU) |
| 3 South African Cochrane Centre (IRU) | 6 Health Services to Systems Research Unit (ERU) |

RESEARCH PROGRAMME 5

PUBLIC HEALTH INNOVATION

UNITS THAT CONSTITUTE THIS PROGRAMME

- | | |
|--|---|
| 1 Drug Discovery and Development Research Unit (ERU) | 3 The Biomedical Research and Innovation Platform (IRU) |
| 2 Primate Unit and Delft Animal Centre (IRU) | 4 Herbal Drugs Research Unit (ERU) |

RESEARCH PROGRAMME 6

BIOMEDICAL RESEARCH

UNITS THAT CONSTITUTE THIS PROGRAMME

- | | |
|---|--|
| 1 Bioinformatics Capacity Development Research Unit (ERU) | 6 Precision Prevention and Novel Drug Targets for HIV-Associated Cancers (ERU) |
| 2 Immunology of Infectious Diseases Research Unit (ERU) | 7 Wound and Keloid Scarring Translational Research Unit (ERU) |
| 3 Stem Cell Research and Therapy Unit (ERU) | 8 Antibody Immunity Research Unit (ERU) |
| 4 Antiviral Gene Therapy Research Unit (ERU) | 9 Cardiometabolic Health Research Unit (ERU) |
| 5 Genomics of Brain Disorders Research Unit (ERU) | |



FUNDING HEALTH INNOVATION

GRANTS, INNOVATION AND PRODUCT DEVELOPMENT



The robust grant management processes in GIPD ensure that health research funding is effectively and efficiently administered by the SAMRC, while the more than 200 grants actively managed by GIPD ensure that South African researchers are able to lead the generation of new knowledge and simultaneously build capacity for the long-term sustainability of the country's health research.

Dr Michelle Mulder GIPD Executive Director
michelle.mulder@mrc.ac.za

R177 233 082.61

(GIPD projects including SHIP, Newton and Strategic projects)

Total value of funding allocated to research & innovation during the 2020/21 reporting period

R16 545 472.50

Self-initiated research grants

OVERVIEW

The Grants, Innovation and Product Development (GIPD) Division at the SAMRC is the custodian of grant funding (including innovation funding), IP management and commercialisation for the SAMRC and is a significant contributor to all 5 of the strategic goals of the SAMRC. The robust grant management processes in GIPD ensure that health research funding is effectively and efficiently administered by the SAMRC, while the more than 200 grants actively managed by GIPD ensure that South African researchers are able to lead the generation of new knowledge and simultaneously build capacity for the long-term sustainability of the country's health research. Projects funded by GIPD resulted in 159 peer reviewed articles in 2020/21 and supported a substantial number

of young researchers to build their research agenda and experienced researchers to train new post-graduates. The SAMRC's strategic goal 3, which is focused on supporting innovation and technology development to improve health, is a particular responsibility of GIPD. The unit manages funding aimed specifically at product development and innovation and hosts the SAMRC's Technology Transfer Office and Global Health Innovation Accelerator, which provide hands-on innovation support to protect and advance technologies towards commercialized products. GIPD also manages the SAMRC-Jembi Collaborating Centre for Digital Health Innovation, aimed at expanding the SAMRC's footprint in digital health research and innovation.

There are a number of programs that fall under GIPD, many of which involve strategic partnerships with organisations that include the Department of Science and Innovation (DSI), the Newton Fund, the Bill and Melinda Gates Foundation (BMGF), the African Academy of Sciences (AAS) and PATH. These have continued in 2020/21 and are focused on the key health priorities in the country. The total value of funding allocated to research and innovation by the GIPD unit during the 2020/21 reporting period was R193.7M, comprising of R177.2M for GIPD's SHIP, Newton, and strategic projects and R16.5 M for self-initiated research grants.

FUNDING IMPACT AND STRATEGIC ALIGNMENT

A new strategic partnership was established in 2020 with GSK and Novartis to support research on genetic diversity in Africa in a program known as Project Africa GRADIENT (Genomic Research Approach for Diversity and Optimising Therapeutics). The primary focus of Project Africa GRADIENT will be to evaluate genetic diversity as the contributing factor to the way patients on the African continent respond to drugs used to treat malaria and tuberculosis. GIPD has been tasked with the administration of the program and launched an Africa-wide request for applications on 18 January 2021. The program, which is worth approximately R50M over 4 years, aims to award grants towards the end of 2021.

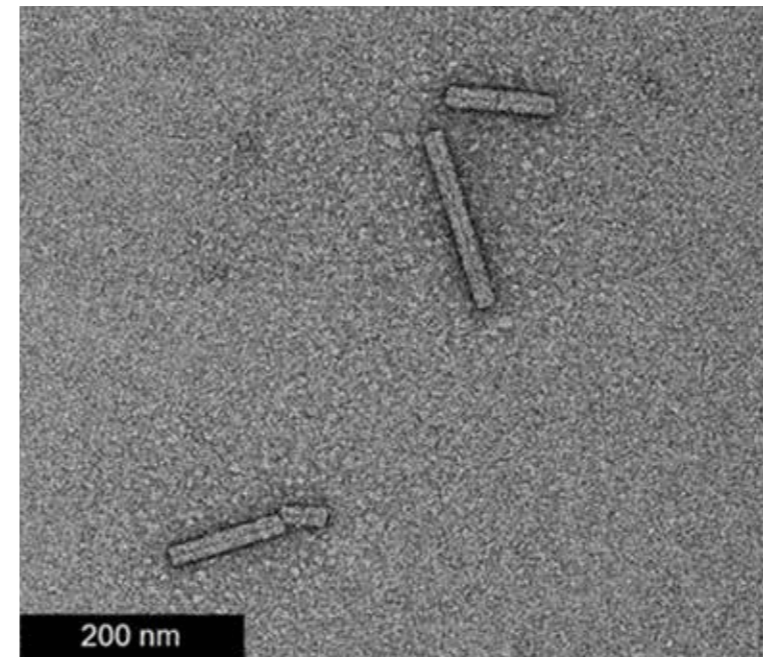
In addition to the above programs, the primary focus of GIPD this financial year has been on responding to the COVID-19 pandemic. GIPD has been the driving engine of the SAMRC and DSI's COVID-19 response, with more than R240 million raised for COVID-19 research and innovation. This was achieved through reallocation of SAMRC budget (~R55M) and the Strategic Health Innovation Partnership's funding from the Department of Science and Innovation (~R70M), and securing grant funding from the Technology Innovation Agency (TIA, R5M), Solidarity Fund (R88M), Elma Philanthropy (R15M) and the Michael and Susan Dell Foundation (R11.5M). More recently, the team has also been key in raising and managing funding for the Sisonke vaccine implementation Study. By the end of the 2020/21 financial year, a total of R240M had been raised for the Study, with additional fund raising in progress.

Since the start of the COVID-19 epidemic in South Africa, the SAMRC has been applying more rapid and agile processes for the award and management of funding for COVID-19 projects, while maintaining compliance with the PFMA and its principles of fairness, transparency and open competition. This has included the establishment of a COVID-19 Research and Innovation Advisory

Committee to advise on research and innovation priorities and a COVID-19 Prioritization of Grants Committee to recommend projects for funding. This has allowed the rapid identification of relevant and appropriate COVID-19 research and innovation priorities, the selection and awarding of quality, peer reviewed projects to address the priorities and the disbursement and management of the accompanying funding. GIPD has also established and/or participated in several task teams addressing different aspects of the response, including vaccines, diagnostics, and treatment, using its neutral convening power to bring diverse stakeholders together.

As a result of the above fund raising and expedited grant processes, the SAMRC, predominantly through GIPD and Strategic Research Initiatives, has funded in excess of 45 projects aimed at studying COVID-19 epidemiology, surveillance, treatment, vaccines, diagnostics, immunology, biology and community awareness. These projects, led by top South African researchers and consortia, have delivered answers to critical operational and translational research questions on COVID-19 and are already guiding national policy and programmes with the overall aim to improve public health. Some examples of this are:

- The Network for Genomics Surveillance in South Africa, driven by Prof Tulio de Oliveira at KRISP, led the discovery and identification of the SARS-CoV-2 501Y.V2 variant, which has had far reaching policy and research implications for the globe, especially relating to vaccine design.
- The South African component of the ChAdOx1 SARS-CoV-2 vaccine trial (Astra Zeneca vaccine), led by Prof Shabir Madhi, showed the reduced efficacy of the vaccine on the local variants. This changed the country's immediate vaccine strategy, resulting in a move to the Johnson and Johnson vaccine and the design and implementation of the Sisonke study by the SAMRC.
- A project at the University of the Witwatersrand, led by Prof Bवेश Kana, has been instrumental in developing controls for the COVID testing platforms which allows for standardization of the assays. It has now been deployed in the South African healthcare system, as well as several African countries, through the NHLS.
- South Africa participated in the global Solidarity Trial with co-funding from the SAMRC, which provided robust clinical trial data on the lack of effectiveness of a range of drugs for the treatment of COVID-19.
- The SAMRC, in partnership with the DSI and TIA, is funding several product development projects aimed at developing local reagents and/or kits for the gold standard COVID-19 diagnostics as well as novel, rapid, point-of-care tests for the presence of the virus. Several of these are close to applying for regulatory approval with SAHPRA.



TEM images of SARS-CoV-2 particles - expected size + ~100nm longer rods represent end-end arrangements of shorter rods



Training midwives and OBS & Gynaes during a district ESMOE training

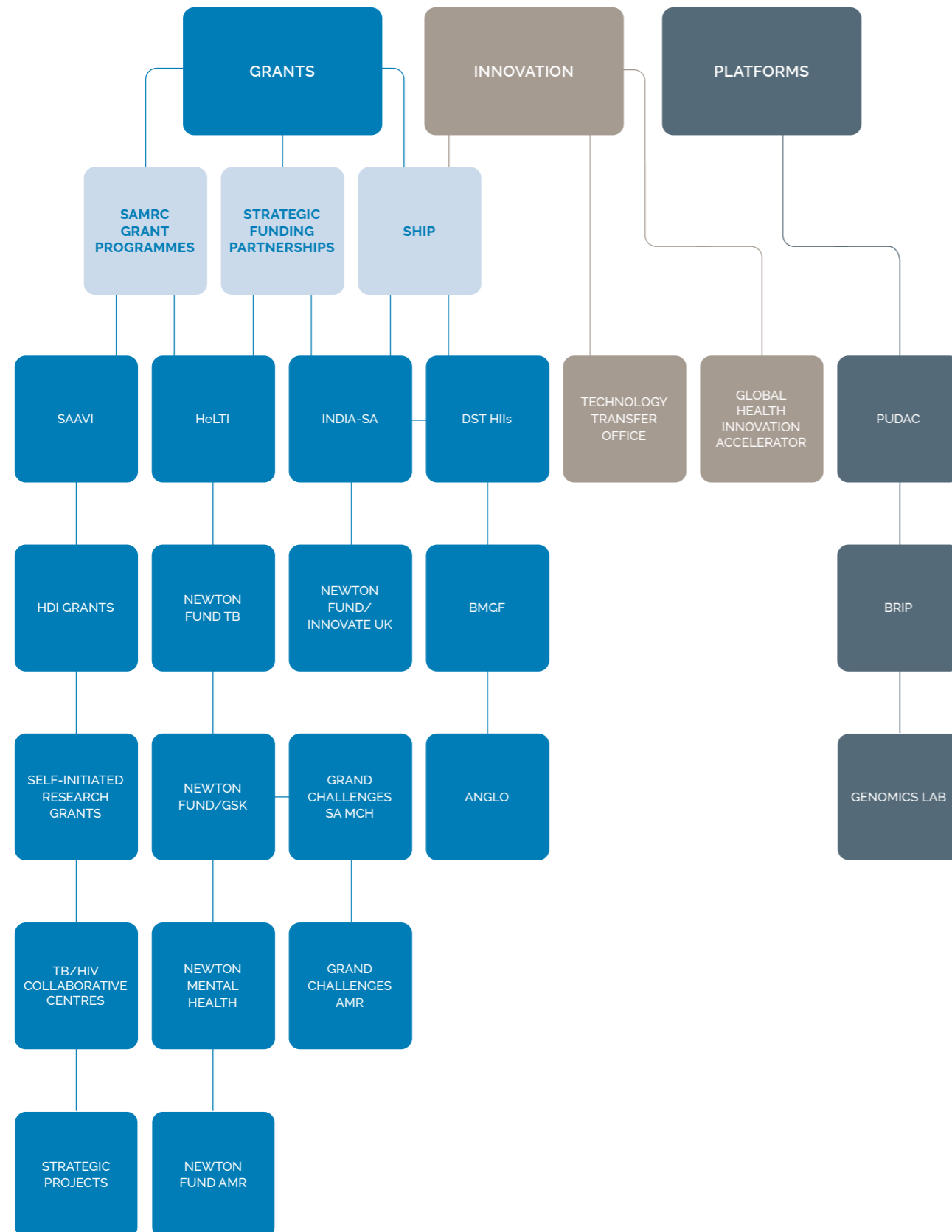
- The SAMRC provided oversight on a Solidarity Fund grant for surge testing for COVID-19 by academic laboratories around the country. This led to a total of 38,638 PCR tests being undertaken by the laboratories on behalf of the NHLS during the testing peak in 2020. The initiative has also seen the capacitation of laboratories at three historically disadvantaged institutions to conduct COVID-19 testing.

The above represent just a selection of examples of impact already achieved through SAMRC-funded COVID projects. An important outcome of the pandemic has also been the ability of the SAMRC to raise funding from non-traditional sources, expanding its funding sources to family and other foundations and the Solidarity Fund, which was established specifically to respond to COVID-19. The pandemic has also seen an unprecedented collaborative effort between several organisations, all with a common goal of addressing the pandemic. Two key examples are the COVID-19 diagnostics projects which brought together a range of stakeholders, including the SAMRC, TIA, DSI, DTIC, IDC, and Business for South Africa, with an interest in building local development and manufacturing capacity in diagnostics, and the establishment of a large consortium of researchers to design research questions to reduce the impact of the SARS-CoV-2 501Y.V2 variant, many of which will be funded by the SAMRC and DSI in 2021/22.

On the innovation front, in November 2020 the SAMRC concluded an agreement with TIA to host the Medical Device and Diagnostic Innovation Cluster (MeDDIC). MeDDIC, which is hosted under the Global Health Innovator Accelerator (GHIA) within GIPD, was officially launched in March 2021 and is aimed at strengthening the medical devices and diagnostics innovation ecosystem through a cluster-based approach. Through MeDDIC, GIPD will drive various networking, coordination, funding, technology development and capacity development initiatives aimed at stimulating and intensifying technology innovation within the sector as well as encouraging an integrated ecosystem to increase the competitiveness of the industry.

GIPD PROGRAMMES

The Division manages a vast array of different grant and innovation programmes as well as several research platforms as illustrated in the figure below.



STRATEGIC HEALTH INNOVATION PARTNERSHIPS

Strategic Health Innovation Partnerships (SHIP) is a partnership between the SAMRC and the DSI to facilitate and support health innovation to address national priorities and enable the national system of innovation more broadly. It incorporates all DSI-funded projects and initiatives managed by GIPD as well as DSI- and SAMRC-leveraged strategic partnerships for health innovation. During 2020/21, SHIP continued funding and managing the existing projects in its portfolio; however, the focus was predominantly on responding to the COVID-19 pandemic. A total of R34.6M of the 2020/21 SHIP funds was reallocated towards COVID projects, in addition to new COVID-specific supplementary allocations from the DSI.

Another focus for SHIP in 2020/21 was expanding its footprint in the Eastern Cape. GIPD hosted the inaugural Eastern Cape Research Symposium “Advancing Research in the Eastern Cape Province” in East London in August 2019. This resulted in the selection of priority areas relevant to the province that were the subject of a request for applications for Eastern Cape institutions run in 2020. The successful applications are currently undergoing final approvals for funding.

The Bill and Melinda Gates Foundation remains an important co-funder on SHIP’s drug discovery programmes and has renewed its commitment to these. The original Foundation grant for HIV and TB projects within SHIP comes to an end in 2021. During 2020, the interest funds on this grant have been applied to whole genome, whole exome and whole transcriptome sequencing by the SAMRC Genomics Centre of samples gathered from the original funded HIV and TB projects to extend the available data and answer additional research questions.

Also co-funded by the Foundation is the Grand Challenges South Africa programme. During 2020, the programme awarded transition-to-scale funding to support pre-commercialization of a point-of-care test for preeclampsia. Preeclampsia is one of the leading causes of maternal and infant deaths, particularly in low- and middle-income countries, and timely diagnosis is critical in the management of the disease and prevention of deaths. The development of the test was funded through the first phase of the Grand Challenges South Africa programme, and following successful laboratory and field evaluation studies, the current funding will support its introduction in South Africa, Ghana, and Kenya. The current phase of the project is also co-funded by Grand Challenges Canada.



On-site training of health professionals by district and provincial Maternal Health Coordinators

THE NEWTON FUND

The Newton Fund (<https://www.samrc.ac.za/innovation/newton-fund>), a co-funding initiative with the UKMRC established in 2015, supports South African projects that respond to national health priorities while simultaneously contributing to global health knowledge for impact. The Newton Fund enables social, economic and health value to be realised.

The SAMRC-Newton Fund program is supporting 21 projects over three years, on TB implementation science, non-communicable diseases, mental health, and antimicrobial resistance across 12 institutions. These projects contribute to knowledge generation, capacity development, building of research infrastructure and creating employment, with several principal investigators securing post-award funding to sustain their projects. The six TB projects focus on improving TB outcomes by modifying lifestyles; preventive treatment against TB and ART initiation; scaling up TB and HIV treatment integration; contact tracing for TB control; conditional cash transfers and pre- and post-TB test counselling; and technology supported systems for rapid impact on TB control. These projects have yielded policy briefs, a m-health app and TB mapping dashboards (national and provincial).

The seven non-communicable diseases projects, in partnership with GlaxoSmithKline, address the cardiovascular disease (cardiomyopathy and hypertension), cancer (breast, cervical and oesophageal), diabetes and chronic kidney disease burdens in South Africa and include studies in some sub-Saharan Africa countries in collaboration with teams across the globe. The six mental health projects, in partnership with the Economic and Social Research Council, focus on schizophrenia, neuropsychiatric problems related to HIV infection and ART, substance use, psychosis mapping, the impact of mental illness on economic outcomes, and the digital delivery of behavioural activation to overcome depression. Finally, the two antimicrobial projects, to combat multi-drug resistance and to develop antimicrobial peptides against antibiotic resistant pathogens, are contributing to drug discovery by harnessing South Africa's rich biodiversity. The projects will benefit from the guidance of an international and African external advisory board to guide the teams towards drug discovery. Ultimately, this initiative aims to establish a collaborative South African-UK antibiotic accelerator with hubs in South Africa and the UK, and integrated opportunities for capacity building.

The SAMRC-Newton Fund health program projects have generated publications, supported masters and doctoral candidates, and created employment opportunities. The research exchange has been truly bilateral as both

South African and UK scientists have benefited from the partnership. This has been a very successful globally leading partnership and one that the SAMRC is seeking to expand upon.

The South African AIDS Vaccine Initiative

While the South African AIDS Vaccine Initiative (SAAVI) is no longer active in its original form, the SAMRC continues to receive funding from the National Department of Health for SAAVI. This funding is used for a variety of activities that complement and contribute to the broader GIPD HIV Program and capacity development initiatives.

During 2020/21, SAAVI funding continued to contribute to the provision of PrEP to participants of HIV prevention trials in South Africa as well as an open-label randomised control study in KwaZulu-Natal on Immediate or Deferred Pre-exposure Prophylaxis for HIV Prevention and a 3-year project at UKZN on the effect of transmitted/founder (T/F) viruses 5' Long Terminal Repeat (LTR) and Transactivation of Transcription (tat) genetic variation on viral reservoir size and latency reversal potential. The latter project is led by an early career researcher and forms part of the SAMRC's broader HIV cure research portfolio. SAAVI funds were also utilized for building research capacity at the WSU as part of the SAMRC-WSU Research Development Programme, which started in 2016. This programme is supporting three Assistant Research Coordinators at WSU in the different Deaneries and various initiatives to increase the university's research intensity, particularly in the health arena, including eight pilot research projects led by early career researchers and clinicians. In 2020, the Research Development Programme was expanded to include a specific allocation for innovation support at WSU.

ELLAVI UTERINE BALLOON TAMPONADE FOR THE MANAGEMENT OF POSTPARTUM HAEMORRHAGE

Since launched in 2019, the Ellavi uterine balloon tamponade (UBT) has impacted 2,500 lives in South Africa (SA). This product is used as part of the management of postpartum haemorrhage (PPH) due to atonic uterus in maternal and obstetric units in SA. Currently, the Ellavi UBT is used in 76 public and private health facilities, including primary healthcare facilities and hospitals with and without theatres. The Ellavi UBT was the first UBT which was able to strengthen service delivery by midwives and medical officers, working in limited resource settings, by supporting the saving of a mother's life during referral and transport to

REVIEW
O&G Forum 2018; 28:23-27

A focus on referral problems in women who died from obstetric haemorrhage in South Africa (2014-2016)

Sue Fawcus
Department of Obstetrics and Gynaecology, University Cape Town, Cape Town, South Africa

Deaths of referred women

128/624 (20.5%) ~ n = 10 from home

- **Waiting for transport 20.8%**
- **During transport 14.2%**

The role of the Ellavi UBT in management of PPH: Zoom Webinars by Prof Theron

the next level of care. The Ellavi UBT can be used in both normal vaginal delivery and caesarean section settings for the management of PPH. This product has addressed a major need in the delivery of maternal health services due to its affordability, availability, and ease-of-use by various health professionals in a collective attempt to save a mother's life. The use of the Ellavi UBT has been included as a standard of care in national and provincial intrapartum care policies and protocols and training programs. In-depth training of obstetricians, gynaecologists, medical officers, midwives, and emergency medical care officials is of utmost importance and this has been supported during 2020/21 by a grant from the SAMRC. The insertion, monitoring and removal of the Ellavi UBT has been included in provincial and district maternal health training and workshops. Not only are health professionals theoretically trained on the

use of the Ellavi UBT, but also practically. Internationally, 13,877 units have been sold to countries in Africa (7), Asia (2), Latin America (2), Middle East (2) and Europe (2). In addition to this, organizations such as Médecins Sans Frontières (MSF), the Alliance for International Medical Action (ALIMA), Partners in Health (PIH) and Pan American Health Organization (PAHO) have adopted the Ellavi UBT as part of their protocols and policies for the management of refractory PPH. A total of four national and international clinical trials have been completed on the use of the Ellavi UBT as part of PPH management. Currently five clinical trials are ongoing and an additional four are planned for implementation. In 2020, Johnson & Johnson reached out to Sinapi Biomedical for a partnership in strengthening PPH management in various countries.



RESEARCH CAPACITY DEVELOPMENT

BUILDING HUMAN CAPACITY IN HEALTH RESEARCH



RCD funding programmes contributed to the development of the next generation of scientists with a demonstrated ability to respond to COVID-19 and future epidemics.

Dr Thabi Maitin RCD Division Manager
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OVERVIEW

Despite the COVID-19 pandemic, the SAMRC's Division of Research Capacity Development (RCD) continued its business adapting to the new normal. Building capacity for the long-term sustainability of health research is considered a priority for the SAMRC to attain health research transformation, and fully achieve other strategic goals of administering health research effectively and efficiently, leading the generation of new knowledge, supporting innovation and technology development. Accordingly, the SAMRC's Division of RCD promotes the growth of health research capacity by offering scholarships to South African citizens studying towards their Masters, PhDs in Medical, Health and Clinical Sciences and research grants and fellowships for Postdoctoral work and health research by mid-career scientists and seasoned researchers at South African universities. The outcomes of RCD programmes in 2020/21 remained consistent in terms of strengthening research capacity building and transformation. The excellent outcomes are also reflected in increased media coverage as compared to previous years.

RESILIENCE IN A TIME OF COVID-19

The RCD division continued to excel in the cohort's transformation (race and gender) and strengthening research capacity at the historically disadvantaged



RCD virtual Gham2021

Aligning funding programmes with National Targets for transformation and development of researchers in scarce skills and other identified fields of health research.



institutions (HDIs). The total number of funded beneficiaries, including new intake for the 2020/21 reporting period, exceeded the annual target set by 33%. The number of grants and scholarships awarded to female candidates was 74%, while African black beneficiaries increased to 60% of the awards. The modification of funding models within the SAMRC Research Capacity Development Initiative at selected previously disadvantaged institutions and the SAMRC Clinician Research Development programme resulted in the substantial increase of the number of awards by 86% and 40%, respectively.

Due to the high performance of RCD, the Public Health Enhancement Fund (PHEF) extended the contract for funding the ninth Cohort of the Bongani Mayosi National Health Scholars Programme. This is a crucial outcome for the division in strengthening capacity development in health research.

The COVID-19 restrictions imposed on travelling and mass gatherings did not prevent the beneficiary's conferences, namely the Early Career Scientists Convention (ECSC) and the Grant-Holders Meeting (GHAM). These two conferences are crucial for monitoring and evaluation of scholars' progress as well as for networking and collaboration between beneficiaries. They were successfully organised on the virtual platforms and were attended by all beneficiaries. The youth month celebration by our young beneficiaries in hard lockdown was also another milestone.

As part of risk management, RCD invited its beneficiaries to submit their COVID-19 research continuity plan highlighting research activities that they would perform to maintain research activity between April and September 2020. In December 2020, RCD ran a survey to assess the impact of COVID-19 risk management on scholars to develop evidence-based mechanisms and strategies to continue supporting scholars during and post COVID-19.

SCIENTISTS AND PROGRAMMES IN 2020/21

NUMBER OF BENEFICIARIES	AMOUNT INVESTMENT	NAME OF PROGRAMME
7 Scientists (PI)	10,500,000.00	SAMRC Mid-Career Scientists
13 Scientists (PI)	7,100,000.00	SAMRC Research Capacity Development Initiative
5 Postdoctoral Fellows	1,750,000.00	
3 PhD	600,000.00	
3 MSc	600,000.00	
20 Postdoctoral Fellows	6,384,998.44	SAMRC Intramural Postdoctoral Programme
1 PhD	200,000.00	SAMRC Researcher Development Grant
26 PhD	10,724,936.1	Bongani Mayosi-National Health Scholars Programme
1 MSc	180,000.00	Biostatistics Capacity Development Program
1 PhD	200,000.00	
1 Scientist (PI)	1,439,207.50	SAMRC Clinician Researcher M.D PhD Development Programme
24 PhD	10,530,000	
1 MSc	160,000.00	
4 MSc	640,000.00	SAMRC Internship Scholarship Programme
31 PhD	6,200,000.00	

Approximately 70% of the scholars indicated that having a research continuity plan was useful, and 91% reported SAMRC scholarship as the only source of income. Whereas the survey shows that many scholars will be forced to extend their study duration beyond the initially proposed, the number of completed scholars in 2020/21 exceeded the previous year's number by 63%.

FUNDING INNOVATION AND TECHNOLOGY STUDIES AND PROJECTS

RCD beneficiaries have contributed to COVID-19 related research and surveillance during the lockdown. Two postdoctoral fellowships were funded in COVID-19 related research areas (surveillance project, obesity phenotypes and its impact on COVID-19 severity and mortality). One of the beneficiaries of the Mid-Career Scientist Programme, Professor Salome Maswime from UCT, is involved in the COVID-19 research (COVID-19 in Surgery). Some of RCD-funded PhD candidates were also involved and making impact in COVID-19 related research projects. Dr Fatima Mustafa funded under the SAMRC Clinician Researcher Programme is the lead author of the publication "Rapid evolution of our understanding of the pathogenesis of COVID-19: Implications for therapy (published in South African Medical Journal). Dr Mbuzeleni Hlongwa funded under the Bongani Mayosi National Health Scholars Programme is the co-author of the publication entitled "COVID-19 consequences on mental health: An African perspective" (published in the South African Journal of Psychiatry). This demonstrates the strong involvement of scholars that RCD funds, and how RCD funding programmes contributed to the development of the next generation of scientists with a demonstrated ability to respond to COVID-19 and future epidemics.

Two beneficiaries of the SAMRC Scholarship Programme, Ms. Lerato Rametse and Dr Caroline Pule, were listed on the 2020 Mail & Guardian 200 Young South Africans. Both named in the Health Category, Rametse and Pule were recognized for being young innovators who are already changing the world by contributing to health research.

Annually, the Mail & Guardian canvasses the country to find and celebrate 200 eminent young South Africans aged 18- to 35-years.



SAMRC Postdoctoral Research Fellow receives the L'Oréal-UNESCO Women in Science Award: Dr Charissa Naidoo (Clinical Mycobacteriology and Epidemiology (CLIME) at Stellenbosch University)



From the SAMRC Intramural Postdoctoral Fellowship to the Professorship at Wits: Professor Janan Dietrich



Dr Awelani Mutshembele, a SAMRC Intramural Postdoctoral Fellow within the Tuberculosis (TB) Platform, carrying her personal protective equipment (PPE). She is about to start working on the SAMRC Wastewater Surveillance & Research Programme, one of the organisation's latest flagship programmes.



SAMRC STRATEGIC RESEARCH PROGRAMMES

Programme 1

HEALTH PROMOTION & DISEASE PREVENTION

PURPOSE OF THE PROGRAMME

To conduct research using a life course approach to healthy lifestyles, early diagnosis, and cost-effective prevention and management of diseases through health promotion.

UNITS THAT CONSTITUTE THIS PROGRAMME

- | | |
|--|--|
| 1 Alcohol, Tobacco and Other Drugs Research Unit | 6 SAMRC/Unisa Violence, Injury and Peace Research Unit |
| 2 SAMRC/UCT Risk and resilience in mental disorders Research Unit | 7 SAMRC/NWU Hypertension and Cardiovascular Disease Research Unit |
| 3 Non-Communicable Diseases Research Unit | 8 SAMRC/UFH Microbial Water Quality Monitoring Research Unit |
| 4 Environment and Health Research Unit | 9 SAMRC Centre for Health Economics and Priority Setting Research Unit |
| 5 SAMRC/Wits Rural Public Health and Health Transition Research Unit | |

PROGRAMME STRATEGIC OBJECTIVES

- To contribute towards the body of evidence by gaining a better understanding of how factors such as nutrition, physical activity, mental health, healthy behaviours, environment and stress factors affect life expectancy
- To be a leader in scientific research by contributing to new knowledge in the area of health promotion and disease prevention
- To train and mentor high-quality postgraduate students and postdoctoral fellows who are able to compete in the science, health and/or education sectors locally and abroad to advance the cause of health promotion and disease prevention
- To assist the National Cancer Registry in producing cancer surveillance statistics and cancer trend reports
- To translate research results into health and education policy, the practice of health-care professionals, and the configuration of health and education systems
- To develop interventions that affect and address poor nutrition, lack of physical activity, excessive alcohol intake, and risky sexual behaviours
- To add to evidence-based interventions that look into factors affecting life expectancy
- To train and educate health-care staff and community members to manage, control and reduce the incidence of non-communicable diseases

RESEARCH HIGHLIGHTS UNDER THIS PROGRAMME

ALCOHOL, TOBACCO AND OTHER DRUGS RESEARCH UNIT



2020/21 did not turn out the way we expected, but it did lead us into new ways - of working together, of supporting each other, of doing research in new ways and into important new avenues of research, research dissemination and policy impact and also opened up new local and global connections.

Prof Charles Parry Unit Director
charles.parry@mrc.ac.za

OVERVIEW

The goals of the SAMRC's Alcohol, Tobacco and Other Drugs Research Unit (ATODRU) include measuring the prevalence of alcohol, tobacco and other drugs (ATOD) use and associated consequences; identifying current and future risk and protective factors for ATOD use; designing, and evaluating appropriate preventive and treatment interventions to address ATOD use and co-occurring problems and strengthening the health system to facilitate implementation of evidence-based ATOD interventions and improve quality of care.

In order to build human capacity to carry out research in the area of ATODs, the Unit undertakes research methods, continuously mentors and supervises masters and PhD students and facilitates the implementation of research findings by supporting advocacy efforts and providing information that will allow policy makers and others to make informed decisions. These fit in with SAMRC goals of leading the generation of new knowledge, building human capacity for the long-term sustainability of the South African health research, and translating new knowledge into policies and practices to improve health.

RESILIENCE IN A TIME OF COVID-19

Supervisors were encouraged to contact persons they supervised on at least a weekly basis and to focus during these calls not only on staffs' work productivity but also on how well they were coping at home. Some research teams also met weekly as a group for virtual "coffee and connect" where the focus was not on reporting on work outputs but sharing tips for managing COVID-19 related stress, work-life balance and supporting each other through additional challenges of home-schooling, bereavement and illness. Staff had to rapidly adjust to use of alternate communication tools.

Staff were also encouraged to undertake and share ways in which they looked after their own mental health so that they could keep a healthy work-family life in balance. Postdoctoral fellow, Dr Carrie Brooke-Sumner, talked about using meditation to help her to stay resilient, and unit director, Prof Charles Parry, set up a 100m running path around the inside of his property and ran well over 100 kms during April and May 2020, including the Mzansi Ultra Marathon and a virtual Two Oceans Marathon with three teams of 10 fellow runners all running 5.6 km.



COVID-19 RELATED RESEARCH

During this time, we initiated nine (9) new studies:

- Modelling of alcohol-related trauma admissions during lockdown levels 3-5 and secondary analysis of data as it became available.
- Study of the effect of the 2nd alcohol sales ban on non-natural deaths.
- Scoping systematic review of smoking and acquisition of COVID-19 and disease outcomes.
- Evaluating impact of COVID-19 restrictions on alcohol use and purchasing practices in SA: IAC study.
- Online survey to evaluate the effect of COVID-19 lockdown in SA on ATOD use, other mental, behavioural, and physical risks, and role of coping mechanisms to reduce such effects.
- Online survey of treatment providers about COVID-19 and impact on substance use and provision of substance abuse treatment in SA.
- COVID-19 restrictions and impact on alcohol, and tobacco use in a TB cohort.
- Effects of COVID-19 and lockdown on people with schizophrenia and caregivers in South Africa.
- News media coverage of the ban on sales of tobacco products during COVID-19 lockdown in South Africa.

The pandemic highlighted the impact of heavy drinking on hospital trauma burden and the broader health system. We have used this opportunity to strongly advocate to policy-makers and the public on the implementation of evidence-based policy to reduce the impact of alcohol on society-not only during but post-pandemic. Similarly, with the pandemic having a negative effect on psychological well-being, there is increased recognition of the importance of

mental health. This has created opportunities for engaging with policy makers and enhanced interest in scaling up our interventions that promote coping and resilience.

We actively engaged with the local and international media (200+ interviews) and provided input on topics related to substance use and COVID-19 based on previous research findings and policy analyses. We also wrote letters/opinion pieces on these topics to Business Day, Tech Financials, The Daily Maverick, and Bhekisisa Health and have taken up opportunities that have arisen to speak at international conferences (e.g. a keynote address at the Australasian Trauma Society Annual Conference), national meetings (the UN Day on Drugs & Drug Trafficking hosted by the Department of Social Development), webinars (arranged by Edinburgh University, SANCA, International Society of Substance Use Professionals, the South African Addiction Technology Transfer Center, and the UN Office on Drugs & Crime). We also used the opportunity of the link between tobacco use and disease progression of COVID-19 to advance a smoking cessation campaign through the Protect Our Next (Thina Abantu) media campaign. These activities have raised the profile of the SAMRC, have stretched our understanding of our work and future research and have strengthened linkages with a range of stakeholders.

INNOVATIVE APPROACHES AND PROGRAMMES

Treatment centre-based epidemiological research by Harker et al. (2020) showed a 24% increase in treatment admissions for opioid-related disorders between 2012 and 2017 suggesting that the country is not immune to the global trend in increasing use of opioids. Community

research by Londani et al. (2020) found that persons who consumed alcohol at on-licensed premises were more likely to drink more alcohol and more frequently. The odds of binge drinking were higher when consuming alcohol in above-average sized containers. Furthermore, being of high socio-economic status was associated with drinking weekly at off-licensed premises, while being less educated was associated with a significantly higher frequency of drinking at on-licensed premises.

In terms of intervention research, a study by Petersen et al. (2020) found that simple 'yes/no' questions when combined with urine testing is recommended for identifying illicit substance use in pregnant women and Sorsdahl et al. (2020), in investigating dedicated versus designated strategies for integrating mental health counselling into chronic disease services at the primary health care level, highlighted the potential of a hybrid approach where these approaches may be tailored to the specific needs and available resources of each facility.

IMPACT ON POLICY AND PRACTICE

ATODRU staff took the lead in a technical committee formed in July 2020 that modelled the effect of a possible second liquor sales ban on trauma presentations nationally. We estimated that just under 50,000 less trauma patients would present to state hospitals over an 8-week period if a

full sales ban was instituted and this would free up capacity to treat about 17,755 COVID-19 patients in general wards or about 12,947 in ICU wards. Via the Ministerial Advisory Committee (MAC) our report was passed on to the National Coronavirus Command Council and used by the government in its decision to instate a second temporary ban on the sale of alcohol. ATODRU staff reviewed available evidence of the link between COVID-19 disease severity and tobacco use which was also shared with the MAC.

ATODRU staff have, after several years of engaging with the National Department of Social Development, secured a commitment from the Department to implement tools from the Services Quality Measures Initiative, a performance measurement system for South Africa's substance use disorders (SUD) treatment system, in all its state-funded SUD treatment facilities. The SQM tools were developed by ATODRU, in partnership with various stakeholders.

CAPACITY DEVELOPMENT AND DIVERSITY MANAGEMENT

In March 2021 three of our staff, Sebenzile Nkosi, Siphokazi Dada and Nozi Gcora, handed in their PhD dissertations. Two staff members graduated with M-degrees: Yuche Jacobs, graduated with an MPhil in Public Mental Health



Thelecia Johnson and Aniena Engelbrecht, study nurses on Project TRUST (The Impact of Alcohol Consumption on TB Treatment Outcomes)

and Phindile Ngobese graduated with a Masters in Medical Science. An external student, Mayara Fontes, supervised internally by Dr Nadine Harker, obtained a PhD in Public Health. A further 27 students are currently being supervised for higher degrees, 18 Masters and 9 PhDs. Regarding diversity, of the 33 students supervised or supported, 22 are female and 27 are Black. In addition, we run a monthly journal club where junior and senior staff develop their methodological competency in a supportive environment.

RESEARCH TRANSLATION

Among other things, staff published a policy brief based on research showing non-smokers' exposure to second-hand smoke. This is relevant to South Africa's smoke-free policy proposed in the Control of Tobacco and Electronic Delivery Systems Bill. We also presented research findings on electronic cigarettes use in South Africa to the ANC Health Study Group in parliament.

To disseminate the results of our Service Quality Measures system, we presented in a series of webinars for the International Society of Substance Use Professionals on treatment quality, the UN Office on Drugs and Crime and the International Technology Transfer Centre (South Africa) on substance abuse treatment monitoring and service quality improvement. The Deputy Minister for Social Development attended one of the webinars and this led to an engagement regarding this project. We also met with officials from the National Department and we have presented training on the system to that department and provincial stakeholders. We have also had meetings to present the system and discuss implementation in key NGOs providing services in this sector.



Attending and presenting an international conference in June 2020-the 12th In Women's Group Conference (and 1st virtual conference)



REFLECTIONS ON 2020/21



Prof Nandi Siegfried, Chief Specialist Scientist

At the beginning of the pandemic during the transition to online work, it soon became clear which staff members were technically competent and understood TEAMS for instance. Everyone shared their tips and demonstrated so much patience and kindness until we were all able to engage effectively together that it became almost as good as face-to-face interactions.



NON-COMMUNICABLE DISEASES RESEARCH UNIT



By refusing to submit to the anxiety and fear, and helped by our workspace which is naturally conducive of physical distancing, we have been able to maintain some form of physical presence in our work environment throughout the COVID-19 pandemic, which in turn has allowed us to remain connected with each other and with our work.

Prof Andre Pascal Kengne Unit Director
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OVERVIEW

The overall purpose of the Non-Communicable Diseases Research Unit (NCDRU) is to formulate and apply an integrated programme of research and capacity development in order to improve the understanding, detection, prevention and management of non-communicable diseases (NCDs), with a major initial focus on cardiovascular and metabolic disorders in South Africa.

The core functions of NCDRU are in alignment with three strategic goals of SAMRC. NCDRU is at the forefront of new reliable knowledge generation to improve the understanding of the burden and drivers of non-communicable diseases (NCDs), with a focus currently on cardiometabolic diseases, and to some extent chronic kidney diseases (CKD). The work of NCDRU also largely address research translation through adaptation of existing knowledge or development of context-appropriate solutions to improve the prevention, detection, and control of NCDs in South Africa, and other countries with similar health challenges.

The Unit is also actively working on model of prevention, detection and control of common NCDs in people with HIV in care, or in the general population in community-based setting, in alignment with new orientation of primary health care in South Africa that positions community health workers (CHWs) as the frontline health worker. Lastly NCDRU significantly invest on capacity development, by leading or contributing to the training of Masters and PhD students across universities in South Africa.

RESILIENCE IN A TIME OF COVID-19

NCDRU has used evolving strategies informed by the accumulating knowledge on the condition to gradually adapt to the COVID-19 pandemic, and within the legislative framework of the country. At the very uncertain start of the first wave of the pandemic and under very stringent lockdown conditions, regular online meetings helped to keep the unit members connected. Most of our research activities involving interaction with the community were temporarily paused and research staff's time redeployed on secondary data analysis and research planning.

With the improved understanding that COVID-19 will be around for far more time than anticipated, we started preparing ourselves towards working efficiently under the context of COVID-19. Such preparation included optimising the office and research space for efficient implementation of applicable prevention and protection measures and developing SOPs for the protection of staff and research participants against SARS-CoV2 acquisition.

When the country eventually lowered the lockdown requirements to level 3 during the first wave, NCDRU staff were encouraged to spend few half days per week in the office. This was helpful in preparing them psychologically, such that we the country eventually reach lockdown level 1, NCDRU was able to immediately start full on-campus operation. Similarly going through the second wave was with less disruption of the operations of the unit.



COVID-19 RELATED RESEARCH

A significant research contribution made by the unit was during the early weeks of the pandemic, when there was basically no information to guide the response of African countries. The unit took part in a research effort to review the context of countries that entered the pandemic before Africa. The review identified Singapore as a model country Africa could learn from. The proposed framework from the review was published in OMICS early in August 2020 (<https://doi.org/10.1089/omi.2020.0077>) and has been highly cited. The unit is currently planning the participation in an international study aiming to explore the status of NCDs care during COVID-19 pandemic in 12 selected countries.

The COVID-19 pandemic has reemphasised the importance of preventing and controlling NCDs, considering worse prognosis of the infection in people with common NCDs such as hypertension, diabetes, or obesity. Mindful of this, the unit has updated some ongoing research activities to include an attention to COVID-19 and is accounting for COVID-19 in all new research endeavours.

INNOVATIVE APPROACHES AND PROGRAMMES

NCDRU has contributed to new scientific knowledge during this financial year through the publication of about 60 peer-reviewed articles. Among the numerous contributions of the research conducted by NCDRU, we highlighted:

- the difficulties among patients living with multiple chronic diseases both infectious/HIV and NCDs and suggested potential solutions for improvements in their healthcare.
- the dearth of tobacco cessation interventions and the need for such measures in South Africa and Africa.
- the lack of evidence in the literature on the benefits of routing detection of diabetes vs. active screening in a Cochrane review.
- the need for quality data to determine the impact of adult sexual abuse in women with cardiovascular and cardiometabolic diseases.
- the high and rising burdens of stroke, heart attacks and cardiometabolic diseases in Africa and described potential innovative solutions for improving care.

IMPACT ON POLICY AND PRACTICE

The South African Diabetes Prevention Programme (SA-DPP) is an initiative of NCDRU aiming to develop a context appropriate model of community-based diabetes prevention for South Africa, using community health workers (CHWs) as frontline implementers. This programme which is currently in the pilot phase was developed essentially using the general populations in townships across Cape Town.

However, the experienced gained so far has allowed a successful development of a new research project to adapt the programme for use in people with HIV, but also in the general population in other settings of the country, the Eastern Cape Province in particular.

The program of research of NCDRU on NCD in people with HIV started as a cross-sectional survey to characterize the burden of major cardiometabolic diseases risk factors in people with HIV across Cape Town. This survey revealed prevalence rates as higher as those in the general population, with similar detection, treatment, and control gaps.

These findings highlighted the missed opportunity to co-screen and co-manage NCDs in people with HIV in regular contact with the health systems, and prompted further research to understand what could be the barriers and enable the introduction of NCDs prevention and control program in people with HIV. Through this new research we identified adherence to poly-medication as a potential challenge, and therefore develop an ongoing trial to assess the effect of SMS adherence support in people with HIV and co-morbid hypertension. We have further expanded the programme to include a component on diabetes risk screening and reduction, which is due to start this year. This expansion will include objectives addressing weight change in people with HIV on dolutegravir-based ART regimens.

CAPACITY DEVELOPMENT AND DIVERSITY MANAGEMENT

NCDRU has graduated eight female students including three masters and five PhDs. By ethnicity, six of these students were African and two mixed ancestry. Overall, during the financial year under consideration the unit was involved in the supervision of 29 students including eight Masters and 21 PhDs. Furthermore, the unit mentored two NRF interns (one African female and one mixed-ancestry male) who successfully registered for Masters studies.

RESEARCH TRANSLATION

The research conducted by NCDRU is regularly published in peer-reviewed journals, with over 60 articles published during this financial year, including in very high impact journals such as The Lancet. While scientific conferences were cancelled and therefore preventing the appearance of NCDRU staff at such events, with the increasing move to online conferences, NCDRU scientists were able in recent weeks to present their work at national and international conferences such as the latest SEMDSA conference where our postdoctoral fellow Dr Kim Ahn Nguyen won the best presentation award.

Senior NCDRU researchers have regular interactions with various stakeholders on issues relating to NCDs. The NCDRU Director for instance gave a keynote lecture on salt reduction and cardiovascular disease prevention, at the webinar organised by the South African Heart and Stroke



REFLECTIONS ON 2020/21



Nasheeta Peer

We stayed resilient during this difficult period by regularly maintaining contact with each other through weekly unit meetings, which made us feel part of a community and prevented us from feeling isolated.



Jillian Hill

COVID-19 has had a major impact on our community research projects. Despite this we have managed to come up with innovative ways to continue with some research work whilst minimizing risk for both participants and field staff. One example is a validation study we managed to do largely telephonically. The support of project staff (including all levels of staff, including the unit director) and the adaptability of field staff enabled research to continue in our current new normal.

Foundation around the 2021 salt awareness week. Our scientists have contributed to guidelines drafting, issued policy briefs and press releases, developed manuals and curriculum material for NCDs; and have had our work cited in clinical practice guidelines. Our Chief Specialist Scientist Prof Julia Goedecke presented a webinar to private nurse practitioners on obesity in South Africa and how the condition can be managed by nurses.

Prof Kengne co-authored a highly cited expert opinion piece on diabetes in Sub-Saharan Africa (<https://theconversation.com/diabetes-is-a-ticking-time-bomb-in-sub-saharan-africa-149766>), and took part in a Q&A with News24 on the risk of COVID-19 in obese people and implications for prevention. Our Senior Scientist Dr Jillian Hill was one of the two SAMRC scientists who took part in the formulation of two policy briefs aimed at highlighting the importance of physical activity and exercise for Africa's overall health and wellbeing during COVID-19 and beyond.

ENVIRONMENT & HEALTH RESEARCH UNIT



Out of the box thinking, novel partnerships and steep learning curves have been the order of the day for the E&HRU since the start of the pandemic. Our reward has been an entirely new platform for research, and the satisfaction of making a real contribution to combatting COVID-19 in South Africa.

Prof Angela Mathee Unit Director
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OVERVIEW

The work of the Environment and Health Research Unit (E&HRU) resonates most particularly with the SAMRC goals: the generation of new knowledge; building sustainable health research capacity in South Africa; and the translation of research findings into policies and programmes that benefit the health of all in South Africa.

The unit investigates and delivers new knowledge on significant environmental hazards to the health of South Africans, especially the youngest and the poorest. We disseminate our research findings to a range of target audiences to maximise benefit and minimise delays. The knowledge we generate can be used to lobby for policies, projects and actions that make the South African environment cleaner and safer, for this generation and for generations to come.

Our priority areas of research are adaptation to climate change, housing, and health as well as exposure to toxic substances, and investigation of the associated health implications. Over the past year, with the advent of the COVID-19 pandemic, wastewater surveillance has emerged to be a key element of the portfolio of work of the E&HRU.

COVID-19 RELATED RESEARCH

Globally, exposure to air pollution is responsible for around 7 million premature deaths each year. During certain lockdown periods, when all but essential services were shut down, industrial and traffic-related emissions appeared to

decrease. From an environmental health perspective, the home environment increased in importance as the setting in which the vast majority of people in the country were spending the major portion of their waking and sleeping hours, in turn making exposure to indoor air pollution a particular concern.

This concern was particularly heightened in respect of people living in poor quality housing or in poverty, where the likelihood of increased use of solid (wood and coal) and liquid (paraffin) fuels are elevated. In partnership with the University of Leicester, the E&HRU used an innovative method to reach South Africans during lockdown. Working with a market research company and an existing contact database, electronic and telephone surveys were used to gather data about energy use, COVID-19 symptoms and cases among 2 505 people living in Gauteng, Western Cape, Eastern Cape and KwaZulu-Natal during Alert Level 5 (drastic measures adopted to curb the spread of the virus and save lives). Overcrowding in the dwelling and the use of coal for space heating were risk factors associated with COVID-19 symptoms or confirmed cases. These findings emphasise the need to improve the quality of housing and increase access to electricity for all.

Housing Quality and COVID-19

The COVID-19 pandemic has shone an uncompromising light on the role of poverty and unhealthy housing in the transmission of COVID-19. Millions of South Africans live in informal housing, use unsafe water, cook with solid fuels, or use bucket toilets; conditions that act in opposition to community or household prospects of implementing

recommended protections against COVID-19. It is therefore apt that during the past year the E&HRU has published several papers on housing quality and health in the Mpumalanga, Limpopo, and Eastern Cape provinces. In Agincourt (Mpumalanga) we showed how households simultaneously face multiple threats to their health in their own homes, including unsafe water supplies and widespread use of wood for cooking.

In villages around the town of Giyani in Limpopo Province we similarly illustrated the shortcomings in housing quality and other social determinants of health in relation to the United Nations Sustainable Development Goals. In the City of Gqeberha in the Eastern Cape we found a triple socio-environmental threat to health in two townships (Walmer Township and Wells Estate) from poverty (high unemployment rates, low household income, heavy reliance on state financial support, low savings capacity, the need to service debt and limited access to medical aid), poor housing quality and ill-advised planning decisions to locate human settlements on the doorstep of sites of industrial pollution.

In the two study sites respiratory ill health conditions were significantly associated with poverty, household composition and living conditions. Overcrowded and inadequate housing conditions, such as those seen in these studies, undermine household capacity for **resilience** in the face of the COVID-19 pandemic and other infectious diseases. The social determinants of health may need to be, in addition to medical factors, considered in the strategic response to COVID-19, including vaccine roll outs. Given that the impacts of unfolding climate change are expected to dwarf those of COVID-19, it is not too soon to review housing and human settlement standards in South Africa from a health perspective.

Wastewater-Based Early Warning System for COVID-19.

In its strongest demonstration of resilience and agility in the face of the COVID-19 pandemic, the E&HRU, together with four other SAMRC Units, designed and initiated, within a very short period of time, a wastewater-based surveillance and early warning system for COVID-19. The SAMRC COVID-19 wastewater surveillance project is currently active in four provinces (Eastern Cape, Limpopo, Gauteng, and Western Cape) and is providing critical intelligence to local authorities to support planning and decision-making regarding COVID-19 interventions.

The details of the SAMRC wastewater project are included under Achievements and Highlights. While the project was prompted by, and initiated, as a strategy to combat COVID-19, we now have in place the system, partnerships and processes on which to build a long-term platform for a diverse and cutting-edge programme of research related to, for example:



Living conditions of people in poverty



Housing quality and health in the Mpumalanga, Limpopo and Eastern Cape provinces



Wastewater-based surveillance and early warning system for COVID-19



REFLECTIONS ON 2020/21



**Sizwe Nkambule,
Senior Scientist, E&HRU**

I joined the SAMRC in July 2020 to work on the COVID-19 wastewater surveillance project. I needed to hit the ground running, and to exercise agility and tenacity to get the job done. As a young scientist, it has been a huge and much appreciated opportunity to learn and grow.



**Dr Renee Street,
Specialist Scientist,
E&HRU**

Our team regularly brainstormed new ideas on how to tackle COVID-19, both personally and professionally, and our ideas evolved at pace with the pandemic.

- COVID-19 as well as other viral infections (such as measles);
- environmental pollutants (for example toxic metals and the derivatives of air pollutants excreted through the urinary system and the association with cardiac diseases);
- pharmaceuticals used in the treatment of chronic diseases such as diabetes, hypertension and cardiac diseases, as well as infectious diseases such as HIV/AIDS;
- the use of illicit substances such as methamphetamines and cocaine.

IMPACT ON POLICY AND PRACTICE

The E&HRU has undertaken multiple studies around the country to illustrate the range of sources of community lead exposure that continue to threaten health in South Africa. Lead sources of ongoing concern include the use of artisanal pots, the use of firearms and ammunition, the smelting of fishing sinkers in subsistence fishing communities and living close to mining operations.

In 2020, following a successful E&HRU lobbying and consultation process, the National Department of Health formally approved a shift from an issue-based to a systematic, integrated approach to lead exposure prevention in South Africa. In terms of the strategy, a National Lead Exposure Prevention Working Group (NLEPWG) is being established, with the first meeting in March 2021. The E&HRU has been invited to be part of the NLEPWG.

CAPACITY DEVELOPMENT AND DIVERSITY MANAGEMENT

A life-long learning mindset is adopted in the E&HRU – most staff are studying towards higher degrees and those who are not, are required to take at least one short course each year. All staff also participate in an internally driven personal development programme aimed at increased self-awareness, enhanced personal (and institutional) agility and resilience, identification of personal character strengths and improved leadership capacity.

The E&HRU personal development programme also contributes to appreciation of the value inherent in diversity, including workplace harmony and productivity. Eighty percent of E&HRU staff are Black (two thirds are Black African), and most staff are female.

E&HRU contributes to United Nations Environment Programme Report on Zoonoses

July 6 is World Zoonoses Day – a day set aside annually to raise awareness of the risk of zoonotic diseases. On World Zoonoses Day 2020 the United Nations Environment Programme (UNEP) launched its newest and very topical report titled “Preventing the Next Pandemic: zoonotic diseases and how to break the chain of transmission”. Caradee Wright and Bianca Wernecke contributed to the report together with others from UNEP, the International Livestock Research Institute (ILRI) and EcoHealth Alliance. In the last century, a combination of population growth and reduction in ecosystems and biodiversity has created unprecedented opportunities for an increase in zoonotic diseases, where pathogens pass between animals and people (and vice versa). This year, with the current COVID-19 pandemic affecting many parts of the world, the scientific assessment consolidates knowledge and identifies areas for policy focus.



The range of sources of community lead exposure that continue to threaten health in South Africa

E&HRU Contributes to United Nations Environment Programme Report: Making Peace with Nature

The world can transform its relationship with nature and tackle the climate, biodiversity and pollution crises together to secure a sustainable future and prevent future pandemics, according to a new report by the UN Environment Programme (UNEP) that offers a comprehensive blueprint for addressing our triple planetary emergency.

The report, *Making Peace with Nature*, lays out the gravity of these three environmental crises by drawing on global assessments, including those from the Intergovernmental Panel on Climate Change and the Intergovernmental Science-Policy Platform for Biodiversity and Ecosystem Services, as well as UNEP's Global Environment Outlook report, the UNEP International Resource Panel, and new

findings on the emergence of zoonotic diseases such as COVID-19. The authors, including Caradee Wright and Bianca Wernecke from the E&HRU, assess the links between multiple environmental and development challenges, and explain how advances in science and bold policymaking can open a pathway towards the achievement of the Sustainable Development Goals by 2030 and a carbon neutral world by 2050, while bending the curve on biodiversity loss and curbing pollution and waste. Taking that path means innovation and investment only in activities that protect both people and nature. Success will include restored ecosystems and healthier lives as well as a stable climate.

RESEARCH TRANSLATION

A Heat and Health Vulnerability assessment previously undertaken in Rustenburg (North West province) by the E&HRU highlighted public sites where exposure to heat might be an increasing health concern, including taxi ranks. Long queues and a lack of shade and water sources were points of disquiet. In the past year we have commenced with consultations toward a vision of "Climate Proof" taxi ranks for South Africa. We are currently working with the City of Tshwane and key stakeholders, including taxi associations, to undertake and evaluate a pilot project in taxi ranks in that city.

In November 2020, the SAMRC's wastewater-based Early Warning System for COVID-19 launched a publicly available dashboard. Wastewater samples are collected on Mondays from over 40 sites spanning four provinces and uploaded onto the dashboard 48 hours after collection. The E&HRU team are responsible for the project implementation including sample collection, logistics and data analysis and presentation. The data are analysed and presented to reach a wide variety of stakeholders and includes times series analysis and mapping of hotspots areas.

SAMRC/WITS RURAL PUBLIC HEALTH AND HEALTH TRANSITION RESEARCH UNIT



Despite the uncertainties, as a resilient team with purpose and commitment to rural health, we soon found our bearings, accepted our critical role, and put our research platforms and resources to work – all to secure the wellbeing of rural communities at home and regionally.

Prof Stephen Tollman Unit Director
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OVERVIEW

The mandate of the SAMRC/Wits-Agincourt Unit is, in partnership with host communities and local institutions, to better understand and respond to the dynamics of health, population and social transitions in rural South and southern Africa, in order to mount a more effective public health, public sector and social response and thereby inform national, regional and global policy.

Through multidisciplinary research, the unit addresses four fundamental questions:

- The *unpredictability and pace* of evolving health, population, and social transitions
- The *interacting social and biological determinants and consequences* – highlighting vulnerability and resilience – at key stages along the life course
- *When, where and how to intervene* most effectively
- The implications for health and social sector responses in order to achieve a more *equitable and socially and economically productive* society.

Through policy relevant research in marginalised rural communities, and in so doing building local, national, and regional capacity, the Unit is fully aligned with the SAMRC's strategic goals.

COVID-19 RELATED RESEARCH

Towards a 'whole of district' response to COVID-19 in rural South Africa

The COVID-19 pandemic imposes profound stress on healthcare systems globally. In South Africa, despite early lockdown, provincial and district health systems faced immense challenges – with COVID-19 the latest and most disruptive epidemic on top of HIV/AIDS, TB and non-communicable conditions including mental health.

In rural Agincourt/Bushbuckridge, the delayed emergence of infections exposed systemic public health fault-lines. As national lockdown eased, the need for devolved responses to complement national policy was highlighted – opening a 'space' into which the unit stepped.

Near-absence of data on the epidemic in local populations and care needs in clinics and hospitals rendered health service leadership without the 'intelligence' needed to determine priorities, deploy resources, or engage communities effectively. As an SAMRC/Wits Unit we asked how a more differentiated public health response could serve local health/social priorities; and how best to grasp the longer-term effects of the epidemic on health and wellbeing?

Working with partners including NICD, and capitalising on robust research platforms – a health and demographic surveillance system; linkage of the platform to clinic/hospital registers; and a cohort study to determine transmission patterns – enables us to establish:

- extent of SARS-CoV-2 infection in rural communities including asymptomatic infection
- burden of COVID-19 on district clinics and hospitals and the demand-for-care
- spectrum of illness from mild to severe, and related risks and comorbidities
- trends in mortality and cause-of-death.

Altogether this is building the evidence for an integrated district health response.

Institutionalising data systems to make such evidence readily available is critical to district leadership of the epidemic; to empowering service leaders to take decisions and deploy resources; to enabling co-development of preventive and clinical/social care by services and communities; and to preparing for epidemic uncertainties ahead.

Further detail follows:

• **Provide data and evidence to support an integrated district response**

Work includes epi-demographic surveillance of rural communities across 31 villages and 120,000 people, registering all deaths, determining cause-of-death through verbal autopsy (VA), and evaluating change in personal behaviours (NPI). A call-centre facilitated telephonic Interviews.

Surveillance is harmonised with nodes in KwaZulu-Natal and Limpopo as part of SAPRIN .

• **COVID-19 and SARS-CoV-2 transmission study**

With NICD (Cohen PI) and Wits/PHRU (Martinson), intensive study of SARS-CoV-2 prevalence and household/ community transmission is underway with repeated PCR-testing of 600+ individuals for SARS-CoV-2 infection twice weekly.

• **Linking population data to district clinics and hospitals**

– Linkage to hospital records allows systematic registration of seriously ill patients enabling computation of rates of symptomatic disease, hospitalisation, and mortality, as well as post-hospital follow-up, with appraisal of social and economic impact on households.

– Linkage to clinics reveals the impact of COVID-19 on service use: with SAMRC/Wits-PRICELESS we are evaluating indirect effects on MCH and chronic care use.

• **Social-behavioural-economic studies**

COVID-19 has potential to profoundly affect rural communities. We are conducting a multi-wave survey with 2000 persons ≥18 years randomly sampled to better understand: compliance with preventive measures, healthcare access, social support, mental health, risk perceptions, alcohol and tobacco use, intimate partner violence, and views on vaccines.

• **Health systems R&D**

Working closely with district leadership, the unit was instrumental in establishing a partnership with clinic/hospital staff and a local NGO to support an effective COVID-19 rapid response; this included adapting policies and protocols to the rural environment, training staff, hospital reorganisation, and fundraising for PPE.

INNOVATIVE APPROACHES AND PROGRAMMES

The Agincourt Unit ensures the SAMRC brings the best science to bear on the health and wellbeing of rural populations in South and southern Africa, so contributing vital evidence on settings that harbour profound inequalities.

Based on a rigorous, longitudinal population-based platform spanning socio-political change, the HIV/AIDS epidemic, and now the COVID-19 pandemic, the Agincourt health and sociodemographic surveillance system (HDSS) covers a ‘whole population cohort’ of ~120,000 persons. The versatile platform now extends to cover genomic, physiological, behavioural, and clinical data – thus spanning molecular to population levels.

Nested studies, cohorts and trials along the life course include children (respiratory infections, under-5 mortality), adolescents (HIV/AIDS, NCD risk, mental health) and older adults (multi-morbidity, hypertension, cognitive change), with a focus on socio-environmental exposures (education, labour migration, socioeconomic status). In response to the pandemic, COVID-19 surveillance was added to the 2020 HDSS data update, and a SARS-CoV-2 prevalence and transmission study initiated.

Technologies, until recently the preserve of urban or high-income societies, are central to several studies: smartphone app to deliver intervention against depression in adolescents; DXA measurements for osteoporosis; MRI scans for dementia.

Ongoing engagement with local/provincial health and public sector leadership facilitates rapid application of study findings. The unit partners with research centres elsewhere, e.g. *African Research in Kidney Disease* (ARK) with Uganda and Malawi; collaborates with leading African, UK and US institutions; and provides leadership to sub-Saharan research networks including INDEPTH, SAPRIN and ALPHA. The unit builds capacity through nesting postgraduate students and postdoctoral fellows, mentoring early and mid-career scientists, and local intern programmes.



Training for the ARK project (African Research into Kidney disease)



Participant completing a table-based questionnaire



Indunas at Jongilanga Council receiving their sanitizers



Setting out to collect biomarkers from the MRCWits Agincourt Laboratory

IMPACT ON POLICY AND PRACTICE

Portfolio tackling critical questions in rural health along the life-course:

Adolescents: While depression is widespread, services are rudimentary with little supporting a sustained response. We have shown that depression is a causal factor in HIV acquisition. This interdisciplinary initiative with University of Limpopo and international colleagues involves a large pilot trial to test a custom-developed app delivering Behavioural Activation Therapy supported by peer-mentors and trained counsellors. We will evaluate effects on wellbeing and productivity and expect to follow with a full-scale trial.

Adults: Responding to rising life expectancy, we established a large-scale older adult cohort (40+) – harmonized with BRICS and high-income countries – to assess the social determinants of successful ageing and interacting effects of cardiometabolic disease, HIV/AIDS and cognitive change.

- We demonstrated HIV acquisition and transmission in older adults then evaluated HIV self-testing against home-based nurse-led HCT – with an overwhelming preference for self-testing.

Elders: Given the ravages of HIV/AIDS, elders play a critical role in childcare. Yet hypertension is widespread with debilitating consequences such as heart failure and stroke. With conventional primary care making little impact, we seek alternate approaches. Intra/extramural units are collaborating to evaluate public and private pension points for hypertension screening and health promotion among pensioners – with potentially far-reaching implications for practice.

We can expand further on projects addressing:

- Health risks and access to care among labour migrants in South and sub-Saharan Africa
- Role of traditional healers in combating HIV transmission and supporting PPE distribution
- Impact of salt regulations governing salt content in foods on hypertension in adults.

CAPACITY DEVELOPMENT AND DIVERSITY MANAGEMENT

The unit provides high-quality training of PhD students and postdoctoral fellows from a range of disciplines, and mentors early to mid-career scientists, including supporting their preparation for competitive fellowships and grants. This approach builds research leadership in South Africa and the region. This capacity building programme benefits from three core elements: a strong research environment, established multi-level longitudinal data platforms providing rich data resources, and multiple studies within the HDSS into which student/fellow research is nested.

There is a *data intern* programme with ongoing recruitment of young candidates from surrounding communities, so building local data management and analytic skills.

The unit is a research centre for CARTA – Consortium for Advanced Research Training in Africa (www.cartafrica.org/).

RESEARCH TRANSLATION

Translation of research findings to public sector policy makers, study participants and communities, and the public is a key goal, supported by a dedicated Public Engagement Office (PEO). Knowledge dissemination interventions include feedback and discussion of research findings at village meetings which bring together community and service providers. There is regular production of tailored knowledge products such as village ‘fact sheets’ to support local development initiatives. Owing to COVID-19, village meetings were not held in 2020; instead fact sheets were distributed through junior schools. Study participants are given clinically-relevant study results and referred to care where necessary. Research into how to feedback genomic results is underway. Ongoing networking with local, district and provincial service providers, decision makers and policy implementers ensures that relevant stakeholders are consulted during community entry and feedback. Owing to COVID-19, this was achieved telephonically and via email during 2020. The PEO has established a Community Advisory Board (CAB) with elected representatives from each village. During 2020, CAB members were contacted telephonically; meetings have restarted in 2021. In 2020 the Unit and Ehlazeni District Health data team worked to co-develop an evidence-informed response to COVID-19 and chronic care.

Study investigators work with the PEO to disseminate research findings more broadly, including (i) reports to the Mpumalanga Department of Health, Bushbuckridge Local Municipality, and Ehlazeni District Department of Health, and (ii) research fact sheets from academic publications distributed to, public service providers and NGOs. Links to peer-reviewed publications are disseminated through Twitter. Newsletters are used to highlight key research results and unit activities to all stakeholders. The unit had a media focus on COVID-19 and the elderly, including the impact of social distancing on older persons, with an SA TV News interview, five radio interviews, and articles in the Sunday Times, The Conversation, Wits News and Curious.ty.



REFLECTIONS ON 2020/21



Simon Khoza,
Public Engagement
Officer

Since COVID started, we have been giving sanitisers to our local Indunas and other stakeholders in the community to help ensure funerals stay safe. The communities are very happy about this; they appreciate it and say the Wits/SAMRC Unit cares for them.



Ngonidzashe Ngwarai,
Head: Research
Operations

We have seen – and mastered – many challenging moments. We are convinced that we will overcome this one too. I am proud and inspired by the way our unit has risen to this challenge – with flexibility, resilience, courage – and a caring heart.

SAMRC/NWU HYPERTENSION AND CARDIOVASCULAR DISEASE



Research aimed at alleviating the increasing burden of CVD, particularly in developing countries such as South Africa, requires now even more intensified action with CVD being a long-term complication of COVID-19.

Prof Marlien Pieters Unit Director
Marlien.Pieters@nwu.ac.za

OVERVIEW

Two of the documents that the SAMRC's Strategic Plan is based on are the National Development Plan-2030 and the Sustainable development goals (SDG). Both of these have the reduction of non-communicable diseases which include cardiovascular disease (CVD), as a strategic outcome. The overall aim of the Extramural Unit for Hypertension and CVD is to directly contribute to new clinical and epidemiological knowledge within the field of CVD risk in different population groups in South Africa in order to alleviate the CVD burden by facilitating more effective awareness, treatment and prevention programs in the future. This unit is in a constant state of transformation to ensure that it always best addresses CVD research in the South African context.

This included a change in directorship (due to the resignation of the first UD) and strategic efforts to renew and adapt our research focus to better address the significant burden of hypertension and CVD in South Africa. With a shift from addressing mainly CVD in the elderly, the unit has initiated strategies to focus on preventive cardiology, namely to focus on the early development of CVD risk factors such as raised blood pressure in children and young adults, and to focus on the unique disease profile of a large proportion of South Africans affected by co-morbidities in terms of HIV and CVD.

Aligned with sharpening our research focus, our staff complement has shifted towards a young generation of researchers, including more women and more staff members from previously disadvantaged groups – empowered to lead these initiatives going forward (e.g. by mentorship programmes and doing international fellowships in expert laboratories). In addition, we have a strong capacity development focus as can be seen from the large number of post-graduate students who are trained in the EMU in health research.

RESILIENCE IN A TIME OF COVID-19

COVID-19 had a significant impact on the activities of the unit, in particular on projects that were in the process of data collection, as all research activities were temporarily stopped due to the national lockdown and restrictions. However, members made use of this unprecedented situation to finalise manuscripts, deliver post-graduate students and, where applicable and possible, completed laboratory analyses of existing samples.

One of the larger projects within our unit, the African-PREDICT study is in the process of obtaining ethical approval to include COVID-19 data, both in terms of antibody testing as well as a questionnaire on symptom severity and duration, lifestyle adaptations and co-morbidities. With COVID-19 infection having a significant impact on inflammation, oxidative stress and blood coagulation, all central components of CVD, understanding the effect of COVID-19 on prospective changes in CVD risk, is critical.



The unit director, in her capacity as Associate Editor of *Frontiers in Cardiovascular Medicine*, section Thrombosis, has arranged a special issue with the topic: Inflammation/ infection and fibrin(ogen) to encourage research results on, amongst others, COVID-19 and coagulation.

INNOVATIVE APPROACHES AND PROGRAMMES

Research conducted by the unit encompasses continuous direct interaction by all 18 academic staff members, three research support staff, three post-doctoral fellows and 39 post-graduate students with the community. From direct community interaction by visiting community members at their homes, workplaces, or young research participants in schools – to connecting via social media, the unit strives to connect with the community whilst transforming the cardiovascular health scene within South Africa. Not only did the unit transform its staff complement, research approaches, projects, and funding over the past years, it also transformed its outreach towards the community.

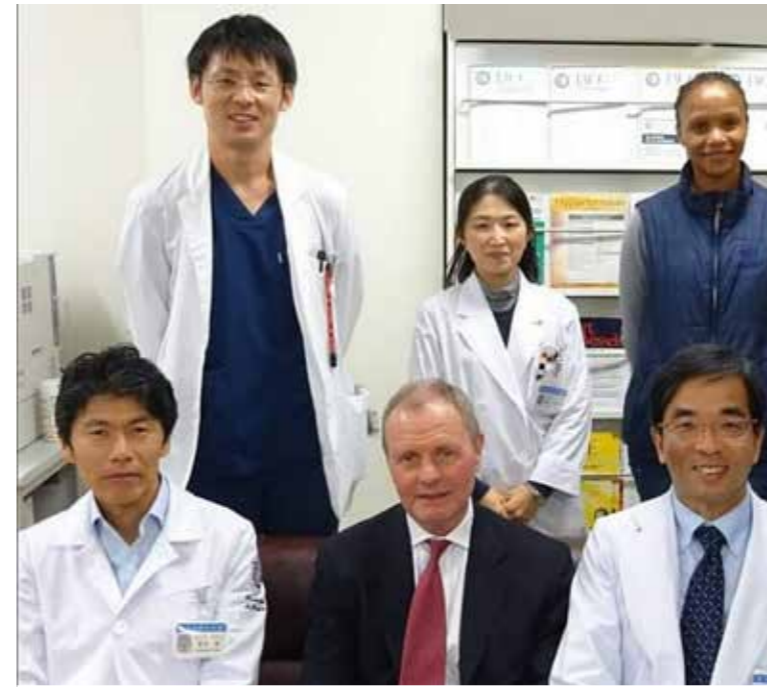
With our research which uses the latest technology such as polyomics and advanced cardiovascular phenotyping, we contribute to original cardiovascular profiling. Our approach to focus on a life course strategy of CVD development, consequently, includes the African youth. This allows the identification of possible novel biomarkers in addition to existing risk factors, which may provide more effective and sensitive screening indicators, predictors, or targets for implementation in successful prevention

programmes in Africans at younger ages. This has the potential to result in lower absolute numbers of adults developing strokes, heart, and kidney disease in later life – reducing the number of hospitalisations and burden on the healthcare system. In addition, we realise that a large proportion of South Africans suffer from comorbidities, such as infectious and CVD combined – which also requires specific attention. Our contributions of novel data and analyses in research publications aim to contribute towards better population-based CVD prevention, as well as better treatment and better care for South Africans.

IMPACT ON POLICY AND PRACTICE

In 2020, the International Society of Hypertension released the ISH Global Hypertension Practice Guidelines, which incorporates essential and optimal standards of care. This dual publication in *Hypertension* and *Journal of Hypertension* has reached some of the highest Altmetric scores for these journals of >1000 and has already been cited collectively >100 times. These guidelines are intended to be tailored easily for use in low resource settings and have been discussed with the South African Department of Health NCD section.

The senior author of the ISH 2020 Hypertension Guidelines is the previous unit director (AE Schutte) and close interactions with other unit members and other researchers on the African continent were made to ensure these guidelines are fit for global application. Furthermore, several original research contributions by the unit are cited



Division of Cardiovascular Medicine at the Jichi University of Medicine



Group of WHO Technical specifications on BP devices reviewing the cuff document

in these guidelines. AE Schutte was furthermore one of the main authors of a new World Health Organization Paper that was published in 2020: a Consensus Statement for Digital Blood Pressure Measurement Devices and Testing Standards <https://www.who.int/publications-detail/who-technical-specifications-for-automated-non-invasive-blood-pressure-measuring-devices-with-cuff>.

Other contributions by the EMU to contribute to South African policy changes include the salt legislation to reduce the amount of sodium in a range of processed foods. The unit contributed to a national study to monitor the sodium intake in South Africans before and after the legislation has passed. Additionally, based on 24-hour urinary sodium analyses from the African-PREDICT study, estimations on South Africans' salt intake were made to inform the Department of Health.

Further research and innovation within the unit include ongoing data capturing and participant examinations in prospective studies to better understand the detailed pathophysiology that underpins early vascular aging and CVD development in Africans. These approaches are based on earlier findings from the PURE study where we highlighted that CVD and hypertension develop early in life with extremely high percentages of South Africans suffering from CVD. By using novel approaches to identify these in early life, our ongoing research will address this important aspect.

The new UD, Prof M Pieters, together with Dr Zelda de Lange-Loots, in collaboration with Prof M Guthold from the Wake Forest University, Winston-Salem, NC, USA are working in the field of method development by developing automated techniques to characterise fibrin clot properties. To date, fibrin fibre diameter analyses obtained from scanning electron microscopy imaging is performed manually which is an extremely time-consuming procedure, ultimately limiting the sample size of projects employing this technique. Automation of this measurement using Diameter J, an Image J software plug-in will significantly shorten the analysis time, allow standardisation between laboratories, and allow the use of this technique in larger sample sizes. We are in the process of setting up such an automated analysis method to be used by laboratories world-wide performing this analysis.

CAPACITY DEVELOPMENT AND DIVERSITY MANAGEMENT

Our staff complement has shifted towards a young generation of researchers, including more women and more staff members from previously disadvantaged groups. These individuals are empowered to lead research projects within the unit by support provided for research visits to leading international research laboratories in order to further their training. Such visits have already been undertaken by two unit members, Dr Gontse Mokwatsi and Dr Lebo Gafane-Matemane. In addition, we have a strong capacity

development focus as can be seen from the large number of post-graduate students who are trained in the unit in health research. In 2020 we trained 32 female students and 15 students from previously disadvantaged groups.

The NWU furthermore has a Grow-Our-Own-Timber (GOOT) initiative that provides funding to previously disadvantaged students to complete their post-graduate studies while receiving mentoring to fast-track them for permanent appointment, particularly in cases where current staff members retire. An example of such an appointment is Miss Bakang Olifant, who is currently enrolled for a PhD and who has been earmarked to replace a current unit member, Pros Salome Kruger, who retired at the end of 2020. Another similar appointment in HART is Dr Gontse Mokwatsi who was recently appointed after the retirement of another HART senior staff member and who is already project leader of the UPRIGHT-HTM study within the unit.

In addition, all vacant positions in the NWU are advertised as BEE positions. These positions are only opened to other ethnic groups, should a successful candidate not have been found after three rounds of nation-wide advertisement. The NWU furthermore actively recruits post-graduate students from previously disadvantaged groups.

Lastly, a concerted effort is made pertaining to succession planning for individuals from previously disadvantaged groups within the unit. This includes such members forming part of the management team meetings of the unit, PI positions in unit research projects, attendance of management and leadership courses, development of national and international networks and access to research funding. The goal is to have a researcher from the previously disadvantaged groups appointed as the new unit director after the term of the current unit director comes to an end.

RESEARCH TRANSLATION

Interactions of unit members with the media (online, print, radio, television) are made on a continuous basis to both inform the public regarding general aspects of raised blood pressure/hypertension and CVD, and to translate our research findings to the general public and other stakeholders. These include:

- an online podcast on Mentorship on 13 May 2020 for the International Society of Hypertension, Mentorship Committee (AE Schutte). <https://open.spotify.com/episode/11qnQWkYUE5Qxjovf3RaB>
- AE Schutte participated in the PressureWise initiative of the High BP Research Council of Australia to interact with media: How to measure blood pressure correctly at home and the importance of medication adherence. Online, Australia, December 2020.
- A Q&A on using renin-angiotensin-system blockade during COVID-19 infection (AE Schutte). <https://www.georgeinstitute.org.au/news/hypertension-and-covid-19-is-there-a-link-qa-with-professor-alta-schutte>



REFLECTIONS ON 2020/21



Prof Carina Mels

The COVID-19 pandemic forced us to stand still, reassess and redirect our research. CVD remains one of the leading causes of death and disability and we are extremely excited to continue our path to find early indicators for future risk to ultimately enable targeted prevention and treatment strategies. However, we also needed to redirect and adapt our research to include SARS-Cov-2 infection as CVD risk factor in COVID-19 survivors.



Dr Lebo Gafane-Mateman

In the absence of any research activities involving contact with participants, we invested time in building national and international collaborations which contributed to the productivity of the Unit during difficult times.

- On the release of the Global Burden of Disease 2019 study in the Lancet (AE Schutte). <https://newsroom.unsw.edu.au/news/health/chronic-diseases-and-public-health-failures-fuelling-covid-19-pandemic-study>

Staff of the Centre of Excellence (CEN) requested a meeting with the Director of Nutrition of both the National and Provincial Departments of Health to discuss inputs from CEN in policy briefs.

SAMRC/UFH MICROBIAL WATER QUALITY MONITORING RESEARCH UNIT



Pandemics will come and go, and like with its predecessors, mankind shall overcome the COVID-19 menace, and exploit the benefits of the new knowledge and new sciences that have evidently come with it for the benefit of humanity.

Prof Anthony I Okoh Unit Director
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OVERVIEW

Our unit strives to be a highly profitable Centre of Excellence for the development of the next generation of microbial water resource specialists and to be primus inter pares in proffering solutions to the myriad of water quality challenges in South Africa and beyond.

This mandate is driven by the serious problem of shortage of skilled manpower in the water and sanitation sectors especially amongst previously disadvantaged demographic groups in South Africa. Our research therefore, is mainly directed at finding solutions to this reality through primarily addressing the myriad of challenges in the water and sanitation sector in the Eastern Cape Province (ECP) within the overarching aim of our research initiatives which is "evaluating some key emerging challenges in microbial water quality and safety as a vehicle for skills and capacity development in water science especially amongst the previously disadvantaged demographic groups in the Province".

RESILIENCE IN A TIME OF COVID-19

The unit has responded and adapted to the COVID-19 situation by reorganizing our research agenda to be compliant with all government's rules on COVID-19, including travels, use of PPEs, appropriate distancing in the lab and provision of sanitizers in our laboratory facilities.

The unit is a member of the SAMRC national wastewater coronavirus surveillance team and we're responsible for monitoring the wastewater treatment plants in Amathole

District Municipality and the Buffalo City Metropolitan Municipality.

The unit's membership of the SAMRC national wastewater coronavirus surveillance project has opened a vista of research opportunities and capacity development for several South Africans from previously disadvantaged demographic groups in the important area of environmental virology. Facilities kindly provided by the SAMRC for the project has been a great booster for our university's infrastructure and promises to be a key resource for sustaining the upward trajectory of our university's research outputs.

OPPORTUNITIES FOR INNOVATION

Since the inception of the unit, our research activities have been driven by the national imperative that recognizes that South Africa is in a "frozen demographic" in Science and Technology; and in our case, the serious problem of shortage of skilled manpower in the water and sanitation sectors, especially amongst previously disadvantaged demographic groups in the country, with the Eastern Cape Province (ECP) having a fair share of this challenge. We're also mindful of the effect of water and sanitation on public health and consequently on poverty alleviation, and our unit is obliged to assisting in finding solutions to this and other challenges in the water and sanitation sectors through capacity development and production of skilled critical mass in water quality science and management, and public health microbiology which are urgently needed in the sectors.



To achieve this aspiration, our research agenda has prioritized such focal themes as water/wastewater quality and genomics, including related emerging infectious diseases and survival of the pathogens; emerging chemical pollutants and their health implications; reservoirs of antibiotic resistance; and new bioactive compounds of health and biotechnological importance.

Our work is guided by SAMRC strategic goals: 2 and 4. Also, our work supports the objectives of the National Water Act, 1998 (Act No. 36 of 1998), and the White Paper on Science and Technology, which recognizes that South Africa is in a state of “frozen demographics” with respect to skills and capacity development in S&T. Our works in the ECP, which is mainly rural, and that our students are mainly from the previously disadvantaged demographic groups speaks to these strategies. Also, is the government’s goal of addressing the triple challenges of reduction of poverty,

unemployment, and inequality in the country. In this regard, over 12 Masters and four doctoral students have graduated from projects in our unit during the reporting period, which makes them competitive in the job market. All graduates from our unit have gained employment or pursuing higher degrees and thus have assisted in breaking the shackles of poverty in their families.

IMPACT ON POLICY AND PRACTICE

Our unit’s research agendas have no doubt contributed to the knowledge economy in South Africa and globally and our outputs in our various research thrusts have been veritable resources in influencing further research. A list of these projects in Antimicrobial resistance (AMR) in the food-water-agricultural products nexus; SAMRC national wastewater Coronavirus surveillance team; Water

Chemistry including innovative methods for the removal of antimicrobial resistance genes from water as well as studies on the occurrence, spatiotemporal distribution and health risk assessment of a number of persistent organic pollutants in the aquatic resources in the Eastern Cape Province, including polycyclic aromatic hydrocarbons, organochlorine, organophosphate and carbamate pesticides, polybrominated diphenyl ethers (PBDEs), polychlorinated naphthalenes (PCNs), BPA (bisphenol A), organophosphate flame retardants (OPFRs), heavy metals, some pharmaceutical and personal care products (PPCPs); Desalination of seawater by freshwater and marine cyanobacterial strains; Waste keratinous biomass valorization studies; Development of Laccase based sensors; Vibriology: Profiling virulence and antibiotic resistance determinants in isolates from Southern Africa and Eastern Africa; Anti-parasitic products; and Alternative to antibiotics in animal production

CAPACITY DEVELOPMENT AND DIVERSITY MANAGEMENT

The unit has been a veritable hum for capacity development especially amongst previously disadvantaged demographic groups in the country. Indeed, during the reporting period, we have trained 12 doctoral and 13 Masters black South African students. Of the doctoral students 11 were females while one is male; and of the Masters students eight are females while five are males, which is consistent with the national agenda of empowerment of women.

RESEARCH TRANSLATION

Our wastewater coronavirus surveillance project data feeds into the SAMRC COVID-19 database which is made available to government. We also publish our findings in DHET accredited journals to reach a wider audience as well as make presentations at national and international conferences.

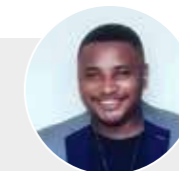


REFLECTIONS ON 2020/21



Dr Nolonwabo Nontongana

The secret of crisis management is preventing the bad from becoming worse. When it comes right down to it, the only way to face it – is together, and the only direction to face is-up! This, the COVID-19 experience has shown.



Dr Luyanda Msolo

As it all appears gloomy in this COVID-19 era, a unified front and self-discipline are the ultimate survival manoeuvres in these trying times. The COVID-19 regulations are meant to protect us and not to deprive us.



Dr KE Ebomah

Peace is not the abstraction of storms, but rather the product of resilience and strength during the storms and in the face of adversity, we should strengthen each other and build bridges via effective communication. COVID-19 provides an opportunity for unity in every community.

SAMRC/UCT RISK AND RESILIENCE IN MENTAL DISORDERS RESEARCH UNIT



Our Neuro-GAP team does research on the genetics of schizophrenia. The team said to me "Knowing that we were all in this together, made it easier to keep going forward."

Prof Dan Stein Unit Director
dan.stein@uct.ac.za

OVERVIEW

Our work at the SAMRC Unit on Risk & Resilience in Mental Disorders focuses on mental health. There is growing awareness of the high prevalence and costs of mental disorders – these conditions contribute to a significant proportion of the global and local burden of disease. Furthermore, as we successfully combat infectious diseases, we can expect that the contribution of non-communicable diseases, including mental disorders, will continue to increase. Our work contributes to generating new knowledge in this area, to technology development, to building capacity, and to translating research into policy and practice, in this area. There is an important need to transform health services to address mental disorders.

Our work ranges from basic neuroscience, on to clinical research, and from there to epidemiological and public mental health studies, that is from bench to bedside, and from the clinic to the community. Our research is diverse, ranging from contributions to nosology and epidemiology, to brain imaging and neurogenetics, and on to cohort studies and clinical trials. This diverse portfolio is appropriate, given our focus on building knowledge, technology, and capacity, in order to transform services. In order to elevate the quality of our work, we also collaborate widely across the country, continent, and globe.

INNOVATIVE APPROACHES AND PROGRAMMES

We have learned to work using virtual platforms – the bulk of our interaction is now done on these. We have begun clinical research again, with careful adherence to protocols. We have also responded by doing research on mental health aspects of COVID-19.

We are part of a number of international consortia which are exploring mental health aspects of COVID-19 e.g. a Harvard-led study of impact of COVID-19 on pregnant women, a UK-led study of neuropsychiatric aspects of COVID-19. There are opportunities to understand risk and resilience to mental disorders by using COVID-19 as a window on to the relevant underlying mechanisms. The mental health consequences of COVID-19 deserve particular attention.

A key publication from the Unit during this year focused on the feasibility of delivering a six-session blended imaginal desensitisation, plus motivational interviewing (IDMI) intervention for adults with methamphetamine use disorder. This work is important given how severe the tik epidemic is locally. The intervention showed potential effectiveness in the intention-to-treat analysis where frequency of methamphetamine use was significantly lower in the treatment than in the control group at both the 6 week and 3-month endpoints.

A second key publication from the Unit during this year focused on delivery of a task-shared psychotherapy intervention to pregnant mothers with symptoms of common mental disorders. This is particularly important group of individuals to target, as it is well known that mental disorders during pregnancy are associated with adverse developmental outcomes in children. Results were promising and support the use of registered counsellors to treat antenatal common mental disorders in perinatal primary health care settings.

A third key publication from the unit during this reporting period used epidemiological data to understand whether or not individuals find treatment for posttraumatic stress disorder helpful. Using data from around the globe, we found that the great majority of patients with PTSD would receive treatment they considered helpful if they persisted in help-seeking after initial unhelpful encounters – but that most patients whose initial treatment is unhelpful give up before receiving helpful treatment. The important take home message is that individuals with mental disorders should be strongly encouraged to persist with treatment. This key piece of advice needs to be included in treatment guidelines.

IMPACT ON POLICY AND PRACTICE

While the unit is involved in a range of projects that impact policy & practice, I wish to highlight our ongoing work on ICD-11, as this has global impact. During this time period, the unit has continued to play a key role in work

on the mental health chapter of the latest revision of the World Health Organization's International Classification of Diseases (ICD), the ICD-11. This includes participating in field trials and contributing to data analysis.

While the Unit has made particular contributions to the classification of obsessive-compulsive disorders, we also participated in a range of collaborative ICD-11 scientific publications, co-produced by leading units around the world, which provide the scientific basis of the revision of this widely-used nomenclature. A key publication this year focused on gaming disorder, a newly introduced condition, which deserves increased attention by policymakers around the world, given our growing immersion in digital environments.

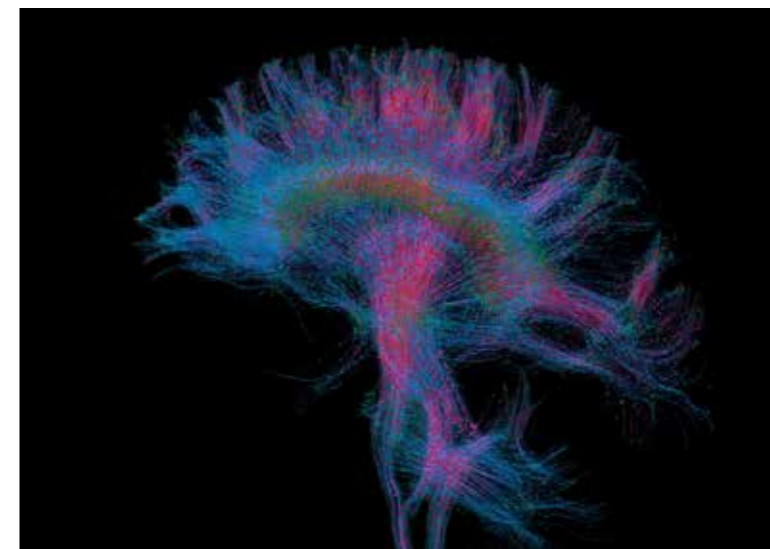
CAPACITY DEVELOPMENT AND DIVERSITY MANAGEMENT

Our unit has a strong focus on capacity development, with significant deployment of funds to support student fellowships. We are also keenly aware of the need for diverse researchers, that represent the local population, and strive to reach that profile.

Firstly, this is increasingly seen in the profile of our students, postdoctoral fellows, and staff. Secondly, examination of the achievements of past mentees of the unit indicates that many black researchers who have been members of our unit are now national and international authorities in their own right (including experts in posttraumatic stress disorder, substance use disorders, neurogenetics, forensic psychiatry, mental health epidemiology).

RESEARCH TRANSLATION

Firstly, our Mental Health Information Centre continues to play a key role in translating our work to relevant stakeholders and the public. It does this through continuous liaison with the media, and through taking direct calls from members of the public. Secondly, we work with the Western Cape Department of Health on a number of different projects, attempting to bring research outputs to services; this includes work on the integration of mental health interventions into primary care. Thirdly, we work with the National Department of Health on a number of issues e.g. during this time period we led the development of guidelines for medically assisted therapy for opioid dependence. Fourth, we work with the WHO on a number of projects, including classification and assessment of psychiatric disorders.



Diffusion MRI, also referred to as diffusion tensor imaging or DTI, of the human brain

SAMRC/WITS CENTRE FOR HEALTH ECONOMICS AND DECISION SCIENCE RESEARCH UNIT



2020 ushered in the COVID-19 pandemic, setting new levels of complexity researchers had to face. The SAMRC Wits Centre for Health Economics and Decision Science met this challenge head on, not only continuing to complete ongoing research but also to contributing to dealing with the pandemic in a myriad of ways. These included applying for and in some cases successfully accessing grants, writing editorials, providing analytic capacity and engaging with the media. The resilience and commitment of the research team and administrative staff has been exceptional.

Prof Karen Hofman Unit Director
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OVERVIEW

This unit addresses a critical gap investigating and developing a South African specific decision-making tool drawing on cutting-edge methodologies looking at economic and ethical implications. The unit has a multi-disciplinary research team undertaking robust evaluations of health interventions and policies across the quadruple burden of disease, including the determinants of disease.

The goal of the unit is to contribute to evidence-based decision-making and health priority setting in South Africa, promoting equitable distribution of scarce resources. Addressing the burden of disease and inequalities presents unique challenges. Careful priority setting taking costs and benefits into consideration is important to the success and sustainability of the NHI.

The unit contributes to the SAMRC strategy by leading research into new knowledge about priority setting, the economics of health and determinants (2); by analysing the best buys for health (3); by translating such research into policy (4) and by building human capacity in a previously neglected area of health research (5).

COVID-19 RELATED RESEARCH

The unit recognised early in the epidemic that priority setting was important in the COVID-19 pandemic and contributed in a number of ways:

PRICELESS staff volunteering

- Dr Ijeoma Edoke, Heather Fraser and Winfrida Mdewa, supported the COVID-19 modelling effort by estimating the inpatient care costs of managing severe and critical cases of COVID-19 in the public healthcare system. Dr Edoke has also represented the unit on the MAC vaccine costs committee
- Prof Susan Goldstein assisted NICD in writing up the DATCOV information and engaged with the MAC about a communication strategy.
- Dr Atiya Mosam – led a nationwide volunteer initiative providing food and money to people affected by the lockdown, engaged in advocacy initiatives and citizen education campaigns as well as providing public health guidance to various organisations. She also convened a national and global ward round for public health colleagues to share their COVID-19 experiences.
- Prof Hofman served on a number of bodies engaging with the costs and opportunity costs of COVID-19. As a member of the ASSAf standing committee on Health, Prof Hofman co-led (together with Prof Madhi) the ASSAf policy statement on the opportunity costs of the pandemic and published an editorial on the same topic.



Prof Hofman was profiled in the Daily Maverick as "the professor leading the fight for healthy eating choices"

PRICELESS applied for and received grants from:

- 1) IDRC Canada to measure the content and the process of making up food parcels.
- 2) UK MRC and NIHR to measure the opportunity costs of the lockdown and diversion of medical resources towards COVID-19 in an urban and rural setting. Led by PRICELESS this is a partnership with Wits SAMRC Agincourt Unit, Ezintsha (WHC) and Harvard School of Public Health.

In addition to the eight COVID-19 related publications over the reporting period, PRICELESS staff also made multiple presentations on aspects of COVID-19 in local and international webinars including topics of behavior change, legal implications, economic, policy and human rights.

INNOVATIVE APPROACHES AND PROGRAMMES

PRICELESS has performed comprehensively and published a significant and innovative research related to:

- Defining the cost of hypertension to South Africa for the first time
- Defining the costs of COVID-19 hospitalisation assisting in making difficult choices
- Exposing the potential underlying opportunity costs of focusing health services on COVID-19, and evaluating the impact of the Health Promotion Levy (Sugar Sweetened Beverages Tax)
- A policy analysis of NCDs, related to SSB taxes in seven sub-Saharan countries
- Exposing and understanding the commercial determinants of health in relation to obesity and NCDs
- Looking at costs and effectiveness of Diabetes interventions by income quintile, ensuring that equity is factored into the analysis
- Analysis of regulations related to front of pack labelling for processed foods.

IMPACT ON POLICY AND PRACTICE

The Director and the entire Unit were honoured to receive the inaugural Wits Vice Chancellor's award for social impact in 2020.

Evaluating the Health Promotion Levy (HPL) introduced in 2018 to save lives from obesity related conditions, has shown a positive impact and was quoted by the Minister in his budget speech. The data shows that this will both improve health and increase money available for government spending. The link between obesity and COVID-19 hospitalizations and death demonstrates the critical importance of this research for policy.

Maximizing the returns to investments in early nutrition, particularly for children in adverse contexts is innovative research that could inform the NDP long term.

Meaningfully engaging communities in priority setting has been a big hurdle for South Africa. In 2020 PRICELESS published the Choosing all Together (CHAT) deliberative methodology, demonstrating that communities can be meaningfully engaged in choices and trade-offs relating to mother and child health. A second research project is underway with communities to select nutrition interventions.

A study on the allocation and costs of seasonal flu vaccines fed into South African policy on seasonal flu vaccination through the NAGI and is even more relevant doing this COVID-19 pandemic.

COVID-19 work on costing of hospital inpatient care provided input to the Ministerial Advisory Committee's deliberations.

CAPACITY DEVELOPMENT AND DIVERSITY MANAGEMENT

This female led unit has complement of 83% female staff. The unit is centrally involved in the MPH Health Economics at Wits University and supervises these students as well as doctoral, and other MPH/ MSc students. Younger researchers are mentored and wherever possible black South Africans are brought into the unit, despite a scarcity of these skills in South Africa. The team has been supported through COVID-19 with innovative engagement online meetings and "care packages" have been provided. We are currently mentoring seven masters' students in health economics and two PhD students in health economics.

RESEARCH TRANSLATION

Working closely with government departments from the outset of our research has meant that we have been able to present our data and results ahead of time to the Treasury and to the National Department of Health. We are regularly approached by national and provincial media and by advocacy organisations to share research evidence and to translate this information for public understanding. Much of this related to our nutrition related research but since COVID-19 we have been regularly called on by the media to engage and interpret research findings. Prof Hofman was profiled in the Daily Maverick as "the professor leading the fight for healthy eating choices."

The unit regularly engages with the media (TV, Radio and Print). The media solicit our thoughts and views. We have produced several pieces for The Conversation and the Daily Maverick about the pandemic trade-offs and hand washing. Many opinion pieces were written about vaccine-related issues such as public engagement, communication, and priority setting.



REFLECTIONS ON 2020/21



Dr Teuri Rwafa

*"Every cloud has a silver lining they say"
For me, the result of the hard COVID 19 lockdown was a full PhD thesis in 3 months. The 'forced' quiet time and long hours at home, gave me an opportunity for a special writing retreat. All I did, was write the crisis looming around me away.*

Programme 2

MATERNAL, CHILD AND WOMEN'S HEALTH

PURPOSE OF THE PROGRAMME

To improve the health status and quality of life of women and children through high-quality scientific research that informs policy and practice, improves health services and promotes health

UNITS THAT CONSTITUTE THIS PROGRAMME

- | | | | |
|---|---|---|--|
| 1 | Gender and Health Research Unit | 3 | AMRC/Wits Development Pathways Research Unit |
| 2 | SAMRC/UP Maternal and Infant Health Care Strategies Research Unit | 4 | SAMRC/UCT Child and Adolescent Lung Health Research Unit |

PROGRAMME STRATEGIC OBJECTIVES

- To conduct and promote research for the improvement of maternal, child and women's health, while also making an impact on gender inequity and gender-based violence (GBV)
- To train and mentor high calibre postgraduate students in the field of maternal, child and women's health
- To synthesise evidence, optimise information and knowledge flow, influence policy and practice within the health sector and other sectors of government in relation to issues affecting maternal, child and women's health
- To develop interventions for prevention of gender-based violence for testing and evaluation of effectiveness in affected communities
- To test or evaluate interventions (programmes) to prevent GBV and reduce maternal and neonatal deaths in primary and secondary levels of care

RESEARCH HIGHLIGHTS UNDER THIS PROGRAMME

GENDER AND HEALTH RESEARCH UNIT



Hope and gratitude were the daily strengths that assisted me. It was not just the deep reflections of these two concepts at a personal level, but both hope and gratitude were about being part of the SAMRC community as we experienced the contribution and leadership the SAMRC made in alleviating the burden of the virus for everyone in the country.

Prof Naeemah Abrahams Unit Director
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OVERVIEW

The mandate of the Gender and Health Research Unit (GHRU) is to improve the health status and quality of life of women through high quality scientific research on gender and health that informs the development of policy, health services and health promotion. Our research focus on gender-based violence (GBV) and is responsive to one of the key human rights crises in South Africa and the world and has been placed on high priority by the political agenda within last year.

Our objectives are to measure and understand gender-based violence, to develop effective preventive interventions and to describe the mechanisms of the health impact of GBV and gender inequity and strengthening responses.

RESILIENCE IN A TIME OF COVID-19

GHRU established several systems to support staff (administrators, field staff and researchers) to adapt and to work effectively from home throughout the lockdown i.e. access to laptops, Teams, Zoom and facilitating access to data. We also provided immediate training on facilitation of on-line meetings, sharing 'Top Tips for working from home' and we often began team meetings with a 'check-

in' on how everyone was doing. We used this opportunity to build staff capacity and did online training in NIVIVO (qualitative analysis), Endnote and statistical methods.

The GHRU managers prioritised team members emotional and physical well-being, stressing the importance of self-care and COVID-19 protection. With the above the GHRU team adapted well to working from home and performance did not change despite the huge challenges encountered in the year.

Ethical and safety issues of doing GBV research under COVID-19 conditions was a huge concern. We adapted our research methodologies to ensure safety of survivors and these experiences was to learn from and shared with the global research communities. We also adopted several innovative approaches for conducting research using various digital technologies to conduct interviews. More importantly we responded to the many new research questions that arose as a result of the pandemic and identified key research questions around gender, women's health and wellbeing and COVID-19 and lockdown.

As early as April 2020 several new studies on the impact of COVID-19 were initiated and funding sought successfully. These include the impact of COVID-19 on Sexual and Reproductive Health Services; impact on family relationships (including among health care workers);



experiences of leaving abusive partners during the hard lockdown and Femicide during 2020 has been planned.

We completely reengineered our workshop based Masibabane PrEP study and developed an online based intervention and control condition. We also seized opportunities presented by COVID-19, in particular we have piloted a number of innovative research methodologies which will continue to be effective during the pandemic and which we can continue to use beyond COVID-19.

Some of these methods are cheaper and safer than traditional fieldwork and, in some cases, enable access to participants who otherwise may struggle to attend interviews, due to gendered-domestic responsibilities, disabilities etc. Furthermore, with the increase of effective online meetings, webinars, conferences, and networking we have seen a significant increase in attendance of team members at strategic events, where previously cost or other commitments may have prevented attendance.

Finally, we were able to position ourselves as a significant stakeholder in a number of critical debates pertaining to COVID-19, lockdown, GBV and gender and many of these included within policy makers i.e. discussion with ANC-leadership on gender based violence and femicide and the role of the alcohol ban and GBV and we offer evidence-based policy recommendations based on previous research

We started several large research projects in this year. The 3rd national femicide study is in the field and includes the data collection for the BOD led male homicide study. We will use this data as a baseline against which to assess changes in femicide and child homicide in 2020 during the first year of the COVID-19 pandemic, with further data collection planned for 2021-22.

A study led by Dr Andrew Gibbs (budget: GBP1.7million) using an inter-disciplinary approach to understanding and intervening on contextual factors that shape HIV-risk for young women and men in South Africa in both rural and urban informal settlements in KZN.

A COVID-19 related study led by Dr Pinkie Mahlangu started to explore the links and impact of COVID-19 on gender-based violence, mental health, and livelihoods. A second component of this study is among frontline health care workers to understand how working during COVID-19 impacted on family dynamics. Dr Jill Hanass-Hancock also started a study that focus on understanding how the sexual and reproductive health rights of women with disabilities was affected by COVID-19 conditions.

IMPACT ON POLICY AND PRACTICE

Evidence from the global What Works to prevent Violence against women and girls programme has been disseminated very widely through its articles and reports, via social media and through presentations to multiple audiences. It continues to influence international guidelines and funding decisions. It has been widely cited in the recently released WHO of global prevalence estimates on VAW, and at the high-level launch of the report in Geneva (15 March 2021). It has been used by UN Trust Fund to guide applicants for its multi-million-dollar annual investment in VAW prevention.

The release of the findings of the long term impact of rape on HIV acquisition from the Rape Impact Cohort evaluation (RICE) study has raised critical questions on post rape care – most importantly, the need for long term mental health care and the role of PrEP as part of post rape care. This has led



to engagements with the HIV sector in South Africa and we developed a research agenda on how to effectively combine mental health and PrEP support as part of post rape care.

Numerous research translation activities of which the most salient is the task given to the unit by the Department of Justice to revise the National Strategy on the Prevention of Femicide. In addition the Unit supported the implementation of the National Strategic Plan (NSP) on gender-based violence and femicide with Dr Nwabisa Shai co-leading the development of the Solidarity Fund's second GBV strategy to bring relief to Community Based Organisations (CBOs) and communities adversely affected by the COVID-19 pandemic, providing R75 million funding for prevention, response and access to justice strategic focus areas. Dr Shai also served as the Chairperson of the Selection and Evaluation Panel adjudicating 695 applications from CBOs and Non-profit organisations (NPOs).

CAPACITY DEVELOPMENT AND DIVERSITY MANAGEMENT

Several senior staff members continued to supervise post-graduate students with four students graduating in this year (three PhDs), and the unit has had one Postdoc. In the context of COVID-19 lockdown, the unit has kept a vibrant learning environment through monthly in house training meetings and encouraging staff to attend online courses/webinars/seminars/conferences and to spend time networking on-line, which opened up opportunities for emerging scientists.

We have also particularly focused on developing proposal writing skills, with teams working on different funding opportunities and all the Unit's Black female post-doctoral scientists have successfully submitted research proposals

as Principal Investigators. Some of these proposals have focused on marginalised communities i.e. disabled women and girls and LGBTQI communities.

RESEARCH TRANSLATION

Research translation happened on multiple platforms. The unit hosted two webinars on the release of study findings (27 August and 1 December 2020). We have published 38 peer reviewed publications in this year. More specifically we have analysed data and prepared manuscripts from the nationwide community-led cross-sectional study of HIV prevalence, treatment adherence and drug resistance, violence, mental health, and associated factors amongst female sex workers in South Africa, led by the post-doctoral fellow Jenny Coetzee. This work has highlighted the very high levels of violence from police, clients, intimate partners, and other men to which sex workers are exposed. It has also highlighted the generally good progress towards the 90 90 90 targets that have been achieved by the sex worker programmes, and great concern about the difficulty in maintaining this in the context of restrictions on funding of programmes, and harsher economic environment due to COVID-19.

GHRU has continued to publish from the large datasets generated in What Works to Prevent Violence Against Women and Girls and has explored such questions as: which men change in response to VAWG prevention interventions? What are the trajectories of their change? What are the pathways to VAWG prevention in the face of interventions? In addition to publishing the main outcomes of many of the evaluations of VAWG prevention interventions conducted across the 13 countries of the What Works Programme.

We have also published the main paper from the Rape Impact Cohort Evaluation (RICE) study as described under highlights below.

Further research translation activities include numerous presentations to academia locally and internationally, civil society, policy makers including UN bodies and South African Government structures.

Some of the policy engagements include:

- Dr Nwabisa Shai Presentation to the National Planning Commission Roundtable on Gender Based Violence – 29 June 2020
- Dr Leane Ramsomaar co-presented with ATODRU to the ANC study group on measures to curb harmful use of alcohol in South Africa, with specific reference to evidence on the association between alcohol and GBV and responses to alcohol & GBV link – 30 June 2020
- Dr Leane Ramsomaar presented to the Commission on Gender Equality (CGE) on Associations between Harmful Alcohol Use and Gender Based Violence (GBV) – 12 November 2020
- Dr Leane Ramsomaar contributed to the SAB legal case with evidence on the link between alcohol and GBV-case brought against SA government around the ban on alcohol during COVID-19 lockdown
- Dr Naeemah Abrahams and Dr Rachel Jewkes presented to The National Council of Provinces: The rule of law as a deterrent to address the Scourge of gender based violence and femicide in South Africa: 28 August 2020.
- Dr Naeemah Abrahams and Dr Rachel Jewkes presented to The National Council of Provinces: Femicide in South Africa: 29 July 2020.



Ms. Bongwiwe Huysamer and Ms. Akhona Ncinitwa at Oudtshoorn SAPS, Klein Karoo on the 2nd of June 2021 conducting interviews with SAPS members for the national femicide and injury mortality study



REFLECTIONS ON 2020/21



Pinky Mahlangu

One did not realise the important role played by colleagues at work until we had to work from home during COVID-19 lockdown. For us who are like pillars and people whom our families and communities drew strength from, GHRU colleagues were like wind beneath one's wings, provided space to be vulnerable, express anxiety, and get support during the difficult times of COVID-19 pandemic.



Jill-Hannas Hancock

Resilience has been captured in our ability to bounce back from life's challenges, unforeseen difficulties, and personal loss, with the support of our colleagues, families, and friends, through nurturing our mental wellbeing in times of crisis and through the love for our work that aims to change the world into a better place.

- Dr Naeemah Abrahams, Dr Yandisa Sikweyiya, Dr Mercilene Machisa and Dr Pinkie Mahlangu presented to the Department of Youth and People with Disabilities on Research and interventions on intersections of mental health ill health and violence against women on 22 February 2021.

Multiple engagements with the media occurred throughout the year with all media platforms. A number of radio interviews were done in a local language. A robust media and communication strategy were planned in the release of the findings from the RICE study. Dissemination products included: 1) Research brief; 2.) A targeted multi-stakeholder high level webinar; 3.) Op-editorial for the Daily Maverick; 4.) media piece – Bhekisisa, 5.) Social media post and amplification 6.) Television interviews – Newsroom Afrika.

MATERNAL AND INFANT HEALTH CARE STRATEGIES RESEARCH UNIT



The Unit, because of its national network, was quickly able to collect and coordinate obstetricians, paediatricians, family practitioners, midwives and nurses, administrators to produce guidelines for managing COVID-19. These were circulated to all relevant stakeholders before submitting a consensus document to the NDoH, which was then accepted and became policy. The network has regularly updated the Framework document and it is currently on version 3.5 and was last updated on the 16th February 2021.

Prof Robert C Pattinson Unit Director
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OVERVIEW

The SAMRC/UP Maternal and Infant Health Care Strategies Research Unit works to seek saleable, sustained solutions for maternal and infant care at the primary and secondary levels of care. By this we mean we perform research to determine effective interventions in maternal and infant care and then develop strategies to ensure that the health care managers (affordable), providers (implementable) and the pregnant women and their infants (effective) find the interventions are acceptable and sustainable.

RESILIENCE IN A TIME OF COVID-19

The unit has continued with most of its research programmes but adopted a 'work from home where possible' policy. We were able to continue to see study patients as we were also providing them with a clinical service.

We also headed a national team to develop a response for the Maternal and Neonatal Services for COVID-19. We produced a "living" document on the guidelines to manage pregnant women and their neonates exposed or having COVID-19. This document was accepted by the National Department of Health (NDoH) and has been updated regularly.

COVID-19 RELATED RESEARCH

As part of the response to COVID-19 we set up a monitoring system for the NDoH for the effects of COVID-19 on pregnant women and their neonates; as well as investigating

the effect of COVID-19 on maternal and perinatal deaths and use of maternal and reproductive health services. In addition, we initiated a local multidisciplinary study on the placental effects of COVID-19.

The unit is part of the SA COVID-Kids study and South African leg of a WHO-sponsored multi-country paediatric COVID-19 study. In addition, we lead a research project on the effects and impacts of the COVID-19 pandemic on the maternal and child health services in Tshwane District.

The CLEVER Maternity Care project conducted two studies in the Tshwane District on maternity health care workers' perceptions of their own wellbeing and changes in practices after the start of the COVID-19 pandemic, and on women's birth experience and breastfeeding practices 6 weeks after birth. In collaboration with researchers from other universities, our unit is leading a national prospective observational study looking at the effects for COVID-19 infection in pregnant women.

OPPORTUNITIES FOR INNOVATION

Few opportunities arose out of COVID-19 for the unit, and in fact some of the starting dates of our projects have been delayed. However, we have been able to document the effect of COVID-19 on pregnancy by creating a database for the NDoH and recording the pregnancy outcomes of women with proven COVID-19 in pregnancy.

We also have monitored the effects of COVID-19 on the use of maternal and reproductive health services and provided an analysis for the NDoH and Ministerial



Jane Ntima (Research Assistant), Sheilla Sono (Research Assistant) & Mothusi Nyofane PhD candidate



Advisory Committee (MAC) on COVID-19. The placenta and COVID-19 study brought together a multi-disciplinary team consisting of clinicians and basic sciences.

The studies in the CLEVER Maternity Care project afforded the Unit the opportunity to work with the Tshwane District Management to give timely feedback on issues that needed attention.

The national COVID-19 in pregnancy study is a strong research collaboration between all universities in South Africa, with centralised data management at our unit. The set-up of a research platform like this will in future enable rapid and nationwide data collection on other pandemics or diseases in pregnancy.

Umbiflow research: This project has expanded from prevention of stillbirths to also include identifying fetuses, neonates and infants at risk of adverse outcomes in infancy, childhood and as an adult. In addition to the Umbiflow studies in pregnancy, the postnatal effects of fetal growth restriction on growth and body composition (using the deuterium dilution method) as well as on neurodevelopmental outcomes of the children are being studied in a longitudinal cohort study. This research is multi-disciplinary, as well as novel and highly relevant towards the improvement of maternal and child health in South Africa.

The Siyakhula study examines the impact of maternal HIV-infection on the growth, developmental outcomes, and immunological profiles of the HIV-exposed-but-uninfected children. The study is fully recruited, with longitudinal follow-up continuing. The research is highly relevant to the South African setting, where more than a quarter of children are exposed to maternal HIV infection in the foetal and early childhood periods.

INNOVATIVE APPROACHES AND PROGRAMMES

The screening of pregnant women with Umbiflow has been shown to have a significant impact on perinatal mortality in South Africa, and implementation studies are currently underway to identify barriers and facilitators in scaling up the use of Umbiflow in several districts. This will inform Umbiflow rolled out South Africa.

The UmbiBaby study, which is looking at infant outcomes from mothers who were assessed with the Umbiflow device in pregnancy as part of the Umbiflow International study South African site, is ongoing. A cohort of 91 infants were followed up in a longitudinal study that assessed their growth (anthropometry and body composition) and neurodevelopment over time. In addition a further study, the UmbiGodisa study, which aims to enrol a larger cohort of infants from the Umbiflow International study at the age of 18 months was started in February 2021 in order to study what factors could be causing fetal growth restriction e.g. the impact of maternal HIV infection, maternal body composition etc.

CAPACITY DEVELOPMENT AND DIVERSITY MANAGEMENT

The unit has greatly expanded on the number of PhD students, currently housing 11 PhD candidates in the various stages of their research projects, from protocol development to finalization of dissertation. The PhD candidates include students from clinical disciplines (Obstetrics & Gynaecology, Paediatrics), Nutrition, Food Sciences as well as from Basic Medical Sciences (Immunology).

IMPACT ON POLICY AND PRACTICE

The unit has integrated the Umbiflow apparatus into Basic Antenatal Care Plus and this is being scaled-up in Tshwane and Ehlanzeni districts. The programme integrates Umbiflow and review of the pregnancy at 30-34 weeks gestation which are current BANC Plus visit times. The unit has previously shown that BANC Plus has improved antenatal care and reduced perinatal mortality. (Hlongwane TM, Bozkurt B, Barreix MC, et al. Implementing Antenatal care recommendations, South Africa. Bulletin of the World Health Organization. 2021; 99: 220–227. <http://dx.doi.org/10.2471/BLT.20.278945>).

Lavin T, Pattinson RC, Kelty E, Pillay Y, Preen DB. The impact of implementing the 2016 WHO Recommendations on Antenatal Care for a positive pregnancy experience on perinatal deaths: an interrupted time-series analysis in Mpumalanga province, South Africa. BMJ Glob Health. 2020 Dec; 5 (12):e002965. <https://doi.org/10.1136/bmjgh-2020-002965>

The unit has developed and continually updated the "South African Framework and Guidelines for Maternal and Neonatal Care during a Crisis – COVID-19 response: Living document (Version 3.5) 16 February 2021". This document provides information for managers, clinicians and health care providers at all levels and information for pregnant women on COVID-19 and its management. It is available on the SAMRC COVID-19 in children website (<https://www.samrc.ac.za/intramural-research-units/covid-19-children>).



REFLECTIONS ON 2020/21



Tsakane Hlongwane

Amidst the shocks and crisis, it was inspiring to see clinicians, researchers and stakeholders come together for one cause. All driven towards one purpose, and this birthed an evolving Maternal, neonatal and child health framework. It also encouraged new collaborations and presented new learning and teaching challenges, solutions and kept us committed to saving mothers and children.

SAMRC/WITS DEVELOPMENTAL PATHWAYS FOR HEALTH RESEARCH UNIT



We encounter many challenges, such as COVID-19; scientific research can help us overcome such challenges. As scientists we need to be able to act fast and be nimble when challenges arise.

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OVERVIEW

The Developmental Pathways for Health Research Unit (DPHRU)'s mandate is to investigate genetic, physiological, psychosocial and lifestyle determinants of growth and development, risk of metabolic disease, and healthy ageing, through innovative, multi-disciplinary methodologies across the life-course so as to improve health in South Africa. Specifically, DPHRU aims to elucidate important pathways to health and development in these areas: (i) maternal and child health and nutrition, (ii) growth, psychosocial and physical development, and (iii) obesity and non-communicable disease (NCD) risk in South Africa.

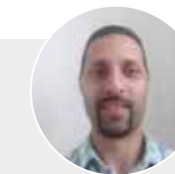
Our focus on interventions to improve maternal and child health, as well as the trajectories and predictors of non-communicable diseases including diabetes and hypertension, fits well as the SAMRC focuses on the top 10 causes of mortality in South Africa, and reducing morbidity and improving health outcomes. DPHRU continues to explore innovative approaches to improving health through not only the design of complex interventions, and we continue to focus on capacity development (over 20 PhD students associated with DPHRU) and research translation.

OPPORTUNITIES FOR INNOVATION

DPHRU has explored various opportunities to collect COVID-19 data, including an application to the SAMRC to add questions onto AWI-Gen data collection. This application was not successful however the study team from this project and many other DPHRU projects has continued to collect data telephonically in order to continue with data collection.



REFLECTIONS ON 2020/21



Yusuf Guman,
Centre Manager

Life is full of obstacles that we have to overcome COVID-19, which is more than just an obstacle. It is the hardest thing I have faced in my life and I am sure others can attest to that as well, having lost family and friends, but we should all still have a belief that we can overcome this virus and it can be beaten. The staff in the unit have proven that despite the obstacle we are facing, we all move forward and keep going.

INNOVATIVE APPROACHES AND PROGRAMMES

DPHRU has provided good evidence of efficient and extensive health research by publishing 120 papers in 2020, as well as graduating four PhD and one Masters students. These publications have been achieved by a small research team in collaboration with national and



Laboratory technician processing blood samples



This is the "RX Daytona+" analyser used for analysis of Glucose, Lipids, Albumin, Creatinine



This is a "Hologic Discovery W" whole body bone density scanner used for DXA scans

international colleagues. All researchers at DPHRU are continually looking for opportunities to translate and disseminate their findings, and in many ways, this was made easier during COVID-19 lockdown by contributing to the many webinars that were organised in the health science field. Innovative approaches have not only been used for research, but also so that data collection could continue virtually. Several studies continued with the collection of questionnaire data as well as qualitative focus group discussions and in-depth interviews virtually.

The MENOPAUSE study is one of the studies that collected all of its qualitative data virtually, and as a result of the findings is in the process of designing information leaflets on menopause. An emerging scientist (Alessandra Prioreschi) was awarded a WT training fellowship to execute a trial exploring an innovative intervention that measures infant movement and behaviour and feeds back to the mother to influence maternal-child interaction as a mechanism to improve early child development.

CAPACITY DEVELOPMENT, DIVERSITY MANAGEMENT AND RESEARCH TRANSLATION

We have identified an upcoming researcher (Gudani Mukoma) and have supported him to move forward his PhD and to launch his own research programme within SAMRC called ACTION (African Centre for Obesity Prevention; <https://www.action-obesityafrica.org>).

DPHRU researcher Associate Professor has been instrumental in the development and implementation of the 24-hour movement guidelines for children (0-5yrs) – <https://pubmed.ncbi.nlm.nih.gov/31877557/>.

SAMRC/UCT CHILD AND ADOLESCENT HEALTH RESEARCH UNIT



The resilience and commitment of staff to child health throughout this time, has been remarkable. The pandemic has shown the importance of flexibility and of working together. At times like this, it has been inspiring to see the amazing generosity and care that the unit team and others have been able to provide.

Prof Heather Zar Unit Director
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OVERVIEW

The SAMRC Unit on Child and Adolescent Health was established in 2015 to conduct research in child lung health across the region and to build capacity amongst local health scientists operating within and in partnership with the unit. The unit has established research centres supporting a multitude of projects focusing in particular on childhood illnesses including pneumonia, respiratory syncytial virus (RSV), tuberculosis (TB), HIV-associated illness, and asthma. Outputs from the unit's research have gone on to influence national and global health guidelines supporting a translational approach to research ensuring findings affect change.

The unit has established a birth cohort, the Drakenstein Child Health Study, where the focus has been to study the determinants of child health and long-term impacts on neurocognitive development, growth, and lung health. The unit also operates multiple tuberculosis cohorts and conducts clinical trials.

Specific objectives of the unit:

1. To expand and strengthen existing research and collaborations in child lung health to improve lung health in South Africa and the region.
2. To develop new research programs specifically focused on translational research and new collaborations addressing major African childhood respiratory diseases.

3. To provide a platform for the training of clinician scientists in child lung health, particularly African and women scientists.
4. To promote implementation of research findings into policy and practice.

RESILIENCE IN A TIME OF COVID-19

The unit has directly responded to COVID-19 by not only making several operational changes to ensure the safety of team members and participants in studies and ongoing work but also by expanding the scope of research focus to include the impact of SARS-CoV2 on child health. During this time, the unit has also responded by:

- Adding an additional focus of study that includes SARS-CoV2 infection or disease in HCWs
- Adapting several studies that were interrupted due to COVID-19 to allow catch-up of data collection or omission of some aspects
- Suspending several study activities (e.g. aerosolising procedures such as lung function), for periods of time
- Adapting to an inability to conduct some face-to-face visits by substituting telephonic interviews
- Employing additional staff to ensure study of COVID-19 aspects could occur; adapting the work of others to allow many staff to work from home and excluding high risk staff from the patient interface



Birth Cohort, the Drakenstein Child Health Study

- Increasingly relying on electronic data collection, telephonic interviews, and remote data collection
- Undertaking socially responsive initiatives including the widespread making of masks (for participants and their families), scrubs (for staff) and poverty alleviation initiatives for participants and families
- Undertaking substantial educational initiatives for staff and participants to ensure better understanding of infection control, and other aspects of the pandemic
- Engaging in national and international efforts on COVID in children to promote effective public health policies and child health

COVID-19 RELATED RESEARCH

The unit has begun work on a number of COVID-19 research projects including those on healthcare workers and in the field of paediatrics as part of our ongoing cohort study work. Measurement of SARS-CoV-2 infection or COVID-19 has been included in several ongoing studies including those of TB cohorts and those involving pneumonia in hospitalised children. Specific additional studies that were initiated include:

- To investigate the spectrum, determinants, and long-term outcome of SARS-CoV-2 in African children, immune responses, and protective role of prior sHCoV (2020-2022)
- SARS-CoV-2 and serological responses in a South African birth cohort (2020-2022)
- Pan European and South African paediatric Health Care Worker SARS-CoV-2 Antibody Prevalence (2020-2021)
- Surveillance for COVID in children hospitalised with lower respiratory tract infection
- Investigating SARS-CoV2 infection in children with suspected TB
- Studies enable investigation of the spectrum, determinants, and long-term outcome of SARS-CoV-2 in children, immune responses and protective role of prior seasonal coronaviruses.
- The "Pan European and South African paediatric Health Care Worker SARS-CoV-2 Antibody Prevalence (2020-2021)" evaluated seroprevalence in HCWS of all cadres at Red Cross Children's Hospital. The findings from this study indicated a low seroprevalence amongst the 200 healthcare workers included in the study at our study site.



OPPORTUNITIES FOR INNOVATION

The unit was well positioned to extend ongoing studies and to submit proposals to national and international funding agencies for funding related to understanding the impact of COVID-19 on children. New study activities were added to study protocols allowing expansion of the scope and network of studies to understand how COVID-19 impacts the paediatric population and investigate why children develop relatively mild illness.

The opportunity for adapting work processes while a challenge has also allowed new ways of working. There has been increased cross study working with study activities including telephonic completion of questionnaires, telephonic screening of participants, and scheduling of visits. Cross-collaboration between teams benefited the unit by creating more adaptive, multi-disciplinary teams.

The pandemic has also resulted in critical appraisal of what core work is needed to be done face-to-face. As a result, we have rationalised and minimised data collection in several studies, enhancing efficiency.

Opportunities for community engagement also occurred and for conveying public health messages and education around COVID-19. For example, masks were procured for all participants and families, enabling communication around the importance of social distancing and mask wearing in containing the epidemic. The unit was also able to undertake other socially responsive initiatives in addressing the large economic impact of the pandemic with initiation of poverty alleviation initiatives

OPPORTUNITIES FOR INNOVATION

Through research, the unit has contributed new knowledge to the field of diagnostics and preventative interventions for priority childhood illnesses. The unit's capacity extends from clinical and epidemiological, to microbiological and laboratory-based research.

In line with SAMRC's goals, the unit has developed collaborations and partnerships with leading scientists with a focus on the establishment of networks with other institutions from the Global South. These partnerships have led to innovative research collaboration including: longitudinal analyses of microbiome interactions to understand pneumonia aetiology, innovative testing for TB including stool, urine, and exhaled breath test analysis, brain imaging in children and adolescents to understand the impact of exposures (including HIV) and association with neurocognition, breast milk microbiome analyses, and participation in multicentre trials of new RSV preventative interventions including both maternal and child vaccination strategies to test novel long acting monoclonal antibodies.

The unit provides ongoing support to satellite sites and partners through strong collaborations in both basic science and public health. The main research sites are located at the Red Cross Children's Hospital, in community peri-urban settings outside Cape Town and in the Eastern Cape. The Unit has several collaborations with local, African, and international partners building local capacity both of resources and expertise. The unit continues to support a high number of masters, doctoral and post-doctoral students from South Africa and Africa. During the reporting period the unit has supported the work of 19 Masters students, 22 PhD students and four Post-doctoral fellows.

INNOVATIVE APPROACHES AND PROGRAMMES

During the current reporting period, the unit contributed publications in peer-reviewed journals, many in high impact journals. Major outputs included publications on complicated pneumonia in children, a systematic review examining the evidence for a causal effect of respiratory syncytial virus lower respiratory tract infections on subsequent wheezing illness, changes in lung functionality of children on antiretroviral medication, and the impact of early life respiratory syncytial virus lower respiratory tract infection on long term lung health including wheezing and lung function in children in our birth cohort. Other novel findings from this birth cohort study include the impact of other early life exposures on lung health – impairment in lung function at two years was associated with early life pneumonia but was not specific to RSV. Impairment was also associated with HIV-exposure in children whose mothers had uncontrolled HIV in pregnancy. Antenatal exposure to indoor air pollution (particularly toluene) or tobacco smoke, were also associated with lower lung function which varied by at-risk genotype and DNA methylation sites, providing novel information regarding disease pathways.

Longitudinal neurodevelopment assessments with brain imaging in a subset have shown that alcohol use during pregnancy was associated with impairments in early motor development; there are important protective effects of maternal education, birth weight, and socioeconomic status on developmental outcomes at two years; HIV-exposed uninfected children have language delays at two years compared with HIV-unexposed children

Novel findings from tuberculosis studies were poor sensitivity and specificity for LAM testing of urine even in HIV-infected children; providing the first paediatric data on FujiLAM results on urine testing, which found higher sensitivity in HIV-infected or malnourished children (approaching 60%), and improved specificity. In collaboration with USA and Canadian collaborators, five specific molecules were identified in exhaled breath condensates that distinguished children with TB compared to other lower respiratory illnesses; this provides important novel data for further large studies that may lead to better non-invasive tests for paediatric TB. Further ongoing work on RNA expression in children with TB has identified a promising signature to distinguish TB from other LRTIs.

There have been several key findings in the HIV-infected adolescent cohort study, CTAAC (Cape Town Adolescent Antiretroviral Cohort) (compared to age matched controls) including:

- Perinatally HIV-infected adolescents had lower lung function at baseline which tracked longitudinally compared to HIV-uninfected adolescents.

- Perinatally HIV-infected adolescents had a high incidence of hospitalization in a 64 month follow up period despite the use of antiretroviral therapy (ART).
- The incidence of tuberculosis disease was high in perinatally HIV-infected adolescents well established on ART, despite similar infection rates to HIV-negative adolescents.
- Perinatally HIV-infected adolescents on ART have a high prevalence of bronchiolitis obliterans.
- HIV-infected adolescents with delayed ART initiation showed less activation during processing conditions on functional MRI. There were also regional differences in brain imaging consistent with impairments in structures involved in maintenance working memory.
- Despite viral suppression, perinatally HIV-infected adolescents were at increased risk for endothelial dysfunction compared to age-matched youth without HIV. In addition to poor endothelial function, there was persistent evidence of monocyte activation and gut barrier dysfunction compared with HIV-uninfected youth.
- Stiffness index (used as a measure of bone health) was significantly lower in among participants with HIV than in HIV-uninfected participants, especially during puberty. Among the adolescents with HIV, having a detectable viral load and the use of lopinavir/ritonavir were risk factors for low stiffness index.

The unit received funding to investigate the spectrum, determinants, and long-term outcome of SARS-CoV-2 in African children, immune responses, and protective role of prior sHCoV. Leveraging two child cohorts, this innovative research will enable us to investigate symptomatic and asymptomatic SARS-CoV-2 and serological responses, including cross-reactivity and cross-protection from seasonal coronaviruses. We will also be able to compare clinical, immunological, and inflammatory profiles and long-term outcomes of children with COVID-19, with asymptomatic infection, and with other viral-pneumonia, in a LMIC community and hospital setting.

CAPACITY DEVELOPMENT AND DIVERSITY MANAGEMENT

The unit has contributed to the growth of research capacity in South Africa through infrastructure development and the expansion in scope and diversity in the field of childhood illnesses. The unit has supported the expansion of the research conducted at the Red Cross Children's Hospital, as well as the support of three research sites in Paarl and development of research in neonatology at Groote Schuur Mowbray Maternity and New Somerset Hospitals. The unit has established a tuberculosis research site in the Eastern Cape at the Dora Nginza Hospital (Nelson Mandela University), with substantial capacity development in

paediatric TB. Ongoing TB studies include a cross African study involving sites in Mozambique, Malawi, and Tanzania.

Our unit supports 74 staff members including 50 from previously disadvantaged backgrounds (68%) and 65 females (80%). Further, the unit supports 39 postgraduate current students who are working on their Post-doctoral, Doctoral, or Masters level studies, with a high proportion from previously disadvantaged backgrounds and the majority female. Several students have received awards or successfully obtained funding, with a focus on building independent academic careers.

RESEARCH TRANSLATION

During the reporting period our research has been translated to stakeholders and the public through publications and international conferences utilising online platforms. Information related to the impact of COVID-19 on Respiratory Syncytial Virus (RSV) and other respiratory infections, pneumonia, and TB in children as well as transmission and mask wearing has been provided by unit researchers to several media outlets including newspaper, radio, and television. Ongoing engagement with stakeholders including the Department of Health has ensured findings can be translated into policy.

Carte Blanche interviewed the unit director about COVID-19 study activities related to an MRC UK GECO award received for COVID-19 research in the Drakenstein Child Health Study. In November 2020, the media team came to film an interview at the Mbekweni study site in Paarl, where study participants were attending their COVID-19 study visits. This information was disseminated to more than 150,000 weekly Carte Blanche viewers.

Data on surveillance provided from our site to the NICD has been disseminated through publications and is provided weekly to the Department of Health and other stakeholders. Key results on TB studies have been provided to the WHO to inform global recommendations for paediatric TB.

Results from DCHS have impacted on policy in several areas including maternal and child health, pneumonia, TB, neurodevelopment, growth/nutrition, and chronic respiratory disease. The impact of environmental, maternal, and other exposures in early life on chronic illness have also been reported. A policy document has



REFLECTIONS ON 2020/21



Jacinta Munro,
Data Manager

Looking back, the words of "WE are strong, TOGETHER" ring clear in my mind. These words encouraged me to remain strong, perform my daily work requirements and reassured me that we are not alone in fighting COVID-19.



Sister Annelene Revelle,
Drakenstein Child Health Study, Mbekweni Community Clinic,
Site Leader

I can confirm that our team worked together – and grew together – with resilience to overcome all the daily challenges that the COVID-19 pandemic created.

been produced for the Department of Health (DoH). The impact of HIV exposure on child outcomes including neuro development, infections in infancy and lung function has been provided to the provincial and national DoH.

Results from pneumonia studies have informed new 2020 South African guidelines for childhood pneumonia and global initiatives (such as a new focus from WHO on RSV preventive strategies). Results of studies on pertussis have informed strategies by the Global Pertussis Initiative including the need for new, more sensitive case definitions and the use of induced sputum (rather than nasal samples) for testing with PCR.

PURPOSE OF THE PROGRAMME

To conduct research on preventing HIV and related co-morbidities including TB and other infectious diseases, such as malaria. It seeks to contribute to the national and international science system by testing TB drugs and malaria insecticides, carry out the AIDS Vaccine project through coordinating development and test HIV vaccines in South Africa, in partnership with our funders and our regional counterparts.

UNITS THAT CONSTITUTE THIS PROGRAMME

- | | |
|--|--|
| 1 HIV Prevention Research Unit | 5 SAMRC/NHLS/UCT Molecular Mycobacteriology Research Unit |
| 2 Centre for Tuberculosis Research Unit | 6 SAMRC/NHLS/Wits Respiratory and Meningeal Pathogens Research Unit |
| 3 Office of Malaria Research | 7 AIDS and TB Research Unit (TB REPORT TB Platform Social Impact Bond) |
| 4 SAMRC/CAPRISA/UKZN HIV-TB Pathogenesis and Treatment Research Unit | 8 SAMRC/UCT Centre for the Study of Antimicrobial Resistance |

PROGRAMME STRATEGIC OBJECTIVES

- To increase the body of knowledge informing the development of the response to prevention and curative interventions for HIV, AIDS, TB and other communicable diseases
- To increase the contribution to the national health system by maintaining national health research facilities that provide services for the prevention of HIV and related co-morbidities, including TB
- To provide research grants to principal investigators responsible for HIV research in line with European and Developing Countries Clinical Trials Partnership (EDCTP) TESA mandate, provide financial support to researchers within neighbouring countries for training in laboratory and research techniques, utilising funds from sponsors and Unit savings
- To provide leadership and coordinate activities for training and development of young scientists and employees at different levels and to work towards retention of critical skills and talent management thereof
- To ensure appropriate training of clinical, laboratory and other research staff, and communities in and around the research sites
- To increase the body of scientific knowledge through research translation into products, patents, papers, policy practice and health promotion (including to the general public) by organising meetings, seminars, workshops and conferences
- To design and construct the most appropriate and promising HIV candidate vaccines for southern Africa and to increase the number of interventions developed for TB and HIV
- To increase the body of scientific evidence that relates to testing and evaluating medical equipment and devices that are developed for the prevention of HIV and related co-morbidities.

RESEARCH HIGHLIGHTS UNDER THIS PROGRAMME

HIV PREVENTION RESEARCH UNIT



It was a bumper year! We continued our clinical research through an adjusted work plan, embraced a COVID-19 research agenda, increased our scientific capacity, re-committed to transformation and entered into a partnership with CAPRISA through the KZN Clinical Trials Unit.

Prof Ameena Goga Unit Director
ameena.goga@mrc.ac.za

OVERVIEW

The HIV Prevention Research Unit (HPRU) aims to build and sustain a world-class research unit, advancing a reduction in the burden of key infectious diseases, particularly HIV and more recently COVID-19 and TB, in South Africa and globally. This aim is achieved by building research excellence in clinical trials and implementation science, fostering national and international collaborations, investing in human capacity development, and encouraging pioneering and innovative ideas. Further, the unit ensures financial sustainability, good governance and compliance.

The unit's aims are directly aligned with Goals of the SAMRC. This synergy is exemplified through phase 1-3 HIV vaccine/prevention trials including long-acting antiretroviral drugs and broadly-neutralising antibodies, phase 2-3 COVID-19 vaccine trials, the Sisonke phase 3b COVID-19 implementation trial, and studies to understand the uptake and outcome of services for TB, drug-resistant TB preventing vertical transmission of HIV

RESILIENCE IN A TIME OF COVID-19

HPRU continued all clinical trial research during the COVID-19 pandemic: These studies are part of essential research and clinical services. To ensure staff and participant safety, the unit developed and regularly updated evidence-based standard operating procedures (SOPs) on infection control and prevention, COVID-19 prevention measures and personal protective equipment and led an SAMRC webinar to share information with other research units. Every research site identified infection control marshals, to implement these SOPs and propagate a zero-tolerance approach to non-adherence, for the protection of staff and participants.

Additionally, staff were rostered during the peak of the epidemic to ensure social distancing at research sites, and study transport was arranged for research participants to maximise their safety. All unit measures and responses were communicated with funders, key stakeholders and the SAMRC human research ethics committee.

Several training sessions were held to update staff on COVID-19-related regulations and SOPs. All unit meetings transitioned immediately to online platforms such as Zoom or Teams. Some research-related activities also transitioned to telephonic interactions following ethics approval. The unit committed to being part of the research agenda to combat COVID-19 and unreservedly embraced COVID-19-related research.

COVID-19 RELATED RESEARCH

The HPRU research scope has expanded to include COVID-19 studies.

List of COVID-19 studies at HPRU

STUDY AND FUNDER	SCOPE	SAMRC ROLE AND SETTING/ SITES
Ensemble trial: NIH COVID-19 prevention network	A phase 3 trial assessing the efficacy, safety and immunogenicity of a single dose of Ad26.Cov2.S – the J&J vaccine.	Role: Site investigators Sites: Chatsworth, Botha's Hill, Tongaat
CROWN Coronation COVID-19 Therapeutics Accelerator	A phase 3 trial assessing the effectiveness of candidate interventions in preventing COVID-19 disease in adults.	Role: Site investigators Sites: Chatsworth, Isipingo
Novavax: Novavax	A phase 2a/b, randomized, observer-blinded, placebo-controlled study to evaluate the efficacy, immunogenicity, and safety of a SARS-CoV-2 Recombinant spike protein nanoparticle vaccine (SARS-CoV-2 rS) with matrix-m1™ adjuvant in South African adult subjects living without HIV; and safety and immunogenicity in adults living with HIV.	Role: Site investigators Sites: Isipingo, Verulam
Sisonke:	Sisonke (Together): OPEN LABEL TRIAL Open-label, single-arm phase 3B implementation study to monitor the effectiveness of the single-dose Ad26.COVID-19 vaccine among health care workers in South Africa (VAC31518COV3012).	Role PI Sites: National – across all Provinces in SA
OBSERVATIONAL STUDIES		
CoVPN 5001: COVPN	A prospective observational study of acute immune responses to SARS-CoV2 infection.	Role: Site investigators Sites: Botha's Hill (semi-rural), Chatsworth, Isipingo Tongaat (semi-rural)
HVTN 405/HPTN 1901: COVPN	A study designed to observe immune responses in a cohort of convalescent COVID-19 participants.	Role: Site investigators Sites: Botha's Hill, Chatsworth, Isipingo, Tongaat, Verulam
SA COVID-19 Point of Care study SAMRC	Investigating Point of Care Diagnostic Strategies to Optimize the Rapid Diagnosis of COVID-19 in routine public and private health care settings in South Africa	Role: PIs Gauteng province, Western Cape Province and Limpopo Province
Longitudinal surveillance study: SAMRC	Longitudinal surveillance of COVID-19 at five South African Medical Research Council Clinical Research Sites in eThekweni, a high HIV prevalence district South Africa.	Role: PIs All 5 SAMRC clinical Research sites
WHO COVID KIDS study: WHO	Severe SARS-CoV-2 related disease in low and middle-income country children aged 0-19 years: a multi-country observational study in a network of hospitals	Role: Protocol chair in South African and SA PI 4 provinces, 11 hospitals; 7 universities
University of Pretoria COVID KIDS study: SAMRC/	Prevalence, clinical characteristics, immunologic responses and outcomes of children with suspected or confirmed COVID-19 disease	Role: co-PI One hospital, Pretoria

STUDY AND FUNDER	SCOPE	SAMRC ROLE AND SETTING/ SITES
CROSS-SECTIONAL STUDIES		
HSRC antibody study: Solidarity Fund	Estimation of the prevalence of antibodies against the-covid-19 virus in South Africa	Role: Technical advisor and co-investigators All 9 provinces
Tshwane district study: unfunded	The impact and outcomes of the COVID-19 pandemic on maternal and child health in the Tshwane District, South Africa	Role: co-investigator Tshwane district
SA COVID KIDS study: SAMRC	SARS-CoV-2 Infection in hospitalized South African children: A multi-centre collaborative study to develop a COVID-19 Paediatric Registry	Role: PI and protocol chair 5 provinces, 18 Hospitals, 8 universities
COVID-19 Learners Survey	Seroprevalence of SARS-COV-2 antibodies in learners (aged 6 to 16 years) at six schools in KwaZulu-Natal	Role: PI Six schools in KwaZulu-Natal
ASCENT study: EDCTP	Acceleration of Novel Coronavirus Serological Test Development and Seroprevalence Study: An African-European Initiative (ASCENT)	Role: Co-investigator
RADIATES ConsortiumL EDCTP	Development, evaluation and impact of RT-LAMP diagnostics and sequence surveillance on SARS-CoV-2 transmission in South Africa	Role: Co-investigator
Covid-19 and RR-TB.	A case series reporting outcomes of patients co-infected with Covid-19 and rifampicin-resistant tuberculosis (RR-TB)	Role: PI Site: King Dinuzulu Hospital, KwaZulu-Natal Province
SOCIO-BEHAVIOURAL STUDIES		
Community perceptions: SAMRC	Exploring community stakeholder's perceptions of and responses to the impact of COVID-19 in Durban, KwaZulu-Natal, South Africa	Role: PI

OPPORTUNITIES FOR INNOVATION

One of the HPRU's main strengths, clinical trials, became of critical value due to the pandemic. This experience with clinical trials provided the opportunity to be involved in two observational COVID-19 trials and two vaccine trials, one of which led to the Sisonke phase 3b open-label trial amongst health care workers which we are privileged to be part of.

We have designed and implemented the Point of Care (POC) COVID-19 protocol, testing POC rapid testing modalities, at the request of the COVID Ministerial Advisory Committee. While we are leading this protocol, it is also an important collaboration with the NHLS and several academic institutions in South Africa. Several HPRU

scientists were invited to participate in a KZN COVID-19 Research Consortium, allowing us to build relationships with all the major research organisations in the province. The HPRU leads the Diagnostics Working Group in this Consortium and participates in the Health Systems/ implementation science working group.

These will no doubt lead to future collaborations, including non-COVID-19 research. Additionally, due to the involvement in this consortium, we have also played an active role been invited to participate in the national 501YV2 consortium to combat the new variant of concern. These protocols and collaborations have allowed us to highlight our strengths and availability to collaborate with external partners.

COVID-19 PAEDIATRICS GROUP

In June 2020, HPRU established an informal, collegial monthly meeting among South African paediatricians that focuses on the impact of COVID-19 on young children. The group promotes collaboration and synergy regarding the national research agenda for COVID-19 in children and keeps updated on global research by having international researchers presenting at the monthly meetings. The group is 60 members strong, with on average 25 members attending these meetings. The SAMRC hosts an active website for this group through which members share research resources: <https://www.samrc.ac.za/intramural-research-units/covid-19-children>

INNOVATIVE APPROACHES AND PROGRAMMES

During the 2020/2021 financial year the HPRU results of the dapivirine vaginal ring (DPV-VR) study which five HPRU clinical research sites participated in, were adopted by the World Health Organization as an additional prevention choice for women at substantial risk of HIV infection as part of combination prevention approaches. Additionally, results of the HPTN 084 study, in which three HPRU research sites participated, were released. This study demonstrated that a pre-exposure prophylaxis (PrEP) regimen of long-acting cabotegravir (CAB LA) injections once every eight weeks was safe and superior to daily oral tenofovir/emtricitabine (FTC/TDF) for HIV prevention among cisgender women in sub-Saharan Africa. Additionally, the first set of results of the AMP study, which two research sites participated in, showed that VRC01- a monoclonal antibody can prevent the acquisition of sensitive HIV strains (preventive efficacy of 75.4%).

The unit also conducted the Novavax COVID-19 vaccine trial in two research sites, which was found to prevent COVID-19 disease by about 60% in South Africa and 89% in UK. The ENSEMBLE vaccine trial which tested the JnJ vaccine was conducted in three SAMRC research sites. The vaccine candidate was 72% effective in the US and 66% effective overall at preventing moderate to severe COVID-19, 28 days after vaccination. Of note is that the vaccine was 85% effective overall in preventing severe disease and demonstrated complete protection against COVID-19 related hospitalization and death as of Day 28. In both Novavax and ENSEMBLE, the unit contributed key study endpoints with regard to vaccine efficacy among participants that were infected with the 501V2Y variant of concern. Additionally, a registry has been set up to track paediatric COVID-19 and monitor outcomes.

The Sisonke study, an innovative phase 3b open-label study using the JnJ vaccine demonstrates how a safe and effective vaccine can be translated into wide-scale early access through research amongst consenting participants. All these studies contributed to the SAMRC strategic goals of building a healthy nation through research.



Phumla Chonco capture a trial participant fingerprint with BECPS



Hassen Bhayet performing lab tests



HPRU staff members



Zinhle Shezi capturing data for a research study

Through the TB Think Tank, we were involved in the conceptualisation and writing of an article in which we described how the strategies and interventions implemented in South Africa to address the COVID-19 pandemic could be used to address TB.

IMPACT ON POLICY AND PRACTICE

- The HPRU contributed to the WHO guidance of adding the vaginal ring to the HIV Prevention tool kit as six of the sites participated in the multicentre ASPIRE and HPRU trials. Further, the CAB LA, injectable PrEP was efficacious in HIV prevention and the three HPRU sites will be part of the Open-Label Trial, giving participants access to choose either oral or injectable PrEP. Data showed that there was uptake of oral PrEP thus encouraging the South African health department to promote the use of oral PrEP.
- The research team published a policy brief from study results demonstrating that the current WHO policy for providing cotrimoxazole prophylaxis to all HIV exposed uninfected infants requires updating. The WHO is currently discussing these data.
- The HPRU in KwaZulu-Natal collaborated with CAPRISA and Provincial Department of Health on the Implementation Phase IIIB open label trial of the COVID-19 vaccine, a first for HPRU. The teams have displayed excellence and partnership as HPRU worked at public health hospitals with vaccinators to meet the target numbers of vaccinations. (n-175)
- The study implementing POC testing for Early Infant Diagnosis (EID) at Addington Hospital (Spooner et al. BMC Public Health (2019) 19:731 <https://doi.org/10.1186/s12889-019-6990-z>) was used in the current WHO guidance that recommends POC testing for EID

CAPACITY DEVELOPMENT AND DIVERSITY MANAGEMENT

In 2020/2021 the HPRU Capacity Development Committee was created to review seed funding proposals, and requests for capacity development support and make recommendations to StratCom; to support staff registered for Masters and PhDs, and encourage other academic development. In 2020/2021 approximately 10% of the HPRU operating budget was diverted towards seed funding for proposals and capacity development. Additionally, the unit set aside funding to fund seed proposals developed by staff. In the last financial year, the unit has established a Diversity and Transformation Forum to guide transformation within the unit.



REFLECTIONS ON 2020/21



Praba Govender,
Health, Safety &
Environment Officer

COVID-19 dawned upon us as an unknown. People needed to understand the cause, the effects, and ways to prevent it. Since so much was unknown about the virus, the best method to prevent transmission was sharing knowledge about what was known and conduct training on the effective safety measures that needed to be taken.

RESEARCH TRANSLATION

The HPRU has engaged with stakeholders at ward, district and provincial level on HIV and COVID-19 by providing training, education, and outreach sessions. These stakeholders have helped researchers understand the gaps in the community that led to misinformation on COVID-19 thus giving the HPRU community team the opportunity to work in partnership to share material and address the stakeholders. This includes engagement with the Operations Sukuma Sake (OSS), District AIDS Council (DAC), Civil Society and the Provincial AIDS Council (PAC). Members from the PAC, Civil Society and Provincial Department of Health participated in the HPRU Strategic Meeting and HPRU is strengthening the partnership through sharing of resources and inviting Provincial Department of Health to be co-investigators in future research studies.

Engagement with the youth sector includes discussions on HIV and COVID-19 and the ethics of including or excluding youth (12 years to 17 years) in trials. At a ward level, there are five community working groups (CWGs) that guide the researchers on the impact and relevance of the unit's research in the community. In addition, these stakeholder and community engagements have contributed to the development of the material so that it is acceptable to the social and cultural context of the community.

CENTRE FOR TUBERCULOSIS RESEARCH UNIT



Through change we'll excel.

Prof Rob Warren Unit Director
rw1@sun.ac.za

OVERVIEW

The mandate of the SAMRC Centre for Tuberculosis Research (CTR) is embedded in UN Sustainable Development Goals (SDGs), specifically Goal 3 (Ensure healthy lives and promote well-being for all at all age), Goal 4 (Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all), Goal 5 (Achieve gender equality and empower all women and girls), Goal 9 (Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation) and Goal 17 (Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development).

The CTR is addressing the WHO TB research priorities and the STOP TB International Roadmap for Tuberculosis Research by focusing on the following global research priorities: Epidemiology; Fundamental research; Diagnostics; Treatment and Vaccines. The CTR objectives address the SAMRCs strategic goal 2 by directing research addressing key knowledge gaps in the field of Tuberculosis. Members of the CTR are developing new technology and innovation to improve diagnosis and treatment of TB as well as designing novel virtual teaching methods (goal 3). The CTR's seamless affiliation with Stellenbosch University addresses goal 4 through the training of postgraduate students at the levels of BSc Honours, MSc, PhD and postdoctoral fellows. The research emanating from the CTR contributes to national and international policy and well as driving the global research agenda (goal 5). The overarching goal of the CTR is to contribute knowledge to impact on the health of the nation through TB research and capacity development.

RESILIENCE IN A TIME OF COVID-19

In response to government regulations, we had to shut down all community clinical research activities and patient recruitment during level 5 lock-down, as no research activities were allowed in the primary health care clinics. We subsequently included COVID-19 research topics into our work, as TB and COVID-19 symptoms can overlap and as the impact of COVID-19 infection on TB disease severity is unknown. We were gradually allowed back into the clinics and have adapted our infection control measures accordingly.

Our laboratory activities and BSL3 facility came to a halt during level 5 lock-down but as the restrictions were gradually lifted, core activities were resumed, albeit with decreased staff numbers on site due to social distancing measures. This resulted in unavoidable delays to some researchers' and students' work that was dependent on lab work. Some student projects were redesigned to incorporate a larger bioinformatic component where possible to allow progress toward graduation to be made while working from home.

Our research bronchoscopies had to be halted as the Tygerberg hospital bronchoscopy theatre was converted into a COVID-19 ward. This delayed many studies. We therefore established our own research bronchoscopy unit on the grounds of the Faculty of Medicine and Health Science, Stellenbosch University and have moved our site-of-disease work to the new facility.

Most groups re-prioritised research activities toward data analysis and writing of manuscripts and grant applications until laboratory activities could be resumed.

Online booking systems were used to schedule the use of facilities to comply with capacity regulations and staff and students are required to work from home where possible. In labs where it was appropriate, shift-work schedules were implemented to allow work to continue.

An important challenge has been psychological, where remote work may leave individuals feeling isolated and lonely. Weekly online meetings with students and staff have been useful to detect these emotions and providing an outlet.

COVID-19 RELATED RESEARCH

COVID-related research conducted at our centre covers a wide range of areas, such as vaccination, host immune response, diagnosis, treatment, COVID-TB and COVID-genomics. A clinical trial is currently ongoing addressing the effect of BCG re-vaccination of front-line workers on COVID-19 disease severity.

On the diagnostics front, a study, just completed (by pulmonologist and PhD student, Dr Jane Shaw) on volunteers working at a popular shopping complex and tourist attraction (the V&A Waterfront) in Cape Town, showed a high seroprevalence of SARS-Cov-2 in Cape Town and that further revealed a high frequency of SARS-Cov-2 antibodies in individuals of low socioeconomic status. This work garnered mainstream media attention and was reported in Timeslive: Covid-19's first wave hit poor hardest, according to tests of V&A Waterfront staff (timeslive.co.za).

One of our PhD students wrote a review article (manuscript currently under peer review) on the different serological tests that are available for the diagnosis of SARS-Cov-2 infection and made recommendations about the potentially most valuable tests.

An ongoing SAMRC funded COVID-diagnosis project involves development of artificial intelligence (AI) to distinguish between coughs of different aetiology. Coughing is reported as a symptom in up to 84% of COVID-19 patients. The preliminary results indicate the feasibility to develop such an AI algorithm that can distinguish a COVID-19 cough from other coughs. In turn, this AI algorithm can be built into a smartphone app, that will be distributed free of charge. This offers a unique opportunity for a simple triage test by using smartphone technology, which is easily deployable, coupled with AI. The use of a screening app will help to alleviate the pressure on testing facilities during pandemic peaks, in addition to resulting in massive cost savings.

A COVID-TB project currently under-way is investigating the impact of COVID-19 on host biomarker-based TB triage diagnostic tests. This multinational NIH U01 study is led by our centre and includes sites in Africa (South Africa, Gambia, Uganda) and Vietnam and partners in Germany, the Netherlands, the UK, and the USA. Another COVID-TB project is an NIH funded study investigating the impact of SARS-Cov-2 infection on response of the immune system to TB infection.

Focusing on COVID-19 treatment, one of our groups is involved in the "Together" trial – which, together with partners in the USA and Brazil, aims to investigate whether anti-viral medication (Lopinavir/Ritonavir) could prevent serious COVID-19 disease if administered early in treatment.

Our drug-discovery group is investigating the possible use of the CaMK1 α inhibitor (compound 191) in suppressing cytokine-storm associated with COVID-19. Preliminary optimization data has indicated that the compound 191 is capable of decreasing the levels of the inflammatory cytokine IFN- γ and increasing levels of the anti-inflammatory cytokine IL-10. The same group is also embarking on a collaborative study where they are exploring quantum simulation algorithms aimed at enabling faster and more accurate characterizations of molecular parameters to refined and improve the accuracy of virtual drug screening platforms.

The genetics group is conducting a COVID-genomics study that seeks to provide determine why some adults and children become very ill from COVID-19, while others experience little or no symptoms. Recent reports highlighted a new, but rare syndrome in children related to SARS-CoV-2, namely Multisystem Inflammatory Syndrome in Children (MIS-C). This has prompted an investigation into possible mechanisms of genetic predisposition in adults who have suffered from severe COVID-19 and children who were diagnosed with MIS-C to disease susceptibility and severity. This study is being done in collaboration with researchers from Stellenbosch University (CTR, Divisions of Molecular Biology and Human Genetics, Haematology, Medical Microbiology, Paediatric Rheumatology and Immunology, Department of Paediatrics and Child Health), the Centre for Proteomic and Genomic Research (CPGR), Artisan Biomed, the South African Medical Research Council (SAMRC) Genomics Centre, the National Health Laboratory Service (NHLS), the University of Cape Town and Pretoria University. To date, we have banked 339 samples from individuals that tested positive for the virus at Tygerberg Hospital and just received the whole genome sequencing data of the first 17 individuals. It is hoped that this study will lead to a better understanding of the disease which could lead to more effective treatment and identify those who are at greater risk of severe COVID-19.

Our clinical epidemiology group is doing a point-of-care evaluation of a hand-held SARS-CoV-2 test in anti-retroviral treatment initiators, who have high risk of COVID-19, together with a suite of TB diagnostics. Patients are fully tested irrespective of symptoms. This received support from the Stellenbosch University Vice Rector's COVID-19 emergency research fund.

Although not conducting their own COVID-19 research directly, the bioinformatics group has and is playing an integral role in the design of COVID-related studies and the analysis of the data they produce. In addition, a number of researchers serve on the Research Ethics Committee for Biological and Environmental Safety at Stellenbosch University and participated in numerous reviews of COVID-19-related research protocols. Several



SAMRC Centre for TB Research staff and students working within state-of-the-art facilities at Stellenbosch University's Division of Molecular Biology and Human Genetics.

of these were expedited, ensuring that this important work moves forward, while maintaining protection of laboratory workers.

OPPORTUNITIES FOR INNOVATION

Besides the new research possibilities involving SARS-CoV-2 alone and in the context of TB, the pandemic has presented us with a number of challenges which have resulted in positive changes. Virtual interaction platforms and practices have been available for some time and, while we have made some use of these in the past, the requirements imposed by the pandemic have resulted in a rapid fast-tracking of a move to much greater exploitation of these technologies. Meetings and student supervision, including online lecturing for our honours program have all been moved online. This has had a number of additional benefits.

We have seen an increased attendance at and participation in scientific meetings and the need to cope with the online platforms has led to the acquisition of the requisite computer skills by both staff and students. Importantly, there has also been an increase in attendance at group meetings by colleagues from other groups leading to increased collaboration. We have also seen an increased use, by both groups and individuals, of online resources such as webinars and courses, many of which have been made available free-of-charge or at reduced cost. This has greatly enhanced access to learning opportunities. Since journal discussions around the world have moved online, a number of researchers have had the opportunity to regularly attend such meetings with international collaborators.

In one project, a planned research training visit to the UK was replaced by the development of training videos for a particular technique – these can now be shared with multiple students, adding extra value to this exercise. We are further exploring the use of point-of-view technology for training complex laboratory skills while ensuring laboratory capacity is not exceeded.

The reduction in time lost to commuting as a result of working from home, the use of flexi-time and the suspension of travel has resulted in increased productivity on many aspects of our work that do not require a physical presence in the lab as well as making it possible to attend international conferences that were held online at greatly reduced cost.

Once we were able to resume work in the clinics, we implemented enhanced infection control measures there which will provide both staff and patients with greater protection. We foresee that much of what we have learned in terms of new ways to function will be retained, possibly as hybrid approaches, and integrated into our normal working lives once the pandemic is over.

African-based population groups are known to be underrepresented in human genomics. This has become even more evident during the current COVID-19 pandemic. Where developed countries could rely on

existing genotyped samples and electronic health records to speedily identify human genetic associations, countries like South Africa had to establish new cohorts and have not been able to contribute to international databases on COVID-19 host genetics. This is in stark contrast to the massive contributions South Africa made in the identification of new SARS-CoV-2 variant strains. The TB Host Genetics group has started to build a collection of DNA samples from individuals hospitalised with severe COVID-19 and the severe clinical syndrome in children related to SARS-CoV-2, namely Multisystem Inflammatory Syndrome in Children (MIS-C), which comprises multi-organ dysfunction and systemic inflammation. We have collected more than 400 blood samples, with informed consent ongoing. We have also generated whole genome sequencing data for more than 30 individuals with MIS-C. These collections will contribute to further research in the group.

Although there is currently not much evidence that animals play a significant role in spreading the virus that causes Covid-19 to people, more studies are required to comprehend the extent and possibility that this is a possibility and how much of a major risk domesticated animals pose to humans, this is especially concerning if one considers farms. In this regard, the animal TB group within the CTR, a leader in the dissemination of knowledge regarding epidemiology, pathogenesis, and immunology of bovine tuberculosis (BTB) is likely to contribute to this infection interphase.

IMPACT ON POLICY AND PRACTICE

Scientists in the CTR were major data contributors and reviewers of a WHO systematic review entitled "Technical Report on critical concentrations for drug susceptibility testing of isoniazid and the rifamycins (rifampicin, rifabutin and rifapentine)". Technical Expert Group (TEG) adopted a pragmatic approach by lowering critical concentrations that were clearly above the epidemiological cut-off value for rifampicin. The TEG recommended that seven "borderline resistance" *rpoB* mutations, need to be treated with an MDR-TB regimen according to the latest WHO guidelines. Changes to the CCs for isoniazid were not warranted based on the available evidence.

Members of the CTR performed a systematic review, commissioned by the WHO, on the diagnostic utility of the new Xpert XDR cartridge for the detection of both first and second-line resistance. The results of this review were reported in a recent WHO rapid communication entitled "Update on the use of nucleic acid amplification tests to detect TB and drug-resistant TB: rapid communication". These findings will guide the use of the Xpert XDR assay in national TB control programs world-wide.

Ongoing research in the CTR has shown the importance of the PCR amplification conditions used in routinely used line probe assays for the detection of first- and second-line drug resistance. Using an incorrect RAMP rate negatively influences the utility of these tests to detect the presence of *Mycobacterium tuberculosis* complex in smear negative

specimens. These findings have been incorporated into a WHO Training tool kit entitled "Hain line-probe assays: ramp rate and troubleshooting".

The advent of the GeneXpert instrument was greatly received by the scientific community and increased the diagnosis of new TB cases. To this end, our scientists have been involved in testing and comparing newer versions of the TB diagnostic test (Xpert MTB/RIF Ultra and Xpert MTB/RIF) as part of the BAR-TB project. They found that in a setting with a high burden of previous tuberculosis, Ultra generated more non-actionable results and had diminished specificity compared with Xpert. In patients with recent previous tuberculosis, a quarter of Ultra-positive samples were indeterminate for rifampicin resistance and culture negative, suggesting that additional drug-resistance testing will probably be unsuccessful. Our data have implications for the handling of Ultra-positive results in patients with previous tuberculosis in high burden settings. This work was recognized by the Western Cape Department of Health and led to a revision in the diagnostic algorithm for pulmonary Tuberculosis.

The identification of RNA and protein host-derived signatures for Tuberculosis has huge potential as triage test in areas where sophisticated technologies are not available. Our scientists have participated and developed through multi-country studies; RNA signatures able to inform the diagnosis of progression to Tuberculosis. These RNA signatures incorporated into a GeneXpert cartridge are now tested in a large NIH-funded international study to test the ability to further improve TB diagnosis in a point of care system. The protein signatures derived from the CTR will also be screened in the consortium as a triage test for TB.

With the advent of the Covid-19 pandemic, our scientists were able to use their knowledge and pivot research around the global pandemic. They found that, in Cape Town (South Africa), during the first lockdown by government, that people living in certain low-income areas were more than twice as likely to test positive for COVID-19 than people from areas with a higher average income. This is likely due to socio-economic factors in low-income settings, such as overcrowded living spaces, which make it almost impossible to practice social distancing and self-isolation. This work was published in the journal PLoS One and received a lot of attention from the science journalists.

Collaboration has been initiated with the Prof Willie Perold, SU Department of Electronic and Electrical Engineering to develop a SARS-CoV-2 biosensor, to be used at point of care facilities. This project aims to develop a real-time detection SARS-CoV-2 detection assay which can be used at point of care facilities by health care workers, using saliva or a nasal swab (resuspended in buffer). Collaboration with industry partners Amasu technologies, who have developed aptamers for the detection of the SARS-CoV-2 surface proteins, increases the potential of using the envisioned biosensor in rural areas with little to no access to refrigeration. This project has also led to the registration of a Masters student co-supervised by Willie Perold and Taimie Sylvester (SAMRC funded postdoctoral fellow).



REFLECTIONS ON 2020/21



Christian Otum

Uncertainty is part of research, but we are not always well equipped for uncertainty as scientists. I have learned to accept uncertainty when planning for experiments, which can aid me to accommodate future setbacks. This includes focusing more on the science and setting up short term goals. It taught me to prioritize the things I can control, over things I can't. When designing experiments; including the objectives of my research, the availability of data and whether time will align with funding goals. In short; to be prepared for any uncertainty in the future.

Furthermore, our scientists were also part of a large (ongoing) study aimed at evaluating the possibility that vaccination with BCG could protect frontline healthcare workers from developing COVID-19 disease. The study is currently following up these healthcare workers. Funded, in part by the EDCTP, this study provides multiple samples and opportunities for further immunological assessment of what protection (or not) may be induced by a BCG revaccination in the era of COVID-19.

The scientists in Genetics continue to develop and test computational tools for South African populations with unique genetic diversity and admixture. Specifically, we detailed the accuracy of local and global ancestry inference in one of the most complex populations worldwide. Due to the accuracy and versatility of the program RFMix which harnesses prior information as linkage disequilibrium, relatedness and phase information in determining global and local ancestry in a single program, we recommended that it should be the algorithm of choice to characterize more complex admixture scenarios.

We also identified a novel hemizygous missense mutation resulting in atypical Wiskott-Aldrich syndrome. With this definitive molecular diagnosis, we could target treatment and offer genetic counselling and prenatal diagnostic testing to the family. The identification of novel variants is important to confirm phenotype variations of a syndrome.

The advent and evolution of next generation sequencing has considerably impacted genomic research. Until recently, South African researchers were unable to access affordable platforms capable of human whole genome sequencing locally and DNA samples had to be exported. Together with the South African Medical Research Council's Genomics Centre we reported the whole genome sequences of the first six human DNA samples sequenced and analysed at the facility. We demonstrated that the data obtained is of high quality and that the output is comparable to data generated internationally on a similar platform. This means that African researchers can access an affordable platform capable of human whole genome sequencing locally and DNA samples do not have to be exported.

The MycoBioChem group's involvement in TB drugs discovery has partnered with the department of computer science (Stellenbosch University) to initiate a machine learning and AI-based approach for potential and efficacious anti-TB drugs that can be validated once all the necessary parameters for a novel therapeutic agent have been established. Remote working due to COVID-19 lockdown compelled the group to investigate strategies for virtual drug discovery processes that eliminate field work (in terms of natural products sourcing), satisfy safe occupancy numbers in a given laboratory to avoid overcrowding and facilitate social distancing. This AI drug discovery-based approach will allow for an algorithm that help other researchers in the field diversify research attitudes without compromising expected deliverables.

The profound negative impacts COVID-19 has had on many global operations including research intensive institutes and councils such as the SAMRC (particularly the CTR unit) have necessitated a close interrogation of research activities and opportunities for expansion. To this end, the TB genomics group has initiated a pilot study showing the utility of an automatic cough sound analysis in TB detection and is currently attracting attention, with many recent citations. The study investigated the possibility of distinguishing TB coughs from coughs produced by healthy volunteers. The group is currently busy with a follow-up study of TB patients, compared to patients with other lung diseases, and although the results are currently proportional to a small cohort, with the best model showing an area under the receiver-operator-curve (AUC) of >95%, there is still nonetheless an opportunity to exploit this area of research of potential useful prototypes leading to the development a smartphone app that can be used in many different settings as a triage test.

As a result of ongoing research and collaboration, we have been invited to join an international, multi-institute, cross-disciplinary collaborative network, which was recently funded by the University of Hamburg, under the Next Generation Partnerships (NGP) funding line – Thematic Networks scheme. A particular focus of the scheme is on promoting young academics and building a sustainable partnership through the preparation of a long-term third-party funded project. Our ongoing work with collaborators

at the University of the Western Cape and South Dakota State University, funded by an NIH R01 award is supporting ongoing research into the development of nanoparticles as a host-directed therapy for novel TB treatment strategies.

The Animal TB Research Group was impacted by COVID-19 during 2020 and to date. However, despite the restrictions on field work, access to laboratory facilities, and requiring work from home, we have been able to publish 28 peer-reviewed scientific manuscripts in international journals, pertaining to the developing of potential diagnostic assays for detection of TB in a variety of animal species, discovery of additional wildlife species infected with *Mycobacterium tuberculosis* complex (MTBC) organisms, and epidemiology of animal TB. These developments have impacted the practice of TB surveillance in wildlife populations in South Africa, by increasing awareness of the role of multiple species in maintaining and spreading infection within and between ecosystems. For example, we have published a review on the epidemiology of TB in African rhinoceros which is the basis for a new project initiated this year with a new MSc student and in collaboration with a disease investigation specialist/epidemiologist with San Diego Zoo Global. We have also produced a review of diagnostic tests available for TB detection in African wildlife species, which has stimulated further research projects with private wildlife reserves, national parks, and veterinarians throughout South Africa. We continue to expand our work in developing and evaluating rapid accurate methods for direct detection of MTBC in animal samples using currently available technology for human TB (Cepheid GeneXpert MTB/RIF Ultra). One of the tests developed by a PhD student in our group has been approved for conditional testing of rhinoceros that are being translocated out of Kruger National Park, to reduce the risk of spread of *M. bovis*.

During 2020, we have developed new collaborations with the African Health Research Institute (AHRI) to investigate *M. bovis* and non-tuberculous mycobacteria in human sputum cultures which are banked and compare these with samples that we have obtained from wildlife and livestock in the same study area. This will continue to be a focus in 2021 as funding and laboratory work was limited this year. This research will provide insight into the role of zoonotic TB in South Africa, for which there is a paucity of information.

CAPACITY DEVELOPMENT AND DIVERSITY MANAGEMENT

The primary functions of our centre are research and capacity development and these two are inextricably inter-dependent. A strong student body and a culture of ongoing personal development are foundational to a productive research effort and a diversity of research groups, focused on a central theme of TB, and led by excellent senior scientists, provides a fertile environment for the development of young scientists. We aim to:

- Develop a cadre of scientists who research the spectrum of health disciplines generate data that will transform the health on the nation.
- Contribute knowledge and expertise to other stakeholders which impact health-related policies, including animal health.
- The CTR is committed to training of students from other African countries. We currently have enrolled 11 PhD and eight MSc students from various African countries. We have secured host status for the CTR in the DAAD In-Region Scholarships programme, as well as the "Partnering for Health Professional Training in African Universities" programme, another intra-Africa mobility scheme funded by the EU. These programmes will provide bursaries for up to 15 MSc and 15 PhD students over the next three to five years, amounting to more than R1,8 million. Our first intake of DAAD-funded students has started in Feb 2021. The numbers for 2020/2021 were 11 PhD and seven MSc students.
- In addition, the CTR has two fully executed memorandum of understanding with Namibia and Zambia, which will see the development of capacity through training of students, scientist, clinicians, and technical staff in molecular methods, as well as the facilitation of technology transfer.

RESEARCH TRANSLATION

The CTR's societal impact efforts are intimately tied to what we value as an institute: pioneering health research, collaborating and connecting, driving excellence in science and catalyzing positive change in the health of our nation. We strive to achieve the National Development Plan 2030 goals and contribute towards the United Nation Sustainable Development Goals (SDGs) 3 (ensure healthy lives and promote well-being for all at all ages), 4 (ensure inclusive and equitable quality education and promote lifelong learning opportunities for all) and 5 (achieve gender equality and empower all women and girls).

In response to the social restrictions imposed in light of the Covid-19 pandemic, the CTR made every effort to adapt our public engagement strategy to ensure active engagement with key stakeholders during the reporting period. While many community outreach activities had to be cancelled for safety reasons, our team rose to the challenge to create informative and engaging online content for wide-spread dissemination. A summary of the societal impact activities of the CTR for 2020 is detailed in the SAMRC CTR Societal Impact Annual Report 2020.

Our stakeholder groups include a range of individuals from scientists and researchers to the general public. We aim to inform our stakeholder groups of recent advances in research within the CTR as well as educate on scientific concepts and infectious diseases, with a particular emphasis on tuberculosis.

OFFICE OF MALARIA RESEARCH



Learn from the past to preserve the future.

Prof Rajendra Maharaj Unit Director
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OVERVIEW

The Office of Malaria Research (OMR) aims to eliminate malaria as a public health concern in South Africa through research and innovation. OMR works towards ensuring that all South Africans have access to quality, safe, effective, and affordable malaria interventions through timely and sustainable initiatives that reinforce the elimination agenda. The OMR's role is two-fold – to generate new knowledge and tools to further the malaria elimination agenda and to develop a platform for malaria scientists in the country and sub-region to share research information that contributes to the National Department of Health's elimination agenda.

Therefore, OMR's objectives are closely aligned to the strategic focus of the SAMRC where research undertaken by the Office (such as insecticide testing) is translated into policy and practice by national malaria programmes in the country to improve health. Through the annual malaria research conference and the mentoring of masters and PhD students the office builds human capacity ensuring the long-term sustainability of malaria research.

RESILIENCE IN A TIME OF COVID-19

COVID-19 impacted on various project timelines causing the OMR to continuously adapt and revise project work in consultation with funders. The advent of COVID-19 impacted on time sensitive studies, as a result of which these studies had to be postponed and was only initiated once level 3 lockdown was implemented. A regional study funded by the Elimination 8 initiative was affected financially since short-term contract employees were not able to

conduct the survey planned but had to be paid throughout the hard COVID-19 lockdown in April 2020. Fortunately, the funder was able to provide some additional funding to mitigate this financial loss and the study is planned for March 2021. With the recommencement of field work the office ensured that all partners adhered to the COVID-19 regulations and the necessary personal safety measures were implemented.

Apart from the insectary which is a critical area and had to remain fully operational over the past year, the activities of the OMR were conducted remotely. National and international meetings were conducted via Zoom and Teams. The OMR also took the opportunity to host and chair regional and international webinars.

COVID-19 RELATED RESEARCH

South Africa is targeting malaria elimination by 2025 but imported malaria is responsible for maintaining low levels of transmission. It has always been hypothesised that closing borders and restricting movement of people from high transmission areas such as Mozambique, will impact on imported malaria and decrease local transmission as well. The lockdown closed the borders, effectively sealing the country from foreign travel. This unique situation presented an opportunity to test this theory. Data was collected during the COVID-19 lockdown to test this hypothesis. The results are currently being analysed but preliminary analysis shows that border closure did prevent the movement of infected individuals into South Africa.



New chemicals for the use in malaria control programmes, being tested under field conditions

OPPORTUNITIES FOR INNOVATION

The pandemic created an opportunity to explore different ways of working and collaborating with partners and stakeholders. In this respect, the OMR used virtual platforms to host and participate in webinars, discussions, and meetings.

The worldwide lockdown presented some unique opportunities for sharing best practices. Whilst people were prevented from spending time outdoors, it provided ample opportunity for hosting webinars to share expertise and skills. A webinar titled "Vector surveillance and integrated vector management for regaining momentum for malaria elimination during COVID-19 pandemic" was co-hosted by South Africa and India. Participants were from the WHO, SAMRC, Vector control research centre (India) and over 250 people attended the virtual event.

The pandemic also created difficulties in implementing vector control measures to reduce malaria transmission in the main summer season. This was country specific but affected the entire southern African region. A webinar was hosted by the Elimination 8 initiative, titled "Malaria importation and the need for improved surveillance in the E8 region" and was chaired by Prof Maharaj from the Office of Malaria Research. Presentations were made by experts from the region highlighting the fact that surveillance should be a core activity of malaria elimination efforts. The risk of imported malaria was also highlighted since countries in SADC region are targeting malaria elimination by 2030. Over 150 participants joined the webinar.

One of the main activities of the Office of Malaria Research is the evaluation of new chemicals for the use in malaria control programmes. MOMR was responsible for evaluating Fludora Fusion, a new combination insecticide developed by Bayer. The insecticide was evaluated in the malaria affected districts of KwaZulu-Natal. Bayer conducted similar trials in several African countries. OMR was invited to present their results to the researchers from other African countries through a series of virtual meetings. Information was shared on the behaviour and longevity of the insecticide on other wall surfaces and in different climatic conditions. This evidenced helped malaria control managers make an informed choice of insecticide for indoor residual programmes. The data review meeting was attended by representatives from Bayer, WHO, academic institutes and research organisations from across Africa.

INNOVATIVE APPROACHES AND PROGRAMMES

Through research conducted in-house or with external collaborators the OMR is targeting the elimination of malaria in South Africa by 2025. Through research activities aimed at finding new technologies to combat malaria, the OMR has teamed up with researchers in the USA who have developed technologies to monitor mosquito populations in real time. This would help pin-point malaria focal areas and help streamline and target control measures. Through the evaluation of new insecticide classes, the vector control

policy can be adapted to include new insecticides for malaria vector control especially in areas where resistance has been reported to currently used insecticides. These activities would help further the elimination agenda and reduce to zero the number of local infections and deaths.

To pave the way for malaria eradication, scientific and technical capacity are being developed by the OMR through post-graduate supervision at local universities and the conduct of workshops for training staff within the various provincial malaria control programmes. To further develop capacity for malaria elimination, technicians from the provinces were sent for training in molecular methods. This capacity will enhance entomological surveillance at a provincial and district level.

IMPACT ON POLICY AND PRACTICE

Syngenta Project:

Insecticide evaluations were conducted for new active ingredients and new combination of insecticides. Currently Actellic 300CS, developed by Syngenta is being tested under field conditions. The nature of this project will determine the efficacy of Actellic 300CS against previously tested (by OMR) insecticides and the results will impact on malaria policy and the practice by influencing the vector control guidelines, especially for temporary housing made of tin. Due to COVID-19 and revised timelines the project is still underway.

LSDI2 Project – Breeding site mapping:

A foci clearing programme has been adopted by the National Department of Health to further the elimination agenda. This requires response to a cluster of cases which includes mapping and treating of mosquito breeding sites, usually small pools of water. Current methods of mapping breeding sites require manual mapping of the breeding sites. This has been ineffective in finding breeding sites off the beaten track. Identification of breeding sites using drones has, in preliminary studies, been found to be more efficient and it can identify all breeding sites around a hut, thus enabling vector control staff to treat all breeding sites which could produce mosquitoes that could cause further transmission. This study is currently underway and will have implications for malaria elimination in South Africa.

CAPACITY DEVELOPMENT AND DIVERSITY MANAGEMENT

Human resource development is a key activity of OMR and aims to address the capacity gap in the entomological field. Hence, several students were enrolled to undertake Masters and PhD studies at the Universities of KwaZulu-Natal and Pretoria. Students comprise three females and two males. Apart from the formal academic sector, key staff in the endemic provinces, namely KwaZulu-Natal, Limpopo and Mpumalanga have undergone entomological and parasitological training.



REFLECTIONS ON 2020/21



Bongani Ngcobo

In times of crisis, we need each other to pull together.



Mr Vishan Lakan

Building a support structure that allowed us to lean onto the support of family and friends, sharing our experiences, whilst accepting the emotions and having a problem-solving attitude is critical during this pandemic. It was the perfect time to look deeper into my beliefs and religious activities and allowed me the opportunity to reflect on who and where I am in life and the direction, I want to grow in.

The director of OMR mentored staff from provincial malaria control programmes on basic entomology during virtual and in-person interactions. Diversity within the OMR and amongst partners is managed through clear and effective communication. Interactions and discussions amongst all colleagues are encouraged.

RESEARCH TRANSLATION

The OMR regularly publishes articles in open access journals such as the Malaria Journal. Over the previous financial year, the office has published two articles in speciality journals relevant to the field of research. With regards to the evaluation of insecticides, the results are presented in the form of technical reports to the person commissioning the research, before the results are disseminated to the scientific community. Results from insecticide trials are conveyed to the public via the provincial malaria control programmes in the relevant areas where community discussions are held.

Communities that have been involved in the insecticide evaluation studies are given verbal feedback by the malaria surveillance agents during the study and after the study has been completed.

SAMRC/CAPRISA/UKZN HIV-TB PATHOGENESIS AND TREATMENT RESEARCH UNIT



Covid-19 has created important new roles for science, enabling it to play a key role in the global Covid-19 pandemic response. With new levels of pro-active communication of science with the public, transparency and public engagement with science has reached unprecedented levels.

Prof Salim S. Abdool Karim Unit Director
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OVERVIEW

The CAPRISA-SAMRC HIV-TB Pathogenesis and Treatment Research Unit undertakes globally impactful research to reduce morbidity and mortality from HIV-TB co-infection. Similar to the SAMRC, the unit's research agenda is supported through external competitive grant funding and is upheld by research outputs. Clearly aligned to the SAMRC Strategic goals, the five focus areas of the CAPRISA-SAMRC HIV and TB Pathogenesis and Treatment Unit are:

- Implementation science to enhance translation of clinical trial evidence into effective integrated HIV-TB services to improve survival of HIV-TB co-infected patients
- Improving survival of HIV-TB co-infected patients through optimized treatment
- Generating new knowledge on immunological mechanisms associated with the high risk of TB recurrence in HIV-infected patients
- Impacting policies and practices aimed at reducing burden of the dual TB HIV epidemics
- Building research capacity and sustainability of health research in South Africa

RESPONDING AND ADAPTING TO COVID-19

- **Research:** From March 2020, when the outbreak first emerged in South Africa, the CAPRISA-SAMRC Unit has expanded its research strategy to include COVID-19 studies. CAPRISA is undertaking a suite of studies assessing COVID-19
- **Policy:** Professor S Abdool Karim chaired the South African MAC on COVID-19, providing epidemiologic and scientific updates to cabinet and the people of South Africa
- **Practice:** Prof K Naidoo developed and submitted a scientific brief to the MAC on the use of pulse oximetry as a triage tool for moderate and severe COVID-19
- **Practice:** Professor N Padayatchi is providing COVID-19 technical assistance to the KZN DOH's COVID-19 response
- **Training:** Prof S Abdool Karim, Professor K Naidoo and several clinicians and scientists have been involved with multiple COVID-19 training activities benefitting thousands of health care workers

We have restructured our staff effort, facilities, and our research portfolio to accommodate COVID-19 research activities. These include:

- Repurposed, customized facilities for COVID-19 research
- Expanded scope of work of all staff to include COVID-19 projects



CAPRISA eThekweni Research clinic

- Evaluation for new drugs and diagnostics for COVID-19
- Pharma-driven COVID-19 treatment and prevention research now included in CAPRISA's research portfolio
- Routine daily COVID screening for all staff with additional PPE use for all frontline patient facing staff
- Health systems strengthening in various facilities in eThekweni and uMgungundlovu to enhance capacity and systems for COVID-19 patient care

COVID-19 RELATED RESEARCH

The following CAPRISA driven COVID-19 research studies are currently underway:

1. Observational study on COVID-19 transmission and natural history: Epidemiological Investigation to Guide Prevention and Clinical Care
2. Observational study to utilize a combination of approaches to characterise laboratory markers of clinical disease progression and clinical outcomes among individuals with SARS-CoV-2 viral infection
3. Determining the concentration and duration of SARS-CoV-2 viral shedding in nasopharyngeal/ oral /and or saliva samples

4. Observational study on COVID-19 severity and outcomes in HIV and Tuberculosis co-infected patients
5. Evaluation of Point of Care COVID-19 Diagnostics in collaboration with FIND
6. Retrospective chart review to assess the impact of the Covid-19 pandemic on investigation and diagnosis of TB meningitis at a Durban Regional Hospital

We are also undertaking collaborative research through the NIH – the Phase II clinical trial to evaluate an adaptive Platform of Treatment for Outpatients with COVID-19.

OPPORTUNITIES FOR INNOVATION

Several new opportunities have arisen as a result of the pandemic – these include:

- Mid-level and junior scientists lead several new studies to enhance understanding of the impact of COVID-19 infection in patients with HIV-TB
- Several new scientific collaborations have been established for deeper understanding of COVID-19 virology and immunology (AHRI, KRISP, UKZN Virology, Centre of Excellence for Biomedical TB Research, NHLS/NICD, FIND diagnostics)

- Successful application to EDCTP for grant funding for CAP 230: Natural History And Laboratory Tests for COVID-19 in South Africa (HALT-COVID-19)
- Several publications exploring the impact of COVID-19 on the HIV and TB-HIV epidemics

INNOVATIVE APPROACHES AND PROGRAMMES

In the reporting period the CAPRISA/SAMRC Unit has generated multiple high impact research publications. A total of 35 journal articles have been published (excluding articles on-line and in press) – among these, 48% have a CAPRISA scientist as 1st author, 43% appeared in journals with Impact Factor > 5

New Grant Funding WITH Unit member as PI/Co-PI:

- 2 x EDCTP
 - HALT-COVID-19 CAP 230: Natural History and Laboratory Tests for COVID-19 in South Africa
 - TRIAD CAP 094: Triage Test for all Oral DR TB regimen
- 2 x NIH R01
 - CAP 093 INSIGHT study: INSTI's for the management of HIV-associated TB
 - TARGET TB: A genomic, geospatial and modelling study for targeting TB transmission hotspots to find undiagnosed TB in South Africa

In line with the SAMRC strategic Goals, we are conducting health research through six clinical trials and various basic science studies in TB-HIV pathogenesis and Treatment. Generation of new knowledge through successful funding to evaluate a second generation INSTI ART combination (Bictegravir/TAF/Emtricitabine) for co-administration with TB in co-infected patients; successful funding award to evaluate Optimising DTG dosing in TB co-infected children as well as national PI in a study evaluating a novel TB vaccine for TB prevention in PLWHA.

Translation for improved Policy and Practice through health systems strengthening and capacity building: the CAPRISA-SAMRC Unit led the inaugural national Advanced Clinical Care (ACC) training curriculum virtually in October 2020. More than 100 doctors from districts all over SA are now certified master trainers, responsible for cascading this training to HCWs in their respective facilities.

Technology Implementation to improve health through successful funding awards for:

- Evaluation of the new Xpert XDR diagnostic for triage patients into DR-TB regimen
- Evaluation of several new POC diagnostics for COVID-19

IMPACT ON POLICY AND PRACTICE

The following research papers highlight work undertaken by the unit that has influenced policy or practice locally and globally and has influenced further research:

1. **Naidoo K**, Hassan-Moosa R, Mlotshwa P, **Yende-Zuma N**, Govender D, **Padayatchi N**, **Abdool Karim SS**. High rates of drug-induced liver injury in people living with HIV coinfected with tuberculosis (TB) irrespective of antiretroviral therapy timing during antituberculosis treatment: results from the starting antiretroviral therapy at three points in TB trial. *Clinical Infectious Diseases* 2020 June
2. **Naidoo K**, **Padayatchi N**, Walzl G, Hatherill M, Zak D, Scriba TJ; Adolescent Cohort Study team; GC6-74 Consortium; SATVI Clinical and Laboratory Team; ScreenTB Consortium; AE-TBC Consortium; RePORT Brazil Team; Peruvian Household Contacts Cohort Team; CAPRISA IMPRESS team. RISK6, a 6-gene transcriptomic signature of TB disease risk, diagnosis and treatment response. *Scientific Reports* 2020 May; 10(1):8629
3. **Padayatchi N**, Bionghi N, Osman F, Naidu N, Ndjeka N, Master I, Brust JCM, Naidoo K, Ramjee A, O'Donnell M. Treatment outcomes in patients with drug-resistant TB-HIV co-infection treated with bedaquiline and linezolid. *International Journal Tuberculosis and Lung Disease* 2020 October; 24(10)
4. **Perumal R**, **Padayatchi N**, **Yende-Zuma N**, **Naidoo A**, Govender D, **Naidoo K**. A moxifloxacin-based regimen for the treatment of recurrent drug-sensitive pulmonary tuberculosis: An open-label randomised controlled trial. *Clinical Infectious Diseases* 2020 January
5. Siedner MJ, Moorhouse MA, Simmons B, de Oliveira T, Lessells R, Giandhari J, Kemp SA, **Chimukangara B**, Akpomemie G, Serenata CM, Venter WDF, Hill A, Gupta RK. Reduced efficacy of HIV-1 integrase inhibitors in patients with drug resistance mutations in reverse transcriptase. *Nature Communications* 2020 Dec; 11(1):5922
6. **Sunpath H**, Hatlen TJ, Moosa MS, Murphy RA, Siedner M, **Naidoo K**. Urgent need to improve programmatic management of patients with HIV failing first-line antiretroviral therapy. *Public Health Action* 2020 December

CAPACITY DEVELOPMENT AND MANAGING DIVERSITY

A total of fifteen (15) Masters, Doctoral and Post-doctoral students are affiliated with CAPRISA-SAMRC Unit – these students are mentored and supervised by the unit leadership and scientists. The majority of students are Indian and Black, with 90% being female.



GeneExpert diagnostic testing, Dr Nolwazi Mncwabe at the CAPRISA eThekweni Research clinic

RESEARCH TRANSLATION

CAPRISA have been impacting science through policy, guideline development and practice to relevant stakeholders. The list below summarises the science citizenship of Professors Salim Abdool Karim, Nesri Padayatchi and Kogieleum Naidoo:

Professor Salim Abdool Karim: MAC Chair for COVID-19, UNAIDS Scientific Expert Panel, WHO: HIV-TB Task Force, HIV and Hepatitis Scientific and Technical Advisory Committee, Steering Committee on strategic use of ART and Gates' Foundation Scientific Advisory Board for Global Health.

Prof Nesri Padayatchi: Ethics Advisory Group of the International Union Against TB and Lung Disease (IUATLD), SA HIV Clinicians Society, Indian Advisory Group for the Indian Medical Research Council, SA National TB Think Tank and South African National Drug Resistance TB Advisory Committee.

Prof Kogieleum Naidoo: WHO HIV-TB Implementation for Impact Working Group and WHO guideline advisory committee, Medscape AIDS/Infectious Diseases Advisory Board, National TB Think Tank Technical working group TB, KwaZulu-Natal Clinical Governance and Pharmacovigilance Committee and Board member of SA HIV Clinicians Society, Data Safety Monitoring Board member of the WHIP3TB study, Chair Data Safety Monitoring Board of the Khartuwe study, Data Safety Monitoring Board member of the Triage TB Study.



REFLECTIONS ON 2020/21



Dr Anushka Naidoo,
Scientist

Finding opportunity during adversity and moving forward with excellence has been the cornerstone of continuing our research efforts in the TB and HIV treatment programme. We have used innovative digital technology platforms to reach our participants and were able to gain new insights into greater efficiency in conducting research. We also had the opportunity to reflect and regroup as well as to focus on preparing for new clinical trials to be conducted at our unit, writing new grant applications and manuscripts.



Senamile Ngema,
Masters student

No one was prepared for the challenges that COVID-19 brought. Our academic work paused and for a while the future looked dull, but with resilience and great supervision we were able to re-direct and focus on what we could accomplish. We regained our strength and the mist slowly vanished. Most importantly we learnt that obstacles will always come, what is important is to learn to adjust and overcome.



Dr Aida Sivro,
Senior Scientist

One must be open to adjustments, especially in the time of crisis. In many ways the ability to focus on research, setting and accomplishing clear goals helped provide normality to an otherwise very stressful time.

SAMRC/NHLS/UCT MOLECULAR MYCOBACTERIOLOGY RESEARCH UNIT



I am exceptionally proud of the resilience shown by the MMRU and its members during this challenging time. Our resilience was based on the Unit's entrenched ethos of teamwork, flexibility and creativity, and culture of support, collaboration, and collegiality. In many ways, the pandemic brought out the very best in each of us. It's an enormous privilege to lead this Unit.

Prof Valerie Mizrahi Unit Director
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OVERVIEW

The SAMRC/NHLS/UCT Molecular Mycobacteriology Research Unit focuses on studying aspects of the physiology and metabolism of Mycobacterium tuberculosis of relevance to tuberculosis drug discovery, drug resistance, mycobacterial persistence, and tuberculosis transmission. In terms of fit with the strategic goals of the SAMRC, the MMRU contributes to Goal 2 through publications in international peer-reviewed journals; to Goal 3 through the development of new biological tools for accelerating tuberculosis drug discovery which are being applied in international TB drug discovery consortia; and to Goal 4 through the support of a large cohort of postgraduate students who successfully compete for scholarships from the SAMRC and other funders.

RESILIENCE IN A TIME OF COVID-19 – RESPONDING AND ADAPTING TO COVID-19

The MMRU has responded to the COVID-19 pandemic by using the period during which access to the unit's research laboratories in the Institute of Infectious Disease and Molecular Medicine (IDM) at UCT has been restricted by focusing, in a very intentional way, on writing manuscripts, grant applications and student theses. Coupled with this was the development of busy virtual work-in-progress and journal club programmes which have been instrumental in maintaining morale and motivation (especially amongst vulnerable staff and students) during this challenging time. In addition to producing a bumper crop of major publications in top international peer-reviewed journals,

three PhD theses and one MSc dissertation were completed and submitted for examination at UCT, and a fourth PhD dissertation is in the process of being finalised. Students and postdoctoral fellows were supported in their efforts to secure scholarship/fellowship funding to pursue their studies; these efforts have been particularly successful.

In another significant development, two new research grants were awarded to the unit director, Prof Mizrahi, and deputy director, Prof Warner, from the Bill & Melinda Gates Foundation for new TB drug discovery projects, and further grants to them are pending as subawards on a TBRU application to the NIH led by collaborators at Brigham & Women's Hospital (Boston) and Weill Cornell Medicine (New York) in the USA. Prof Mizrahi, who also directs the IDM, Prof Warner, and other members of the MMRU with expertise in biosafety as well as health and safety, played key roles in developing and implementing the IDM's (and hence, the unit's) COVID-19-compliant return-to-work plans, and in developing strategies for managing risks to the research and postgraduate training enterprises in the IDM, Faculty of Health Sciences and university.

In terms of service, acting in her capacity as IDM director, Prof Mizrahi also led the IDM's SARS-Cov-2 surge diagnostic testing project as part of the national initiative convened by the SAMRC and funded by the Solidarity Fund. An Intercalated MBChB-PhD student in the MMRU worked as a volunteer in the NHLS/UCT virology diagnostic laboratory at Groote Schuur Hospital for several weeks during the first wave of the pandemic. The MMRU has not engaged directly in COVID-19 research but has focused on sustaining its TB research programs by aggressively pursuing international funding opportunities for new studies that are built on the unit's strong track record of achievement in biomedical TB research.



Eh!woza Science Workshop

OPPORTUNITIES FOR INNOVATION

As outlined above, the MMRU has contributed to the SAMRC's strategic goals in the areas of research and its application as a vehicle for human capital development. The unit produced major publications from all of its major research thrusts. These included papers in *Frontiers in Cellular and Infection Microbiology*, *Antimicrobial Agents and Chemotherapy* and *ACS Infectious Diseases*. In the area of TB drug discovery, papers in *Elife* and *Journal of Bacteriology* in fundamental aspects of mycobacterial

physiology and metabolism, and a landmark paper in *PLOS Pathogens* on the aerobiology of TB transmission. Prof Mizrahi also co-authored editorials/ commentaries in *Cell*, *Science* and *Nature*. MMRU trainees excel in their academic endeavours by winning prestigious prizes, scholarships, and other awards. Through these achievements, the MMRU has contributed significantly towards three of the strategic goals of the SAMRC.

INNOVATIVE APPROACHES AND PROGRAMMES

In a major paper published in *eLife*, Intercalated MBChB-PhD student Tim de Wet used a combination of CRISPR interference (CRISPRi) and quantitative imaging to describe the morphotypic landscape of essential mycobacterial genes. *M. tuberculosis* possesses many genes of unknown or predicted function, undermining fundamental understanding of pathogenicity and drug susceptibility.

To address this challenge, de Wet, working under the supervision of Prof. Digby Warner, developed a high-throughput functional genomics approach combining inducible CRISPRi and image-based analyses of morphological features and sub-cellular chromosomal localizations in the model organism, *Mycobacterium smegmatis*. Applying automated imaging and analysis to 263 essential gene knockdown mutants in an arrayed library, robust, quantitative descriptions of bacillary morphologies consequent resulting from target gene silencing was developed. Leveraging statistical learning, this study demonstrated that functionally related genes cluster by morphotypic similarity and that this information can be used to inform investigations of gene function.

The results of this study support the application of large-scale image-based analyses for mycobacterial functional genomics, simultaneously establishing the utility of this approach for drug mechanism-of-action studies. This work formed the basis of a new research grant awarded to Prof. Warner from the Bill & Melinda Gates Foundation.

CAPACITY DEVELOPMENT AND DIVERSITY MANAGEMENT

The unit hosted four postdoctoral fellows, 15 PhD students, two MSc and two BMedSci(Hons) students who were supported by eight academic, technical and administrative staff members. In terms of gender balance, approximately 50% of the students and postdocs are women. In terms of nationality, the majority of trainees in the MMRU are South Africans (75%), with the remaining trainees hailing from Zimbabwe, Kenya, Ghana, Botswana, and France. The MMRU has seen a steady increase in participation by black South African students, particularly amongst the newest recruits to the unit, all of whom are black (African or Coloured).

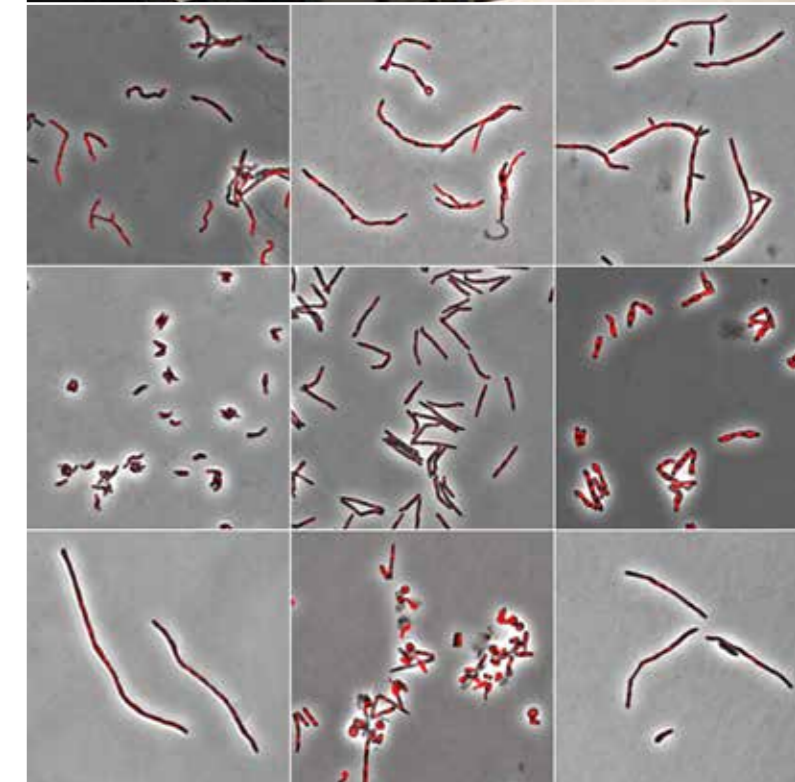
RESEARCH TRANSLATION

Since the MMRU played an integral role in Eh!woza by providing seed funding for its pilot project, members of the unit have been centrally involved in facilitating workshops and running the project. Dr Anastasia Koch (Junior Research Fellow) is the co-founder of the programme, together with artist Ed Young. Dr. Anastasia Koch jointly leads the Eh!woza public engagement project ([www. Ehwoza.com](http://www.Ehwoza.com)) together with Ed Young, Bianca Masuku and Prof Digby Warner.

Over the past year, MMRU postgraduate students Atondaho Ramudzuli and Kristy Winkler were active participants in Eh!woza initiatives. Overall, Eh!woza aims to increase TB awareness in communities where this disease has the biggest impact, as well as to educate learners (aged 15 – 17) living in these communities about the intricacies of biomedical TB research. Eh!woza's four core focus areas for 2020 included: (i) Consolidation of existing projects to ensure sustainable implementation; (ii) Capacity development within beneficiary communities to lead equivalent PE initiatives in future; (iii) Embedding impact assessment within the programme and developing innovative quantitative methods for assessing the impact of health PE; and (iv) Expansion of collaborative networks.

While the COVID-19 pandemic imposed significant disruption to Eh!woza's planned activities (many of which rely on in-person workshops), the organisation was able to quickly adjust its focus to address the COVID-19 pandemic. In addition to establishing an independent organisation and growth to include five staff members, Eh!woza's key outputs include the production of seven documentary films that address and describe the social and personal impact of COVID-19 on South African communities and eight informational animations (developed in collaboration with students from the MMRU) that address different aspects of COVID-19. Documentaries were disseminated in partnership with the Bhekisisa Centre for Health Journalism (and syndicated partners *News24* and the *Daily Maverick*) and have been viewed over 400 000 times over the last 12 months.

In addition, two news articles were written, two international webinars were delivered (mentioned above) and a book chapter was submitted to Policy Press's Rapid Responses series titled 'COVID-19 and Co-production in Health and Social Care Research, Policy and Practice'.



SAMRC/NHLS/WITS VIDA-RESPIRATORY AND MENINGEAL PATHOGENS RESEARCH UNIT



The COVID-19 pandemic brought to the fore the dedication and passion of staff at Wits-VIDA. Rather than being daunted and paralyzed by the uncertainty of the pandemic, the staff at VIDA sprang into action at much sacrifice to their personal lives and demonstrated unwavering dedication to contribute to the once in a lifetime occurrence. The Unit, having been at the forefront of research on vaccines against respiratory pathogens, immediately assumed a leadership role in the clinical development of COVID-19 vaccines on the continent.

Prof Shabir A. Madhi Unit Director
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OVERVIEW

Wits VIDA's objectives underscore the strategic goals of the SAMRC through conducting translational research on vaccine preventable diseases and training the next generation of clinician scientists. Combining clinical, microbiological, and epidemiological expertise in an African setting, Wits VIDA's scientific research informs local and global policy recommendations on the use of next-generation and novel vaccines today.

Wits VIDA's current focus areas include next-generation vaccines against rotavirus and TB, as well as development of novel vaccines targeted at pregnant women to protect their young infants against the leading causes of sepsis and pneumonia during early infancy. Wits VIDA is one of seven participating units in the multi-country Child Health and Mortality Prevention Surveillance (CHAMPS) programme, aimed at providing refined estimates as to the causes of stillbirths and under-5 childhood deaths in low-middle income countries (LMICs).

In addition, the unit has recently embarked on several COVID-19 vaccine as well as immunological and epidemiological studies.

COVID-19 RELATED RESEARCH

In 2020, under the leadership of founder Prof. Shabir Madhi (newly appointed Dean of the Faculty of Health Sciences at the University), Wits VIDA championed South Africa's participation in the race for a COVID-19 vaccine. The ChAdOx1 nCoV19 vaccine was Africa's first COVID-19 vaccine study, and Prof. Madhi's team leads the national coordination of seven trial sites around the country.

The trial enrolled volunteers across seven sites in South Africa and determined that a two-dose regimen of the ChAdOx1 nCoV-19 vaccine provides minimal protection against mild-moderate COVID-19 infection from the B.1.351 coronavirus variant first identified in South Africa in mid-November 2020. The findings have been published in the prestigious New England Journal of Medicine (March 2021).

Additionally, VIDA participated in the Novavax COVID-19 Vaccine trial. This Phase 2 NVX-CoV2373 study in South Africa successfully enrolled 2,904 volunteers 18-84-years-old. Results of the Novavax COVID-19 vaccine trial in SA and UK have confirmed high levels of efficacy against the original and variant COVID-19.

Furthermore, Wits VIDA has initiated several surveillance studies in South Africa.

- The COVID-19 Hospital Surveillance studies investigate disease burden in the Adults, Paediatrics and Maternity wards within Chris Hani Baragwanath Academic Hospital in Soweto, Johannesburg.
- The Healthcare Workers study aims to describe the COVID-19 infection rate amongst our frontline healthcare workers, using PCR and antibody testing done by the Wits VIDA Laboratory.
- Wits VIDA's Community Surveillance studies aim to understand the indirect impact of COVID-19 in the community. This includes looking at days of education lost in children and loss of livelihoods and income in adults. The study further investigates the impact of the epidemic on health services usage such as antenatal care and chronic morbidity treatment, as well as child vaccinations and the short- and long-term impact thereof.

- The Household Transmission study investigates risk exposure within households. The study aims to answer the question of whether people employed in certain sectors are more likely to spread COVID-19 in their households. Additionally, clinical presentation of symptoms and how that affects transmission is investigated. The study further investigates community perceptions around the disease and how this translates into implementation of COVID-19-prevention measures. The study will shed light on why communities are reluctant to follow non-pharmaceutical interventions against the disease and inform policy and implementation around culturally and socio-economically acceptable intervention measures by government.
- Wits VIDA pioneered the Survey to Estimate the Sero-Prevalence of SARS CoV2 across Gauteng and the North West Province in South Africa. This study investigates immunity in the population and will inform on hotspot areas. This data will indicate whether these areas may have had high infection rates, resulting in higher immunity, compared to areas with low immunity and greater susceptibility for the disease.
- The MRC Point of Care study monitors various exposures in pregnancy (disease, including COVID-19, environmental factors, medication, etc.) and the effects thereof on pregnancy outcomes. The study will follow-up on women and their birth outcomes, as well as their children, linking back to exposure during pregnancy.
- Wits VIDA seized the research opportunities created by COVID-19 by pioneering these studies for the benefit of the South African and global population.

OPPORTUNITIES FOR INNOVATION

Wits VIDA championed South Africa's participation in the race for a COVID-19 vaccine, the first in Africa, and continues to be at the forefront of leading the generation of new knowledge. Our work on the Oxford vaccine trial in particular and collaborations around sequencing the virus has in turn guided policy and planning on national vaccination objectives (translation of research into policy and practice). Our academic programme as well as our organisational growth and breadth of research focus areas and our world-class facilities continue to build capacity for the long-term sustainability of South African health research.

IMPACT ON POLICY AND PRACTICE

Pneumococcal Vaccine Studies:

The unit continues research on the prevention of pneumococcal disease through vaccination with the pneumococcal conjugate vaccine. This includes the work of two PhD students, which has investigated the direct and indirect benefits of vaccination. Included in this are studies



REFLECTIONS ON 2020/21



Dr Portia Mutevedzi, PhD,
Senior Epidemiologist

Through conducting impactful COVID-19 research in the community; visiting households and interacting with people, it gave us (VIDA CHAMPS and COVID-19 surveillance teams) a sense of worth and togetherness, at the height of the COVID-19 pandemic, a time where everything seemed hopeless. While conducting community COVID-19 screening and testing, collecting data on the impact of COVID-19 on individuals, households and communities at large; we came to the realisation that our work is important and carries us through all life seasons.



Suzett Fourie, RN,
Clinic Manager

Our staff have been stretched to the limit with long hours, fear and uncertainty and their own personal loss. During this testing time, however, our team has learned that they are resilient and can be confident that they are making a huge impact in the fight against this disease.

which has shown that since South Africa introduced PCV into its public immunization program, based on evidence generated by VIDA, annually more than 300 children's lives are saved and there are approximately 125,000 fewer pneumonia hospitalizations in children, compared to prior to vaccine introduction.

Group B Streptococcus:

Included among these studies were the first studies to show the association between immune mediators and risk of recto-vaginal GBS acquisition during pregnancy, as well as studies on correlates of protection against invasive GBS disease in Africa.

Stillbirths and Infant Mortality:

Studies by Wits VIDA have established GBS to be an important contributing cause to not only neonatal death, but also stillbirths in South African women. These studies will be important in informing the design for future vaccines aimed at immunization of pregnant women to improve their birth outcomes and prevent invasive disease in their young infants.

Wits VIDA's various studies on COVID-19 and especially the unit's partnership with Oxford on the ChAdOx1 nCoV19 vaccine trial have pioneered African involvement in the global pandemic response, as well as raising awareness worldwide of the necessity of developing vaccines that target variants of the SARS-CoV2 virus.

CAPACITY DEVELOPMENT AND DIVERSITY MANAGEMENT

Wits VIDA employs over 450 staff members and has supported 17 PhD and three MSc students during the reporting period. Staff categories include research assistants (often employed immediately post matriculation), laboratory technicians (trained at Wits VIDA), laboratory technologists, medical scientists, enrolled nurses, professional nurses, epidemiologists, statisticians, clinical associates, and medical doctors. Staff are offered opportunities for further training through skills-development programs and higher degree training.

RESEARCH TRANSLATION

Prof Madhi and his research team have been prominently featured in local and international media such as the SABC, eNCA, BBC, CNN and Aljazeera, and have actively engaged with the government and public on issues related to vaccines.

Furthermore, a Q&A webinar for participants on the ChAdOx Vaccine trial was held by the unit following the release of trial results. Prof Madhi participated in academic webinars for the WITS Journal of Clinical Medicine and Wits Pathology Society, as well as various webinars for The Daily Maverick, informing the public. Wits VIDA further engages with the community through Community Advisory Boards (CAB) during bi-monthly meetings arranged by the unit.

Prof Madhi has authored 45 peer-reviewed publications during the reporting period, most notably being published in the New England Journal of Medicine. Prof Madhi and his team collaborated with local and international researchers from various academic institutions such as the University of Oxford, the University of Colorado, and Emory University, amongst others.



REFLECTIONS ON 2020/21



**Dr Vicky Baillie, PhD,
Senior Scientist**

It hasn't been easy, but we had an incredible laboratory team who chose to band together instead of fall apart, who were driven by the need to stand up when South Africa needed us most.



**Nana Thwala, Clinical
Research Associate**

The spirit of teamwork and positivity is one thing that the MITS team had, when we reached COVID peak, increasing deaths, more colleagues testing COVID positive, we remained positive and relied on each other to get work done!

AIDS AND TB RESEARCH UNIT

AIDS and TB Research Unit includes REPORT TB, the TB Platform and Social Impact Bond



The COVID-19 pandemic highlighted the fact that we need to do things differently. We understood that the social impact bond, as an innovative form of finance and with a focus on optimising performance and impact, provided a real opportunity to do things right for the future. This invigorated the team to develop an accelerated plan to catch up and complete the design of the social impact bond.

Dr Fareed Abdullah Unit Director
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SOCIAL IMPACT BOND OVERVIEW

The SIB administers and supports research to improve the knowledge available to inform optimal programmes for adolescent girls and young women to improve outcomes for HIV and teenage pregnancy. We also lead the generation of new knowledge concerning the design, implementation, and evaluation of Social Impact Bonds to improve health outcomes in South Africa.

In line with the organisation's collaborative nature which always encourages partnerships and collaborations that are designed to improve the health and quality of the lives of the people of South Africa and the broader African continent, the SIB works with international and local stakeholders (Social Finance UK and the Bertha Centre for Social Innovation and Entrepreneurship) to set up an ecosystem for social impact bonds.

Furthermore, we lead the development of a knowledge repository for information regarding design, development and evaluation of SIB in Africa while working with national government structures (South African National AIDS Council, Department of Health, Department of Basic Education) to translate new knowledge gained through the design and implementation of social impact bonds into policies and practices.

RESPONDING AND ADAPTING TO COVID-19

As a unit, we have had to rework a lot of our plans due to delays and uncertainties brought about by the pandemic. However, we rose to these challenges and made continuous adjustments as needed and made extra effort to ensure optimal communication and team work even if we were not able to meet face to face.

OPPORTUNITIES FOR INNOVATION

There was an opportunity to submit a proposal to the Solidarity Fund for a potential social impact bond to support services as part of a response to COVID-19. Although our proposal was not successful, it did allow us to explore the role of a social impact bond in responding to an emergency.

INNOVATIVE APPROACHES AND PROGRAMMES

We developed a research report that pulls together all the research commissioned as part of the development of the AGYW SIB. This research will result in more than 70 publications over time. This research was mostly conducted by units within the SAMRC, supporting both existing and new studies and contribute to the knowledge base on the health and wellbeing of adolescent girls and young women aged in South Africa, as well as develop interventions to improve HIV and teenage pregnancy outcomes.

We have built a financial model for the first SIB with government as an outcomes funder, as part of building innovative finance mechanisms, which bring investment from the private sector and also focus on improved outcomes and cost effectiveness of programmes for AGYW.

The SIB has successfully built a partnership with the Department of Basic Education, Department of Science and Innovation, the Department of Health, and the National Treasury to support the design and development of the SIB. This partnership will assist with the translation of lessons learned in the SIB into policy and practise. The National Treasury has requested the SAMRC to draft a practice note on Social Impact Bonds in the South African legal context. The Department of Basic Education (DBE) has requested the SAMRC to draft a guideline on implementing AGYW programmes in schools.

IMPACT ON POLICY AND PRACTICE

The OATB awarded funding to 13 studies within the SAMRC and partner institutions such as the HSRC and the University of the Witwatersrand to consolidate existing knowledge and produce new knowledge to 1) better understand the challenges of adolescent girls and young women age 15 to 19 years old in school, and 2) develop and test interventions for this target population. All 13 projects were finalized in March 2020, however, most of them continue to draft manuscripts for publications from the vast amounts of data that was collected and produced. The knowledge created by these 13 projects subsequently informed the development of the Theory of Change and the SIB intervention package, as well as produced more than 70 publications and close to a dozen abstracts, posters and oral presentations at national and international conferences to date.

PROJECT NAME	PROJECT LEAD
HIV and pregnancy in AGYW in South Africa – A tale of Two Surveys	V Pillay-van Wyk (BOD – SAMRC)
Adolescents living with HIV in South Africa: what do we know about them?	M Zungu (HSRC)
Evaluation of the Global Fund Young Women and Girls (AGYW) Intervention in Ten South African Districts: HERStory Study	C Mathews (HSRU – SAMRC)
Adolescent and youth mortality in South Africa	D Bradshaw (BOD – SAMRC)
Substance abuse among AGYW	C Parry (ATODRU – SAMRC)
Assessing the role that social protection and social support play in AGYW risk and vulnerability	W Zembe (HSRU – SAMRC)
Lessons learned from the evaluation of an intervention for preventing men’s use of SGBV in urban South Africa – Abigail Hatcher (Wits Health Consortium)	A Hatcher (G&H – SAMRC)
Modelling HIV & Associated Factors amongst Sex Workers in South Africa	J Coetzee (PHRU)
Overview of reviews: Interventions to reduce unplanned pregnancy, school dropout, HIV incidence and enhance HIV care in adolescent girls and young women in South Africa	T Kredo (Cochrane Centre – SAMRC)
Can we reduce HIV acquisition amongst pregnant and lactating adolescent and young women?	A Goga (HPRU – SAMRC)
Developing a gender-enhanced PrEP information-motivation workshop for young South African women (PrEP project)	J Hanass-Hancock (HPRU – SAMRC)
Strengthening South Africa’s health system through integrating mental health counselling into HIV services.	B Myers (ATODRU – SAMRC)
Formative Research and development of a sexual violence prevention intervention for South African Higher Education institutions	M Machisa (GHRU – SAMRC)

RESEARCH TRANSLATION

We have shared a summary report of the research undertaken with relevant stakeholders including Department of Science and Innovation, South African National AIDS Council. Department of Basic Education. We plan to share this more broadly through a website in the next year.

THE REGIONAL PROSPECTIVE OBSERVATIONAL RESEARCH FOR TUBERCULOSIS (TB REPORT)

The South African TB RePORT Consortium

The SAMRC Office of AIDS and TB Research (OATB), in partnership with the US National Institutes of Health, has established a TB research network that brings together 18 research sites in the country to collaborate on a wide range of TB biomarkers, diagnostics and service delivery projects united by a common sample collection protocol. The SA network is linked to a global network of TB researchers in India, Brazil, China, Indonesia and the Philippines. The SAMRC has recently negotiated a renewal of the research collaboration with the NIH for just under R100m over a three year period resulting in the largest TB biomarkers, diagnostics, therapeutics and vaccine basic science research with access to a biorepository with hundreds of thousands of samples.

Background

The Regional Prospective Observational Research for Tuberculosis (TB RePORT) Consortium represents a global network established to address key challenges related to developing new tools for addressing the growing TB problem, which has been further exacerbated by COVID-19. The South African TB RePORT consortium has completed its first three-year tenure and in 2020, was successful in initiating a second 3-year tenure of operations. A single consortium of South African researchers comprising several institutions, led by the South African Tuberculosis Vaccine Initiative (SATVI – at the University of Cape Town [UCT]) is leading this initiative.

TB RePORT is founded on the principle of establishing patient cohorts in these settings following a common recruitment and sample collection protocol to establish a biobank of specimens that can be used for biomarker, diagnostic and related research endeavours. The common protocol allows for specimen collection in two cohorts designated as Cohort A and Cohort B, the former comprising participants with drug susceptible TB and the latter the household contacts of these individuals. Specialist cohorts such as those that encompass paediatric TB are also included.

These collective efforts are expected to yield a valuable set of specimens, from clinically well-characterised patients, across different geographical locales. The availability of these specimens allows for the leveraging of additional grant funds for scientific analysis, collaborative efforts and will form the basis for future biomarker research. Furthermore, sequence analysis of these specimens can be done through the SAMRC Genomic Centre to enable the development of a locally grown repository of valuable genetic information.

Current Status

The application and international review process of the new South African RePORT consortium was concluded in the third quarter of 2020. As this is a bi-partite project, with a component of funding being supplied by the NIH, through CRDF global, the successful consortium was required to complete two contractual processes. The contract with CRDF was initiated in the last quarter of 2020 and the SAMRC contract and financial arrangements were recently concluded in March 2021. CRDF is contracting separately with each member of the consortium, a process that is at different stages with each member. Whilst awaiting contractual approvals, the following progress has been made:

- Research protocol and related activities:** TB RePORT requires that all sites operate with a common protocol so that congruent specimens are collected which enables the generation of large datasets that can be compared across sites. The South African consortium has finalized this common protocol for the second iteration of the project and also completed all amendments to the informed consent forms that will be used by the sites during recruitment.
- Ethics approval:** The consortium has enlisted 7 sites for the clinical recruitment component of the work. Six of these have successfully applied for and received Human Research Ethics Approval for starting recruitment and collection of samples.
- Contractual agreements:** Four of the 7 sites have concluded revised CRDF agreements and are able to now initiate participant recruitment. The SAMRC contractual process has been completed for the entire consortium.
- Clinical recruitment:** The Case Report forms for all sites have been finalized, these will need to be synchronised with the data management centre.
- Laboratory Operations:** The Lab manual for all sites has been finalized, this will dictate how all samples are processed.
- Site status:** Four sites have been activated; 2 sites are expected to be activated later in March; 1 site is expected to be activated in April, the first enrolments will be in the first week of April.

TUBERCULOSIS PLATFORM



During the first three weeks of Lockdown level 5 it was easy to stay focused and resilient – everyone was doing something related to the number “21” and we enjoyed everyone’s stories. As the lockdown period was extended, More time was allowed during these weekly meetings to focus on everyone’s health, their experiences and observations as time went on. I believe that the attention given to staff’s emotional well-being played a role in how well we coped. We learnt more about each other’s daily lives and this was great.

Prof Martie van der Walt Platform Director
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OVERVIEW

The Tuberculosis Platform undertakes research in the epidemiology of tuberculosis and through evidence contributes to improved policy and practice to prevention and control of tuberculosis in South Africa and globally.

Specific objectives of the Platform include the understanding the drivers of the epidemiology of tuberculosis in South Africa and designing interventions to reduce the burden of TB, the prevention of tuberculosis in congregate settings and among vulnerable populations, being pregnant women, health care workers and people living with HIV and AIDS. The Platforms also focuses on understanding the mechanisms and drivers of drug-resistance in Mycobacterium tuberculosis, as well as developing innovative ways to diagnose and treat tuberculosis.

IMPACT ON POLICY AND PRACTICE

Pregnant women are highly susceptible to TB due to their reduced immune response, and pregnant women with HIV is even more so. Prevention of TB in the HIV-infected group is key to ensure the wellbeing of the mother, and her new born baby. Isoniazid preventive therapy is highly protective in men and non-pregnant women with HIV, but isoniazid preventive therapy causes in some people undesirable side effects, and blanket offering of isoniazid to pregnant women was cautioned. Findings from the longitudinal cohort of pregnant women that we studied showed that low numbers of women had isoniazid prescribed and the women without isoniazid had significant poorer pregnancy and birth outcomes. Our findings contributed to policy and practice on the prescription of TB preventive therapy.

Our research on the impact of anti-retroviral therapy during treatment of HIV-positive pregnant women for drug-resistant

tuberculosis showed the protective effect of ART during pregnancy, however it also showed that it is preferable that among women treated for drug-resistant disease should preferably delay pregnancy until after completion of drug-resistant TB treatment. Family planning advice should be routinely offered to HIV-infected pregnant women.

RESILIENCE IN A TIME OF COVID-19

Health care workers are high risk to contract tuberculosis due to poor infection control infrastructure in health facilities and high numbers of undiagnosed patients in facilities. The hierarchy of infection prevention and control measures advocated to prevent TB in congregate settings are very similar to those implemented for TB, and we had published two papers on the overlap between tuberculosis and COVID-19 disease, diagnosis and prevention.

COVID-19 RELATED RESEARCH

Very early on in the pandemic it was evident that the stringent lockdown measures to curb the spread of COVID-19 will have a devastating impact on TB and HIV control. The stringent measures such as keeping people indoors, travel restrictions and the realignment of health care workers and other resources, away from tuberculosis, meant that people were less likely to visit clinics to seek care for their tuberculosis symptoms, there were drug stock outs and people on TB treatment did not come back for follow up visits. The Tuberculosis Platform is busy with a study in the Eastern Cape, KwaZulu-Natal, and Tshwane to review the TB programme performance during the months of the stringent lock-down and which groups of tuberculosis patients were the most severely affected. The qualitative component of this study will interview



TB Platform staff members collecting wastewater in Daspoot



One of the scientists in a TB Laboratory

TB nurses and clinic managers on their experiences and challenges during stringent lockdown. This information will show where the TB programme now need to focus to find neglected groups.

The Platform hosted from 3-10 July 2020 together with CSIR a series of three webinars on COVID-19 and the paradigm shift in building and workplace management. Since COVID-19, hierarchy of infection control measures that consist of administrative, environmental, and personal protection measures had to change radically: processes and procedure to provide a safe workplace have been found to be inadequate against the virus. We identified the need to among building managers and engineers to provide them with case studies and best practices on how to safeguard the workplace.

Given the different infrastructure of SAMRC across the three campuses, the way SAMRC had to adapt and adopt office management was presented as a real-life example. Similarities in the transmission of and protection against tuberculosis and COVID-19 were discussed and highlighted how past research done by SAMRC informed the body of knowledge on the transmission of airborne diseases.

We also participated in the 2020 Year of the Nurse and Midwifery campaign with Corporate and Marketing Communications Department of SAMRC and the Department of Nursing and Midwifery of University of Stellenbosch.

OPPORTUNITIES FOR INNOVATION

The equipment for the molecular diagnosis of the SARS-Co-V-2 RNA, the virus that causes COVID-19, is the same as what is used for the rapid diagnosis of other infectious diseases such as tuberculosis. For each specific disease, a specific cartridge is used, and the machine is programmed that disease and cartridge. Therefore prior to the COVID-19 pandemic these machines were widely used by research and diagnostic laboratories for the diagnosis of tuberculosis. The pathogenesis of COVID-19 disease showed early on that the virus is also excreted in faeces and that pieces of its RNA can be detected in sewage water. When the pieces of RNA are present in wastewater it can be used as a marker of COVID-19 in the catchment area of the wastewater treatment plant which is an important tool to study the epidemiology of SARS-Co-V-2.

The Tuberculosis Platform rapidly responded to the opportunity to participate in the environmental monitoring of wastewater and has realigned staff and equipment to this opportunity. We are part of the SAMRC COVID-19 Prevention Research Programme and started in August 2020 with the monitoring of wastewater in some of the bigger treatment plants of the Tshwane Metropolitan area. Surveillance started after the first wave of COVID-19, and covers the period of the second wave. The wastewater samples are stored and will undergo genotyping which will shed more light on the circulation of different strains of SARS-Co-V-2 in Tshwane.

The TB Platform is also in partnership with the NICD collaborating in the Water Research Commission's project "Establishing a National COVID-19 Wastewater Surveillance Pilot".

INNOVATIVE APPROACHES AND PROGRAMMES

Evaluation of Computer Automated Reading Software in Detecting Tuberculosis from Chest X-Ray in a Prevalence Setting. A major reason for high mortality in tuberculosis is the persistent gap in detection; a substantial number of TB cases are not diagnosed and reported. Chest X-ray (CXR) has historically been used in TB detection; for mass screenings and more recently for prevalence surveys and active case finding interventions. It is recommended by the World Health Organization (WHO) as a triage test prior to the use of Xpert MTB/Rif. However, CXR is of only limited use for TB diagnosis due to its modest specificity, since many diseases present with similar radiologic patterns, high inter- and intra-reader variability and reproducibility, and the paucity of skilled radiologists in many high TB burden countries.

There are new software systems available using deep learning (artificial intelligence) to read CXR and give possible findings that can be used in patient screening. The Stop TB Partnership, under the Accelerator for Impact project, identified and evaluated three deep learning systems for detection of TB specific abnormalities. The South African TB prevalence CXRs and datasets have been identified as a good source to compare the deep learning software systems with that of radiologists experienced in detecting TB.

CAPACITY DEVELOPMENT AND DIVERSITY MANAGEMENT

Also, aligned to the organisation's Goal 4 – to build human capacity for the long-term sustainability of the South African health research, we have two MSc students who graduated (Unarine Matodzi and Dillon Muzondiwa) and one PhD, Dr Thuli Mthiyane with three that are enrolled for their PhDs (Sikhetiwe Masuku, Tebogo Sole and Unarine Matodzi).

RESEARCH TRANSLATION

Radio and newspaper coverage of our work is one of the main methods that we use to translate our research to the public. The director often receives requests from the media for interviews as on new findings and developments in tuberculosis. Press coverage is very important, as we reach the public and create awareness about the disease and also with the aim that awareness leads to less stigma around the disease. We also had newspaper coverage by one of the mainstream newspapers on the wastewater

surveillance of COVID-19. This type of coverage also shows to the public how versatile SAMRC researchers are and that as an organisation we can rapidly respond to the threats of new infectious diseases.

We held a meeting with officials from the Water and Sanitation of Tshwane Metropolitan Area as a feedback mechanism and to acknowledge them as stakeholders.

On World TB Day, annually celebrated on 24 March, The TB Platform held a community outreach event with the purpose to raise awareness about TB. The theme of the 2021 World TB Day is "the clock is ticking" and with this event we aim to raise awareness that people with TB should early on in the progression of disease seek care for their symptoms. In line with the Strategic Goal 2 of the organisation, which is to lead the generation of new knowledge, the Platform has published peer-reviewed publications during this reporting period.



REFLECTIONS ON 2020/21



Mike Manzina

In order to stay safe, we adhered to all safety protocols as set out by the President of the Republic of South Africa and the Ministerial Advisory Committee (MAC) on COVID-19.



Tebogo Sole, Chief Research Technologist

This difficult period was treated as an opportunity rather than an obstacle. Committing to always stay in touch with each other via these support mechanisms brought all of us together. We remained one family with a common goal. Hence it is that sense of togetherness that helped us stay resilient in the time of COVID-19 – we were never apart, even when operating virtually.

SAMRC/UCT CENTRE FOR THE STUDY OF ANTIMICROBIAL RESISTANCE



COVID has taught us how to better work together as teams and flatten hierarchies, but most of all that we can do so much in such a short space of time if we are serious about fighting other diseases like TB. The challenge now is to apply what we have learned so that other pandemics can be defeated whether they are infectious or non-communicable diseases.

Prof Keertan Dheda Unit Director

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OVERVIEW

The Centre for the Study of Antimicrobial Resistance (CAMRA) is embedded within the Centre for Lung Infection and Immunity in the Department of Medicine at the University of Cape Town. CAMRA collaborates with South African and international scientists and clinicians to conduct research into TB and non-TB MDR pathogens to study the relationship between pharmacokinetic mismatch and drug resistance development, and corrective strategies including (i) better diagnostic readouts to detect mismatch (ii) newer approaches to drug delivery (inhaled formulations of existing drugs). A long-term goal is also to develop a platform to study inhaled antibiotics at UCT and South Africa. These research activities aim to provide important insights into mechanisms of drug resistance evolution and subsequently lead to better diagnostic and treatment strategies, which aligns with SAMRC's strategic goals of generating new knowledge and development of new technologies to improve health and build research capacity in South Africa.

RESILIENCE IN A TIME OF COVID-19

The COVID-19 pandemic has presented several unique challenges to our research activities in the unit. The surge in COVID-19 cases during the first and second waves of the pandemic in SA and the subsequent strict lockdown

measures taken by the national government led to several institutions, including UCT, to adjust their research practices. As a result, recruitment for many of our TB studies, including CAMRA, were temporarily suspended and access to UCT facilities were severely restricted.

However, despite these restrictions, the unit was able to rapidly pivot its research focus onto COVID-19 research. Subsequently, several measures were introduced to adapt to performing SARS CoV2 research including (i) Training in infection control and physical protection (PPE) for clinical and laboratory staff to ensure safety (ii) Implementation and optimization of a SARS CoV2 viral PCR assay and the acquisition of an automated nucleic acid extraction machine and additional Rotorgene qPCR machine to accommodate high volume clinical testing (iii) Implementation of testing protocols in the Unit for high risk and symptomatic staff members (iv) Upgrade of lab facilities from BSL2 to BSL2+ and BSL3 in order to process COVID-19 clinical samples and culture of live virus (v) Optimization and development of virus-specific assays including live virus and pseudovirus plaque assays, viral load assays, antibody neutralization assays, antigen stimulation assays using various peptide pools proteins and whole virus of specific virus variants (Wuhan strain, 501.Y.V2, etc) for immunology and other COVID-specific studies (vi) Repurposing of cough aerosol sampling technologies used in our TB transmission studies to study transmission of SARS CoV2.

These measures allowed for the implementation of several grant funded COVID-19 studies in the Unit:

1. We are the primary Western Cape recruitment and testing sites for the phase II clinical trials to determine safety, immunogenicity and efficacy of the AstraZeneca/Oxford ChAdOx1 and Novavax SARS-CoV2 rS vaccines (2 publications in The Lancet and 2 in the NEJM).
2. We are currently performing an SAMRC/Xylomed funded multicentre study to determine the impact on Nitazoxanide on reducing symptom severity in patients with moderate to severe SARS CoV2 infection
3. We are a recruitment site for an SAMRC-funded multicentre study investigating the feasibility and performance of a point-of-care SARS CoV2 rapid antigen test.
4. We are performing an EDCTP-funded active case finding trial to assess the impact of a combination of Xpert and radiology using a mobile-lab setup to detect minimally symptomatic TB and SARS CoV2 cases in the community
5. An SA NRF-funded study to identify a urine-based biomarker signature for COVID-19
6. A study to evaluate the integrity of various models of respirator masks (N95, KN95) used by clinical staff during the COVID-19 pandemic.

These studies also led to the generation of a large COVID-19 clinical dataset and sample repository including (blood, serum, urine, NP swabs, sputum, etc). This allowed us the opportunity to study several aspects of COVID-19 including (i) the host genetic profile and immune response to different SARS CoV2 variants along a gradient of COVID-19 susceptibility ranging from asymptomatic patients to hospitalized patients, and (ii) the transmission dynamics of SARS CoV2 infected patients using cough aerosol sampling technology.

OPPORTUNITIES FOR INNOVATION

Antimicrobial resistance is a major public health priority in South Africa and globally. A key aim of CAMRA is to understand the key drivers of antibiotic resistance. Of particular interest is the notion of PK mismatch where bacteria are exposed to sub-therapeutic levels of antibiotics leading to development of drug resistant populations of bacteria. However, we do not know

the extent to which this occurs and how are we able to overcome PK mismatch. One such method is the ability to develop better diagnostic tools for early detection of drug resistant bacteria. Another is the development and use of inhaled antibiotic which are delivered directly to the site of disease so that higher levels at the target site can be achieved, thus minimizing PK mismatch. Thus the work proposed here addresses several of the SAMRC goals including the generation of new knowledge (how PK mismatch develops) and translation of this research and technologies into policy and practice to improve health (development of new diagnostics and treatment strategies to treat drug resistant infections) and to build capacity for the long term sustainability of South African health research (development of a multidisciplinary platform to develop and study inhaled antibiotics in South Africa).

IMPACT ON POLICY AND PRACTICE

Due to the COVID-19 pandemic, there have been several delays regarding our TB research thus the impact of this research will be fully reported during future reporting periods. However, our COVID-19 work has made significant impacts in policy and practice in South Africa and globally. Our work as recruitment sites for the Chadox and Novavax vaccine trials has aided in determining the efficacy and safety of these vaccines for their subsequent approval and rollout both nationally and globally. There have been two publications in The Lancet and two in the NEJM.

We have also shown that KN95 masks failed to adequately protect healthcare workers against airborne pathogens like SARS CoV2 and highlighted the need for proper personal protective equipment to prevent transmission in a healthcare setting. These data have resulted in SAHPRA amending their regulations regarding South Africa evaluation of KN95 masks and have informed local and global guidelines.

Our publication on optimisation of a controlled challenge model for TB infection (AJRCCM, 2020) has informed WHO guidance on this issue (currently being drafted). Projects likely to have future impact include innovative diagnostic methods for detecting COVID-19 in the urine and blood, Nitazoxanide in reducing hospitalisation in COVID-19 patients and assessing the test performance of rapid antigen tests for COVID-19.

CAPACITY DEVELOPMENT AND DIVERSITY MANAGEMENT

Several capacity development activities have occurred over the last year. We recently hired a new female junior research fellow, Dr Danicke Willemsse, who will be investigating novel immune pathways related to the neuro-endocrine system in XDR-TB patients. Furthermore, two female students from previously disadvantaged backgrounds are ready to submit their PhD theses. Dr Phindile Gina is a clinician/scientist who has been working on the role of autophagy in TB and Ms Rolanda Londt, who has been working on identifying potential targets for the development of an XDR-TB vaccine. Additionally, our COVID-19 research led to capacity development through acquisition of new equipment (qPCR, nucleic acid extraction machine), training of clinical staff in conducting large vaccine trials, implementation of new assays and training of staff in these assays.

RESEARCH TRANSLATION

Prof Dheda has been interviewed across several forms of media (television, newspapers, radio) in order to inform the public on various topics related to TB and COVID-19 including the progress of COVID-19 vaccine evaluation, the lack of protection offered by specific types of respirator masks used by healthcare professionals, the impact of COVID-19 pandemic on TB diagnosis and treatment in South Africa and the complications associated with COVID-19 disease. A full list of media stories can be found at <https://lunginstitute.co.za/liiu-news/>. There have been six COVID-related publications including two in The Lancet and two in the NEJM.



REFLECTIONS ON 2020/21



Dr Aliasgar Esmail,
Pulmonologist

We re-invented ourselves and stepped up to join the fight against COVID-19. It was wonderful to see how efficiently our own funding agencies like the SAMRC and the regulatory authorities also stepped up to enable high quality and critically important research to occur at an unprecedentedly challenging time for us all, especially, the mental stress of seeing our colleagues succumbing to COVID-19.



Dr Anil Pooran,
Senior scientist

Our rapid shift to COVID-19 research has been challenging in many ways but our involvement in so many high impact COVID-19 studies, highlights our dedication and resilience, and also ensures South African researchers maintain a global footprint in the fight against COVID-19.

PURPOSE OF THE PROGRAMME

To contribute to health systems strengthening by undertaking systematic reviews, health policy and health systems research to provide evidence for policymakers, stakeholders and researchers seeking to address today's most pressing health challenges. The programme aims to take advantage of information and technology by exploring and expanding the role of eHealth (health informatics, digital health, tele health, telemedicine, eLearning and mobile health) in strengthening health systems.

UNITS THAT CONSTITUTE THIS PROGRAMME

- | | |
|-----------------------------------|--|
| 1 Burden of Disease Research Unit | 4 Health Systems Research Unit |
| 2 Biostatistics Research Unit | 5 SAMRC/UWC Health Services to Systems Research Unit |
| 3 South African Cochrane Centre | |

PROGRAMME STRATEGIC OBJECTIVES

- To contribute towards the evidence base for national, regional and international health-care decision making by conducting high-quality systematic reviews, and health systems and health policy research reviews to improve health systems effectiveness
- To strengthen research and development through training and mentoring postgraduate students (MSc, PhD, Postdoctoral Fellows) in eHealth, health policy, health systems research and biostatistics
- To contribute to capacity development and training in the use and conduct of systematic reviews, and support of clinical trial registration for the African region
- To synthesise evidence, optimise information and knowledge flow through ICT and other means to ensure that research results are translated into policy, practice, cost-effective products and health promotion
- To develop and enhance health information systems and surveillance through systematic evaluation and identification of processes for improvement
- To provide statistical analysis to ensure scientific validity, relevance and efficiency of health systems interventions and/or service delivery models, and engage in health systems strengthening activities
- To carry out bio-statistical support training projects to assist SAMRC researchers and postgraduate students within the SAMRC

RESEARCH HIGHLIGHTS UNDER THIS PROGRAMME

BURDEN OF DISEASE RESEARCH UNIT



Prof Richard Matzopoulos
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Dr Victoria Pillay-Van Wyk
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OVERVIEW

Monitoring the country's health status and determinants of disease is an essential foundation for guiding policy and programmes to improve life expectancy and quality of life. The Burden of Disease Research Unit (BODRU) provides accurate and reliable burden of disease estimates to describe changes in health status across South Africa, patterns of disease and emerging priorities. This information is essential for setting priorities and monitoring progress in the health sector. The Unit uses multidisciplinary approaches including epidemiology, demography, and biostatistics. It provides summary health measures, mortality data analysis, health informatics and sentinel surveillance and occasional surveys on key conditions, such as cancer and injuries. We have identified disparities in health status by province and population group, strengthened population-based health information systems and, most recently, measured the impact of COVID-19 on mortality.

RESILIENCE IN A TIME OF COVID-19

The Burden of Disease Research Unit (BODRU) initiated and led the Rapid Mortality Surveillance of excess deaths study in collaboration with the University of Cape Town during COVID-19 which shows distribution of deaths since the disease arrived in South Africa in March 2021. This study shows two-thirds more deaths excess deaths compared to those reported by the Minister of Health

during the COVID-19 pandemic; many but not all these deaths were attributed to COVID-19. Furthermore, this study showed that the lock down levels and the ban on alcohol did influence the numbers deaths. This work is ongoing and can be accessed at <https://www.samrc.ac.za/reports/report-weekly-deaths-south-africa>. In addition, the Unit, together with Biostatistics responded to a request from the office of the Minister of Health to ascertain the impact of the pandemic on people living with HIV using the line list of reported COVID-19 deaths. This is due to the magnitude of the HIV epidemic in South Africa. We showed that diabetes and hypertension were the most common comorbidities in people who died from COVID-19 followed by HIV. BODRU in collaboration with Alcohol, Tobacco and Other Drugs Research Unit, investigated the impact of imposing and lifting of the alcohol ban on prevalence of trauma cases at health facilities and the number of deaths from unnatural causes and showed that when the alcohol ban was lifted, the trauma cases increased.

BODRU has initiated a study that aims to create a database of COVID-19 deaths by integrating multiple datasets and linking datasets with the rapid mortality surveillance data to ascertain the vital status of individuals and identify COVID-19 related deaths as well as deaths due to the indirect effects of COVID-19. This study is done in partnership with the National Department of Health, the National Institute of Communicable Diseases and the University of Cape Town and is ongoing.

Our South African WHOFIC collaborating Centre developed a short local guideline based on the WHO international guidelines to inform clinicians on how to certify cause of death due to COVID-19. This was reviewed by the Ministerial Advisory Committee on COVID-19 adopted by the National Department of Health. The collaborating Centre has also supported the National Department of Health with updating the ICD-10 codes to include COVID-19 morbidity and mortality.

INNOVATIVE APPROACHES

The Unit revealed the quadruple burden of disease affecting South Africa, which has impacted on research priorities. Findings from our national burden of disease study has contributed not only towards the restructuring of the SAMRC in 2012, but also the identification of health interventions to improve the health of the nation for each of the major disease burdens. The methodology developed for our second national burden study was adopted by the Western Cape Department of Health for their Western Cape Mortality Surveillance System.

Regarding HIV/AIDS our Unit provided the first clear indication of this epidemic on mortality, which was an important catalyst for the implementation of antiretroviral treatment. The national statistics office, Statistics South Africa (Stats SA) report – what is written on the death notification form – do not adjust the data for misattributed HIV/AIDS deaths that occurs due to stigma and discrimination. BODRU has developed a model that provides more feasible numbers and trends of HIV mortality for South Africa addressing the challenge of misattributed HIV/AIDS deaths.

Due to the delays in the release of mortality data from Stats SA, a Rapid Mortality Surveillance (RMS) system was established to enable an urgent response to maternal and child mortality trends. This year the RMS has been upgraded to provide weekly analysis with just a two-week lag, which provides most real time perspective of the impact of COVID-19 on South Africa in terms of excess mortality. The RMS also provides a separate non-natural (injury) mortality analysis, which shows the fluctuations in response to various lockdown measures and alcohol sales bans.

For Non-Communicable Diseases (NCDs), our Eastern Cape Cancer Registry provides the only rural African population-based estimates that are internationally recognised. The Unit also managed the South African Demographic and Health Surveys, which provide a platform for monitoring selected NCDs and their risk factors.

For injuries we conducted the first representative injury mortality study, which described the injury profile and highlight the importance of interpersonal violence. This study is currently being repeated to inform and update injury mortality profile for the next national burden of disease study. Monitoring firearm-related deaths nationally and, in the Western Cape in particular, has highlighted the impact of gun control efforts.



REFLECTIONS ON 2020/21



Dr Oluwatoyin Awotiwon

During these difficult and uncertain times, trying to survive and maintain some semblance of normalcy while juggling demands of work, family and life in general, I have admired the tenacity, perseverance and motivation of my colleagues to keep their heads above water and strive to get important work done efficiently. This quote by Roy T. Bennet captures my experience perfectly: "Your hardest times often lead to the greatest moments of your life. Keep going. Tough situations build strong people in the end". It has indeed been a blessing working with strong people!



Dr Victoria Pillay-van Wyk, Co-Director

This pandemic has shown me the heart of compassion in those I have had the privilege to work with, and the perseverance of my colleagues while navigating very challenging circumstances. Online working group meetings, even though sometimes technologically challenging, created the space for frequent communication between colleagues. I have heard the saying that "You never know how strong you are, until being strong is your only choice" – many had to tap into this inner strength in the past year and kept moving forward while dealing with loss of their loved ones. May they be commended for their steadfastness.



Cancer registry & Edwards SHeS'Cap Project.

A part of the WHO Strategic Advisory Group of Expert (SAGE) on improving the quality and use of immunization and surveillance data work, which promotes a data use culture that maximizes the utility of data-guided immunization programmes, we proposed specific recommendations, many of which are for national and subnational levels. These recommendations were endorsed by WHO SAGE and supported the "Data-guided" principles of the implementation of the Immunization Agenda 2030 (IA2030), within the broader efforts of Universal Health Coverage and Primary Health Care.

Findings from our MbHIS Quality study have been included in National Department of Health quarterly reporting on the objectives of the Presidential Health Compact, pillar 9, relating to the availability of coded clinical data in patient health records

Outputs from BODRU have contributed towards identifying the disparities in health status by province and population group as well as strengthening population-based health information system through surveys. Recent efforts have focused on hospital information systems, assessing the availability and quality of routine clinical data collected in the public sector.

IMPACT ON POLICY AND PRACTICE

Development of local guidelines for certifying COVID deaths:

- Consolidation and distribution of WHO guidance on coding for morbidity and mortality associated with COVID-19.
- Development of Standard Operating Procedures for the collection of reporting of COVID-19 mortality data in partnership with National Department of Health and National Institute of Communicable Diseases: An evaluation of the official COVID-19 deaths for South Africa highlighted the lack of standardisation of reports across provinces as well as under-reporting of deaths. Together with National Department of Health (NDoH) and NICD we have drafted a SOP to address these challenges.
- Expert contribution to Ministerial Advisory Committee of alcohol ban: Trends of the numbers of unnatural deaths were made available in the weekly report of deaths prepared by BODRU. These highlighted the changing numbers of unnatural deaths aligned with various levels of lockdown and availability of alcohol.
- Expert contribution to National Department of Health on COVID mortality and comorbidities: Weekly reports of excess deaths have been published to track the overall impact of COVID-19 and efforts to reduce the spread. Numbers are estimated for the provinces as well as the metropolitan areas. The reports have been provided to the NDoH and the Incident Management Team on a regular basis to provide timely information about the pandemic.

CAPACITY DEVELOPMENT AND MANAGING DIVERSITY

There has been very limited movement of staff in or out of the unit in the last year. Nevertheless, supporting the development of a cadre of researchers with expertise in several disciplines required for the application of the burden of disease methodology (epidemiology, demography, and biostatistics) remains a core tenet of the Unit's work. Several staff members are currently enrolled for postgraduate degrees as set out below.

NAME	RACE	GENDER	COURSE NAME	PROVIDER	NQF LEVEL
Monique Maqungo	B	F	Masters in Public Health	UCT	9
Akhona Ncinitwa	B	F	Masters Public Health	UWC	9
Edward Nicol	B	M	Post graduate Diploma in Future Studies	US Bus School	8
Rifqah Roomaney	I	F	PhD Public Health	UWC	10
Monique Fourie	C	F	Bachelors of Business Administration	MANCOSA	7
Nontuthu Somdyala	B	F	PhD	University of Tampere, Finland	10

Researchers in the Unit have continued to attend short courses, namely:

- General Clinical Practice Beginners course provided by CREDE (4 staff members)
- General Clinical Practice Refresher course provided by CREDE (8 staff members)
- A ten week Project Management course provided by UCT (1 staff member)
- A COVID-19 Workplace Compliance Health, Safety and Claims Management course (2 staff members)
- A short courses in Monitoring and Evaluation from Stellenbosch University (1 staff member)
- A short courses in Program Evaluation from the University of Cape Town (1 staff member)
- A Webinar series on Data for Health Initiatives and Maintaining Civil Registration during COVID-19 (1 staff member)
- OpenVA training (2 staff members)
- ICD-11 IT and technology for implementation (1 staff member)

In addition the Unit's staff supervise postgraduate students at several institutions both nationally and internationally.

RESEARCH TRANSLATION

The Unit has adapted several work-streams to support government in its COVID-19 response, all of which have resulted in numerous engagements with the media, researchers and public officials. The RMS reports that are released weekly provide a particularly popular online resource. In addition, researchers from the national burden of disease study conducted a rapid epidemiological analysis for the Department of Health to describe the profile of COVID-19 deaths and their association with various co-morbidities. Injury researchers have analysed alcohol-related injury data in response to intermittent alcohol sales bans.



REFLECTIONS ON 2020/21



Phophi Rathando

There's time in life where things happen and no one is prepared for what is ahead and also how to deal with everything happening in difficult times. It was not easy to adjust with work demands, family, online schooling and life in general. I found myself having to learn to accept that some situations are beyond my control as I like to plan and prepare everything in time. With great support from my manager and colleagues it became very easy to manage work demands and that allowed me to also support my family very well and find balance. Self-esteem played an important role in coping with stress and recovering from difficult events. The unit came up with different strategies to support colleagues during this period e.g. weekly follow ups on how staff are doing and coping, general monthly meeting, and one on one meetings with managers. This was a very great initiative that really shows that management cares for our wellbeing. I can strongly say that this has helped us to support each other as a teams and increased working relationships within the unit.

BIOSTATISTICS UNIT



The COVID-19 pandemic has been our most traumatic and silent adversary in recent times. Following David Hatfield's words 'Out of adversity comes opportunity', our Unit demonstrated greater unity than before to proactively and urgently respond to research opportunities and benefits that fell on the science community.

Prof Samuel Manda Unit Director
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OVERVIEW

A key objective of the Biostatistics Research Unit is to provide biostatistical support to research scientists and investigators in biomedical studies by ensuring that the studies are sufficiently designed, appropriately analysed and findings correctly reported. In some cases, biostatisticians in the Unit assess whether the available data and questions in a study can be answered with currently available methods and computer statistical software. If not, then the Unit objective would be to develop biostatistical methods for the design, conduct, and analysis of the resulting data; the new approaches or software developed could be used for application to similar studies. These two objectives align with the SAMRC strategic goals on research translation and the generation of new knowledge. Another of the Unit's objectives is capacity building in biostatistics through advanced training and postgraduate supervision, which falls within the fourth SAMRC strategic goal on building human capacity for South African health research.

RESILIENCE IN A TIME OF COVID-19

The Unit ensured that all staff were adequately equipped to work from home by ensuring that all staff had their laptops as well as data allowances. We also purchased wireless headsets to ensure that staff can efficiently conduct remote meetings from home. A WhatsApp group was created for all BSU staff to ensure we remained in touch during the challenging period. All staff attended Return to Work coaching which was arranged by the SAMRC. The Unit arranged weekly writing retreats where staff gathered for three hours to work on specific writing goals. The Unit

had initiated a Study Support forum a year before the pandemic, but we intensified meetings since March 2020 to ensure that all our Ph.D. and MSc students were well supported and motivated.

COVID-19-RELATED RESEARCH

From March 2020 when COVID-19 was detected in South Africa, the Unit has been supporting the Department of Health in several projects including the analysis of COVID-19 mortality data in South Africa (Pillay-van Wyk et al., 2020), the National COVID-19 Antibody Survey, and monitoring and data management of the Sisonke J&J COVID-19 vaccine roll-out in the country; COVID-19 Paediatrics Repository and the Evaluation of Excess Mortality. Other important projects that we are involved in include the COVID-19 Wastewater Surveillance project, which has been providing an early warning system for SARS-COV2 resurgence in the Western Cape. The Unit is also working on short-term real-time prediction of total COVID-19 burden (cases, hospitalizations, deaths) in South Africa. This is in collaboration with the University of Hasselt, Belgium, and local research teams. This has resulted in a (unit) first-authored peer-reviewed publication (Reddy et al., 2021). Through this collaboration, we have submitted a paper on modelling the positive testing rate of COVID-19 in South Africa (Owokotomo et al., 2021). We are also leading the work on Spatial analysis of COVID-19 in South Africa and Africa. We also worked with the Sports Exercise Medicine and Lifestyle Institute (SEMILI), University of Pretoria, South Africa on studying the impact of COVID-19 on return to active sports (Schwellnus et al., 2021)

INNOVATIVE APPROACHES

We have enhanced our collaboration with intramural SAMRC units, CSIR, University of Hasselt and HSRC where we worked together on COVID-19 research, for example the National COVID-19 Antibody Survey, COVID-19 modelling and prediction. These have benefited our unit by opening new networks (e.g. York University in Canada and Jimma University in Ethiopia). Through these collaborations, we have expanded our scope into infectious diseases modelling (which was not previously a key research area of the Unit), wastewater COVID-19 surveillance and epidemiology, conduct on antibody studies, in addition to peer-reviewed publications and project writing. With South Africa being the worst-hit country in Africa in terms of COVID-19, the unit had also engaged with several local, national, and international research teams who sought our support and input into their projects.

- (i) The Unit is supporting several COVID-19 studies including a double-blinded randomized clinical trial evaluating the efficacy of lactoferrin, Ovotransferrin, and lysozyme to prevent severe COVID-19, Sisonke COVID-19 vaccine implementation clinical trial, National COVID-19 Antibody Survey and monitoring Excess Mortality due to COVID-19. These studies are generating new knowledge that will help us to understand the COVID-19 pandemic. The Unit was involved in the first TB prevalence survey, the findings of which have provided a direct measure of TB burden in South Africa. This will facilitate improved planning and guiding resources in addressing the TB burden in the country.
- (ii) The Unit developed and implemented two COVID-19 dynamic dashboards: for real-time visualisation of observed and predicted COVID-19 cases and deaths and for the National COVID-19 Antibody Survey. The Unit also innovatively applied Infectious disease modelling to provide short-term COVID-19 case and death loads; and understand the impact of testing strategies and rates on COVID-19 cases.

IMPACT ON POLICY AND PRACTICE

The COVID-19 mortality South Africa project (Pillay-van Wyk et al, 2020) highlighted which groups of people are more vulnerable to COVID-19 deaths based on age and gender and comorbidities. While cumulative diagnosed

cases are heavily dependent on testing rates, the National COVID-19 Antibody Survey is designed to provide insight into the true burden of COVID-19 in the country. Similarly, the Evaluation of Excess Mortality study allows the public and policymakers to visualise and compare excess deaths weekly to the reported COVID-19 deaths in the country. The COVID-19 Wastewater Surveillance project, which started in June 2020, has been providing an early warning system for SARS-COV2 resurgence in the Western Cape. The Unit is involved in the data management and the statistical analysis of the ongoing Sisonke vaccination rollout in the country. The three previously mentioned projects have all contributed to changing and complementing evidence from confirmed COVID-19 cases and deaths.

Two of the pioneering papers on COVID-19 modelling in Africa, namely COVID-19 mortality in South Africa (Pillay-van Wyk et al., 2020), and the modelling and prediction of COVID-19 (Reddy et al., 2021) have been well received and generated a lot of interest among the research community. Our modelling and prediction work has also influenced similar COVID-19 research including modelling of the testing positivity rate, Bayesian phenomenological modelling, and prediction of COVID-19 cases and deaths in the region. These are being conducted through our new and established network such as the University of Hasselt (Belgium), University of Malawi and Durham University (UK).

CAPACITY DEVELOPMENT AND MANAGING DIVERSITY

We embarked on an extensive mentorship program and capacity building for staff, a very diverse group both in terms of skill level and background. Six members are pursuing their PhDs and are mostly being supervised by the Unit's senior statisticians. The BSU-Durban hosted an Introduction to Biostatistics virtual training course, which saw 30 attendees including staff from other SAMRC intra- and extramural units. Prof Samuel Manda also facilitated Masters modules in Biostatistics Stellenbosch University course, in Computational Biology at Hasselt University, and organised and chaired sessions at the SSACAB virtual conference and organised a Biostatics Research Group meeting at the virtual Southern Africa Mathematical Sciences Association Conference 2020, where mostly postgraduate students presented.

RESEARCH TRANSLATION

The Unit was a member of the National COVID-19 Modelling group, which included statisticians and epidemiologists from the CSIR, uHasselt, UKZN, HSRC, Department of Health and NICD. As part of this collaboration the Unit developed a publicly available, user-friendly dashboard for visualisation of COVID-19 predictions for the period March – July 2020 as well as reports on the spatial-temporal modelling of the initial COVID-19 outbreak in South Africa. Some of these modelling results were presented to the Commissioner and Director Generals of the South African Revenue Services, Statistics South Africa, the Department of Science and Innovation, Department of Health and the Statistics Research and Data Stream of the National COVID-19 Crisis Centre. These engagements were meant to facilitate a discussion on the likely burden of COVID-19 in the country based on the initial outbreak size and were instrumental in shaping some of the country's responses to the initial epidemic.

At the start of this year 2021, the Minister of Health, Dr Zweli Mkhize formally launched the results of the first National TB Prevalence Survey. The launch was via a webinar, and he was joined by officials from the Department of Health and a team of experts that were involved in conducting the survey and the media. The Unit played a pivotal role in the data management, design, and analysis of this survey. Discussions around the findings from the survey centred around what steps to follow for the management of TB in South Africa, including TB screening for people living with HIV, and new diagnostic tools for TB screening to achieve TB elimination in the country.



REFLECTIONS ON 2020/21



Tshifhiwa Nkwenika

It is not better but difficult days that bring people to unity. The more we stand during hard times, the more we became stronger as a unit.



Yusentha Balakrishna

The strength of the team is each individual member. The strength of each member is the team.



Our expertise in both systematic reviews and vaccine hesitancy came in handy during the COVID-19 pandemic as we were sought after by decision makers at all levels from global to provincial, for intellectual input and strategic guidance.

Prof Charles Shey Wiysonge Unit Director
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OVERVIEW

Cochrane South Africa promotes evidence-informed healthcare decision-making in South Africa and in sub-Saharan Africa by producing and disseminating high quality, relevant and accessible systematic reviews, and other forms of synthesised research evidence. The findings from these syntheses enable policy makers, health service providers, the public, and other relevant stakeholders to make informed decisions about health and health care. These activities link to goals 2 and 5 of the SAMRC strategic plan.

As part of the Unit's capacity building initiatives, we build the capacity of researchers to conduct methodologically robust quantitative and qualitative systematic reviews. In addition, we build the skills of policy makers and other decision makers in South Africa on how to use the best available evidence to inform policies and guidelines. Our training for journalists enhances their understanding of important health research concepts and ensures that the health information provided to the public is evidence-based. These activities link to goal 5 of the SAMRC strategic plan on Research Translation.

Cochrane SA hosts the Pan African Clinical Trials Registry (PACTR), the only World Health Organization (WHO) primary registry in Africa. Additionally, we have taken over the management of the South African National Clinical Trials Register (SANCTR) to ensure that trials conducted in South Africa are prospectively registered following WHO

standards, and adhere to the SA Good Clinical Practice guideline. PACTR and SANCTR have freely accessible platforms for finding updated information on planned, ongoing, and completed clinical trials. The clinical trial registry work fulfils an important regulatory function in South Africa, and links to goal 5.

Finally, the Unit builds human capacity for the long-term sustainability of South Africa's health research through graduating multiple MSc and PhD students (goal 4).

RESILIENCE IN A TIME OF COVID-19

Unit staff have supported the National Department of Health in conducting COVID-19 rapid reviews to inform national clinical guidelines, and the work of Ministerial Advisory Committees (MAC). Unit staff served on various national committees, including MACs, MAC workstreams, inter-MAC Technical Working Groups, and the National Essential Medicines List subcommittee on COVID-19. Unit staff are also members of several regional and international organisations that have emerged to respond to the challenges of COVID-19, such as the African Union Scientific, Research and Innovation Council Advisory Board for COVID-19, the African Taskforce for Novel Coronavirus, and COVID-END (a time-limited network that brings together more than 50 of the world's leading evidence-synthesis, technology-assessment and guideline-development groups).

COVID-19-RELATED RESEARCH

The following COVID-19 research is underway in the Unit:

- a study exploring COVID-19 information propagation through Twitter in South Africa, to help inform the development of locally relevant and evidence-based COVID-19 communication and education strategies in the country.
- an NRF-funded study, in collaboration with Sefako Makgatho Health Sciences University, focused on leveraging COVID-19 to build confidence in vaccination and promote antimicrobial stewardship in South Africa.
- a mixed methods study, in collaboration with Sarraounia Public Health Trust and the Human Sciences Research Council, to determine and co-create with local stakeholders in four wards of a comprehensive understanding of vaccine hesitancy and opportunities to support the promotion of COVID-19 health seeking behaviours.
- 2 Cochrane qualitative evidence syntheses on vaccination acceptance and hesitancy.
- a project to rapidly plan for and support an evaluation of Cochrane's COVID-19 response. Findings from the evaluation will inform how Cochrane responds in the future.

A staff member was part of the author team which published the Cochrane systematic review on (hydroxy) chloroquine for prevention and treatment of COVID-19 and another staff member led a Cochrane systematic review on food security. Staff are contributing to the living reviews project (www.covid-nma.com) which monitors and records in real time, ongoing research on interventions for treating or preventing COVID-19.

In collaboration with the Global Evidence Synthesis Initiative, Unit staff conducted a survey of researchers in low- and middle income countries, to gather and share information on the ongoing and planned research responses to the COVID-19 pandemic amongst those involved with evidence synthesis. Results reported include information about the respondents and the organisations they work for, respondents' plans to conduct primary or secondary research, COVID-19 research questions received from policy makers or practitioners, and respondents' willingness to share evidence briefs or rapid reviews.

OPPORTUNITIES AND NEW APPROACHES

Cochrane SA produced 40 COVID-19 rapid reviews for the National Department of Health, the WHO African Regional Office, and the College of Public Health Medicine of South Africa. In addition, staff published commentaries on Cochrane systematic reviews in the South African Medical Journal and the Pan African Medical Journal.

- Cochrane SA staff are contributing to COVID-END <https://www.mcmasterforum.org/networks/covid-end/> – a global collaboration supporting decision-making about COVID-19 to fund and use the best available evidence.
- The South African Clinical Trials Register (SANCTR) being managed by Cochrane SA ensured that the 16 COVID-19 trials captured on SANCTR were prioritized for assessment and approved expeditiously.
- Cochrane SA has been building a multi-disciplinary vaccine implementation research programme over the last 4 years. COVID-19 provided a unique opportunity to use and share the research insights we have gained from this work so far (e.g. through engagement with the media and various MACs on vaccine hesitancy) and to expand our portfolio of projects to include issues pertaining specifically to COVID-19 vaccination in South Africa.
- Unit staff were successful in securing funding for 3 research projects on COVID-19.
- Cochrane SA staff published articles in peer reviewed journals in 2020/21 which mainly focused on COVID-19, vaccination, and non-communicable diseases.
- The Unit was commissioned by the WHO to conduct a systematic review on the effectiveness of school food and nutrition policies which will inform global guidelines.
- Unit staff are contributing to the National Department of Health and WHO guideline efforts as methodologists, facilitating guideline development in areas such as tuberculosis, COVID-19, air travel safety, and vaccination.
- Unit staff have conducted rapid reviews that inform national guidelines and WHO policy briefs.

IMPACT ON POLICY AND PRACTICE

Findings from the Unit's programme of work on vaccine hesitancy (1) have informed an inter-MAC advisory on vaccine hesitancy, and (2) have been taken up in a report of the National Advisory Group on Immunisation. In addition, our review on social media and vaccine hesitancy has been cited in multiple international technical documents, taken up by 30 news outlets, and tweeted more than 300 times.

Cochrane SA conducted a review on school food and nutrition policies, which WHO took an interest in and invited a presentation on the review to a WHO guideline meeting. This review will be taken up by an upcoming WHO guideline.

The Unit also conducted COVID-19 rapid reviews which have informed national COVID-19 guidelines. In addition, 16 COVID-19 rapid reviews produced by the Unit have formed the basis of policy briefs from the WHO African Regional Office.



Cochrane Team during a workshop

CAPACITY DEVELOPMENT AND MANAGING DIVERSITY

Cochrane SA facilitated several capacity development initiatives. One of the goals of Cochrane SA is to increase awareness about the importance of evidence-informed decision-making at historically disadvantaged institutions (HDIs).

To this end, the Unit provided online training on the conduct of systematic reviews to 12 South African students and researchers, four of whom were from HDIs. In addition, bursaries were awarded to seven South African researchers and managers to attend the Primer in Systematic Reviews online course at Stellenbosch University, of which three bursaries were awarded to applicants from HDIs. Staff facilitated lectures to medical students at Stellenbosch University and the University of Cape Town; and hosted nine systematic review methods webinars, each session attended by between 40-150 participants from all over Africa.

- Twenty-eight graduate students received supervision from Cochrane SA staff. Two of these students graduated, one with a PhD and another with Masters degree.
- Cochrane SA has co-developed and co-facilitated together with Stellenbosch University three online short courses in qualitative evidence synthesis. In addition, staff were guest lecturers at the University of the Western Cape Summer School.

RESEARCH TRANSLATION

Unit staff contributed to online blogs, gave more than 10 interviews (print and broadcasting media), and contributed to articles to debunk any misinformation and any conspiracy theories on COVID-19 vaccines and therapeutics.

- Unit staff facilitated several webinars for Bhekisisa journalists, including a webinar on "Finding the evidence and navigating the Cochrane Library"; <https://bhekisisa.org/resources-for-journalists/2020-06-12-heres-a-really-great-way-to-find-the-studies-youre-looking-for/>
- Unit staff prepared 16 rapid policy briefs on COVID-19 for WHO, and also published commentaries on Cochrane COVID-19 reviews in the South African Medical Journal and Pan African Medical Journal.
- In addition, Cochrane SA disseminates the results of relevant Cochrane reviews through its websites (www.southafrica.cochrane.org and www.africa.cochrane.cochrane.org) as well as through its twitter accounts.

HEALTH SYSTEMS RESEARCH UNIT



COVID-19 pandemic has shown up every weakness in the health, social protection, education and allied systems. And so, the pandemic has led us to renew our commitment to conduct policy relevant research to inform decisions and actions to strengthen these systems, so they can meet the needs of the most vulnerable people in South Africa.

Prof Catherine Mathews Unit Director
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OVERVIEW

Aim of the Health Systems Research Unit

Our Unit conducts Health Policy and Systems Research (HPSR) to contribute to national and international evidence-informed health and social policy decision-making and health systems. By strengthening both decision-making and health systems we aim to contribute to achieving UHC and to improving health throughout the life-course.

Objectives of the Health Systems Research Unit

- To evaluate the effectiveness and efficiency of health care delivery, including routine and novel models, in communities, schools, and health facilities (This fits in with SAMRC Strategic Goal 2: Lead the generation of new knowledge)
- To evaluate the impact of social protection interventions and policies on health and well-being. This fits in with SAMRC Strategic Goal 2: Lead the generation of new knowledge)
- To apply implementation science frameworks and approaches, and to engage and partner with the health and allied sectors at all levels of government, as well as with local and global communities and stakeholders, to ensure the relevance of our research. ((This fits in with SAMRC Strategic Goal 3: Support, through funding and other mechanisms, technology development and implementation, translation of research into policy and practice, and innovations in health and technology delivery to improve health

- To use health economics analytic tools to contribute to decision-making about investments in health systems (including investments in human resources and health programmes, interventions, and services). (This fits in with SAMRC Strategic Goal 3: Support, through funding and other mechanisms, technology development and implementation, translation of research into policy and practice, and innovations in health and technology delivery to improve health)
- To conduct policy-relevant evidence synthesis, and to advance methods and develop capacity in this field. (This fits in with SAMRC Strategic Goal 3: Support, through funding and other mechanisms, technology development and implementation, translation of research into policy and practice, and innovations in health and technology delivery to improve health)
- To contribute to capacity building in the field of HPSR through teaching and supervision. (This fits in with SAMRC Strategic Goal 4: Build human capacity for the long-term sustainability of the South African health research)

RESILIENCE IN A TIME OF COVID-19

The Unit created a video for our Unit Review and many staff members spoke about how they were coping and adapting under lockdown conditions. Scientists in the HSRU have been conducting research to guide decisions and actions during the COVID-19 pandemic, and in the post-pandemic era. Some of the work focused on rapid systematic reviews to guide decisions and actions during the beginning of the COVID-19 pandemic, for example systematic reviews

on the use of masks, and screening practices at borders. These reviews fed into guidance documents of the College of Public Health Medicine of South Africa. We also used these opportunities to develop the capacity of mid-career Unit scientists to undertake systematic reviews.

Through Cochrane Effective Practice and Organisation of Care (EPOC) – the Cochrane review group focused on health systems questions – we have provided support for several high priority health systems reviews for COVID-19. These include a mixed methods review on strategies to support the mental wellbeing of frontline workers during infectious disease epidemics; a rapid qualitative evidence synthesis on factors affecting health worker adherence to infection prevention and control guidance; and an effectiveness review on dissemination interventions to improve healthcare workers' adherence with infection prevention and control (IPC) guidelines for respiratory infectious diseases in the workplace. We also produced user-friendly summaries for health service managers of a number of existing EPOC reviews relevant to COVID-19, including reviews on critical care telemedicine, on different modalities of task shifting, and on health workers' perceptions and experiences of using mHealth technologies to deliver primary healthcare services. We also participated in COVID-END (COVID-19 Evidence Network to support Decision-making), which was established to coordinate global efforts to supporting decision-making about COVID-19 through the best available global evidence and to reduce duplication of effort in producing evidence syntheses, health technology assessments and guidelines for COVID-19.

Together with scientists from the University of Edinburgh, we are conducting a living systematic review to answer the following questions: 1. What is the evidence for transmission of SARS-CoV-2 by children in schools? 2. Do children transmit SARS-CoV-2 in the school environment? 3. What is the rate of transmission of SARS-CoV-2 in the school environment from children to other children and from children to adults? This review can guide policy decisions about school opening and NPI in schools (<https://pubmed.ncbi.nlm.nih.gov/33437465/>). The collaboration with the University of Edinburgh's "Uncover" group was born out of the Unit's response to the COVID-19 pandemic.

Other work in the HSRU focused on economic research to guide investments in COVID-19 healthcare. Together with Colleagues from the Health Economics Unit at the University, scientists in the HSRU established MOSAIC, a health economic modelling collective established to respond to the need for prompt policy guidance for the South African response to COVID-19. MOSAIC carried out series studies examining the cost-effectiveness of purchasing critical care for COVID-19 patients from the private sector, and the use of dexamethasone and Remdesivir as part of the treatment regime for COVID-19 patients.

Scientists from the MOSAIC collective also supported the Alcohol, Tobacco and Other Drugs Research Unit with providing a health economics analysis to estimate the effect of re-imposing a ban on liquor sales on trauma-related hospital visits and admissions. Savings in alcohol-related trauma presentations and days spent in general and hospital wards were translated into the number of critical COVID-19 patients that could be managed and this was fed to the ministerial task team and resulted in the re-introduction of the alcohol ban.

Social protection systems are even more important during pandemics. In 2020, Dr Wanga Zembe and other researchers in the Health Systems Research Unit conducted a qualitative study during Levels 5 to 3 of the pandemic, to understand how primary caregivers of child support grant recipients were experiencing COVID-19. The researchers sought the views and experiences of caregivers on coping with the pandemic, the lockdown levels, income loss, food insecurity, safety, and access to social grants. Findings from the study have been shared in an Op-Ed, and as a result the researchers were invited to present them at a national child health conference, the Child Health Priorities Virtual Conference in November 2020; and more recently they were invited to present them at the launch of UCT's Children's Institute Child Gauge in February 2021.

In his role as an Associate Honorary Professor at the Centre for Rural Health (CRH) in the School of Nursing and Public Health, College of Health Sciences at the University of KwaZulu-Natal (UKZN), Arvin Bhana of the HSRU has been part of a team that has been involved in a longstanding partnership with the Provincial Department of Health KZN in collaborating the Directorate of Mental Health and Substance Use to promote the integration of mental health into primary care. With the advent of COVID-19, this focus shifted dramatically to promoting mental health among health care workers and service users. The urgent need to develop content that addresses the issues that frontline health workers confronted because of the COVID-19 pandemic (anxiety, depression, grief) and the need to provide support to service users who had lost family members due to the pandemic was overwhelming. The importance of supporting managers and supervisory staff was also seen as important in providing a cascade of care. The CRH team started with "The Mental Health and Well-being Waiting Room talks", i.e., talks to patients in the PHC facility waiting to receive one or more services. During these talks, a CHW or a nurse or anyone designated to do so in a clinic can provide these talks with a modicum of training. Topics covered included Depression, Anxiety, Grief and Loss and Adherence. The latter was included given the concern that the focus on COVID-19 would tend to lead to non-adherence as fewer people came to the clinics. In addition, posters and videos were produced that could be played in PHC facilities or downloaded off the PDoH website or the CRH website or shared on social media.



REFLECTIONS ON 2020/21



**Dr Wanga Zembe,
Specialist Scientist**

COVID-19 has taught us that a transformative work environment fosters kindness, compassion, understanding, adaptability and ultimately, resilience.



**Dr Kim Jonas,
Specialist Scientist**

I have found this quote by Jimmy Dean inspiring in the uncertain times we have been through since March 2020: "I can't change the direction of the wind, but I can adjust my sails to always reach my destination (my goals).

Tanya Doherty in her role as a commissioner for the WHO–UNICEF–Lancet Commission –

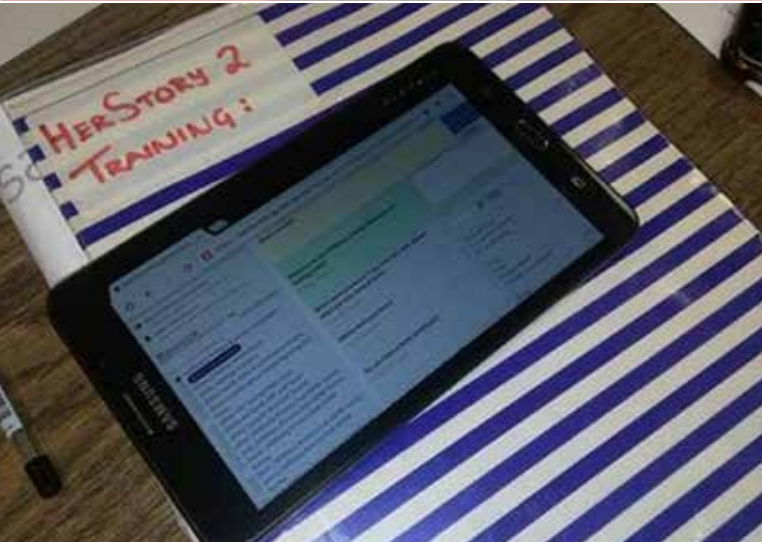
'A Future for the World's Children?' was involved in a commentary published in the Lancet highlighting the indirect impact of Covid-19 on children ([https://www.thelancet.com/journals/lanchi/article/PIIS0140-6736\(20\)31481-1/fulltext](https://www.thelancet.com/journals/lanchi/article/PIIS0140-6736(20)31481-1/fulltext)). The article urges country leaders to place child health and wellbeing at the centre of COVID-19 recovery plans. Tanya also led a commentary published in BMJ Global Health which describes intersectoral strategies that will be required to mitigate the unintended consequences of COVID-19 and its containment measures. These include investing in community cadres and organisations to ensure catch up in immunisations, birth registration and chronic medication adherence as well as building important social safety nets for future health crises (<https://gh.bmj.com/content/5/10/e003928>).

INNOVATIVE APPROACHES

Our research contributes to the SAMRC's strategic goal to lead the generation of new knowledge in the sections above and below. An example follows in which our research is contributing to the NHI roll-out, and has been responsive to the National Department of Health. This fits in with SAMRC Strategic Goal 3: Support, through funding and other mechanisms, technology development and implementation, translation of research into policy and practice, and innovations in health and technology delivery to improve health.

The National Department of Health has made clear its intention to strengthen both resources and services for public mental health care in the country. In 2017 NDoH identified a need to evaluate the full costs of mental health services and programmes in South Africa. Research was conducted nationally with support from the Provincial departments of health to generate national estimates on how much the country is spending on mental health care, and on which aspects thereof, by province and service-level, within the integrated health system. Findings from this exercise revealed a significant treatment gap of over 90% for mental health care, and large inequities between provinces in budget allocations for mental health – provinces allocate between 2.1% and 7.7% of their health budgets to mental health. Furthermore, most resources remain concentrated in hospital settings – 86% of mental health spending on inpatient care and there are major inefficiencies in the use of the limited resources with almost one quarter (24%) of mental health patients who are discharged from inpatient care are re-admitted within 3 months. This revolving door pattern of care consumes 18.5% of the total mental health budget. In 2019, the Investment Case for Mental Health was commissioned by the Department of Health. The aim of the investment case was to inform the development of a clear national plan to reduce the substantial burden of untreated mental disorders, through the identification of the most cost-effective mix of interventions to address mental, neurological and substance use disorders and intellectual disability in South Africa, over the next 15 years. New data on the economic outcomes of mental health treatments have been providing encouraging signs of a potential return on investment for mental health services.

In a global return on investment analysis, Chisholm and colleagues found that for every \$1 invested in care for depression and anxiety disorders, there will be a \$3-5 return on investment over the 15 years of the Sustainable Development Goals. The importance of addressing this significant mental health treatment gap closely aligns to the objectives of universal health coverage in the country. This large treatment gap not only carries a significant burden of disability but has significant implications on the economy due to lost economic outputs. In 2010, worldwide, an estimated US\$2.5–8.5 trillion in lost output was attributed to mental, neurological, and substance



Health Systems Her story2 training workshops

use disorders. This sum is expected to nearly double by 2030 without significant investment in treating mental disorders. Furthermore, mental health conditions do not occur in isolation, and carries a high level of comorbidity with other conditions such as HIV and TB, and therefore has implications on adherence to medication and the management of other non-communicable and communicable conditions. The COVID-19 epidemic is also likely to have resulted in increased health anxiety, loss, social isolation and increases in food insecurity, poverty and domestic violence – all of which are risk factors for mental illness in populations. Helpline mental health services operated by the South African Depression and Anxiety Group (SADAG) have reported significant increases in demand for care during the COVID-19 crisis. The South African investment case estimated the expected return on investment (ROI) over a 15-year period from scaling up interventions targeting anxiety, depression (and perinatal depression), psychosis, bipolar disorder, epilepsy, intellectual disability, behavioural disorders, dementia, alcohol and drug dependence. The investment case examines the costs and benefits of scaling up treatment for these conditions, and quantifies the infrastructural, human resource and programmatic requirements that should be complementary for the achievement of mental health

The cover features the SAMRC 50 Years logo at the top right. The title is in white text on a dark blue background. Below the title, it says 'FIRST SURVEY 2017 TO 2018' and 'MAY 2020'. At the bottom, there are logos for the Department of Health, CDC, and the HerStory project.

The study addresses barriers that undermine adolescent girls and women's sexual and reproductive health.

service scale-up. The investment case was guided by the World Health Organization (WHO) and United Nations Development Programme (UNDP) methodological guidance note: Making the Investment Case for Mental Health but included a number of additional methodological innovations including: (1) provincial collaboration through multisectoral workshops; (2) consensus building for setting priorities through a panel of national experts through a delphi study; (3) inclusion of programmatic enablers that are required for mental health service scale up; (4) quantifies human resource and infrastructural requirements; (5) models a redistribution of services over time towards the PHC and community levels; (6) an expands the analysis to include a broader compliment of MNS disorders as well as substance abuse and intellectual disability.; (7) considers the roles and responsibilities of other sectors in this response. This investment case will go towards an intersectoral budget bid for a conditional grant to invest in mental health service scale up in advance of the NHI roll out and support an explicit prioritization exercise and identification of benefits package under the NHI.

Why this is important for health system strengthening in the context of the NHI?

- South Africa's commitment to provide Universal Health Coverage through a National Health Insurance mechanism has the potential to ensure widespread access to critical health services to South Africa's uninsured population.
- South Africa faces a constrained fiscal environment, resulting from a decline in economic growth and tax revenue, which has translated into limited increases in public health expenditure-these increases are inadequate to meet demand.
- The COVID-19 epidemic has led to a significant reprioritization of resources (21.5 billion) away from the provincial equitable share.
- Considering these challenges there is a need for a rational and comprehensive response which promotes increased equity in resource allocation and co-ordination between all levels of the health sector and an assessment of the efficiency of these strategies.
- At present, our largely implicit approach to priority setting means that decisions are made on a discretionary basis by managers, professionals, and other health personnel functioning within a fixed budgetary allowance.
- Explicit priority-setting will allow decisions related to the amounts and types of resources to be made available, eligible populations, and specific rules for allocation informed by economic analysis to maximise value and to achieve social goals.

The page includes the SAMRC Research logo and lists the authors: A. Shana, M.A., PhD; N. Matambo, MSc; S.G. Gijaba, MSc; Z.P.B. Luvana, MSc, PhD; H. Grant, MA; D. Adesina, MSc; E. Ntse, BSc; M. Ntantsho, BSc; J. Pitso, MSc, PhD.

The cover features the Department of Health, Province of KwaZulu-Natal logo. It is signed by Dr. N.K. Khogo, Director: Mental Health and Substance Abuse, KwaZulu-Natal, SA.

The cover features the Department of Health, Province of KwaZulu-Natal logo. It is dated September 2020 and includes fields for Name and Date.

Policy briefs produced by the unit

IMPACT ON POLICY AND PRACTICE

Integrating mental health into primary healthcare (PHC) should assist in reducing South Africa's burden of disease. Appropriate identification of mental disorders in primary care can be facilitated by brief, easy-to-administer screening. The absence of a locally validated screening instrument for this purpose was lacking leading to a variety of unreliably and invalid approaches in PHC. The criterion-based validity of a Brief Mental Health (BMH) screening tool for assessing positive symptoms of common mental disorders (depression, anxiety, alcohol abuse) (CMDs) was established in 2019. Consequently, a feasibility study was undertaken to establish how best to train and implement the BMH in PHC facilities. Based on the findings of this feasibility study, in 2020 the KZN Department of Health sanctioned an SOP for inclusion into a policy for the implementation of the BMH at its PHC facilities including the development of a training.

CAPACITY DEVELOPMENT AND MANAGING DIVERSITY

We prioritize developing the capacity of Unit staff, and we encourage them to pursue higher degrees and attend training courses. We allocate a substantial proportion of our Unit operational budget to initiatives to promote capacity development, especially of the early- and mid-career staff members in the Unit. We do not limit this to scientific staff, but we also encourage staff in the support arms to pursue further studies.

We encourage scientists in the Unit to supervise post-graduate studies of other South African students, and we encourage scientists and support staff in the Unit to undertake their own post-graduate studies.

We contribute to a range of capacity development initiatives by leading or contributing to workshops, courses, and seminars.

Regarding managing diversity, we have a unit-level Transformation Committee, to work in collaboration with the SAMRC-wide transformation initiative. The purpose of the Unit Transformation Committee is two-fold:

- a. To advocate for Unit and SAMRC practices and policies that promote fairness and equity in access to career opportunities and funding resources, and to foster and everyday working relationships characterized by fairness and respect for human rights and dignity.
- b. To influence the ethos and strategic direction of the Unit so that Unit research contributes to the transformation of health care and redresses unfairness and inequity in the health sector.

RESEARCH TRANSLATION

Emmanuelle Daviaud and Donela Besada wrote an Op-Ed where they reflected on the re-ignited use of Community Health care Workers for the COVID response and reflected on the findings of our investment case to ensure that this platform is optimized through improved resourcing and supportive supervision.

<https://bhekisisa.org/opinion/2020-05-20-community-health-care-workers-in-south-africa-investment-case-covid19-coronavirus-tracing-programme/>

We have been undertaking evaluations of a large scale, multi-million-dollar South African combination HIV prevention intervention for adolescent girls and young women (AGYW), implemented in schools and communities by government and non-government organisations, and funded by the Global Fund. The findings of our evaluations have enabled us to make recommendations to optimize programming for Adolescent Girls and Young Women (AGYW) to reach vulnerable AGYW and to meet their needs. We disseminate these findings directly to stakeholders including policy makers, programme managers and funders of AGYW prevention and treatment programmes. In this way, such programmes can be optimized to meet AGYW's needs and to achieve effective coverage of key interventions to promote the sexual and reproductive health and well-being of AGYW. (<https://www.samrc.ac.za/intramural-research-units/HealthSystems-HERStory>)

SAMRC/UWC HEALTH SERVICES TO SYSTEMS RESEARCH UNIT



The HSSRU stayed resilient by maintaining regular contact with each other, providing opportunities for staff to debrief, keeping organizational routines such as journal clubs and staff meetings, and sharing information on the progress of the epidemic such as discussing presentations made at the Western Cape government's 'digicons' at staff meetings. These measures to build everyday resilience helped us to stay on track, with three doctoral candidates submitting their completed PhDs for examination.

Prof Helen Schneider Unit Director
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OVERVIEW

The Health Services to Systems Research Unit (HSSU) is located within the field of health policy and systems research which, amongst others, is concerned with the mechanisms by which effective interventions are anchored and scaled up within health systems; and the actors, contexts and processes that enable or constrain this. The HSSU conducts research, teaching and policy engagement in support of Universal Health Coverage in South Africa and beyond, focusing on bottom-up health system strengthening, and with a growing interest in the role of intersectoral collaboration for health. Positioned in a School of Public Health with a large postgraduate (~200 students) programme, the HSSU places particular emphasis on capacity building through doctoral and post-doctoral training.

RESILIENCE IN A TIME OF COVID-19

As part of the wider university and School of Public Health (SoPH) measures, HSSU staff have worked from home for the duration of the lock down. Modes of communication, coordination and teaching shifted rapidly to fully online modalities. Where possible (e.g. stakeholder interviews), research activities have been conducted remotely. Fortuitously, the doctoral students linked to the unit were either in the write up or the early inception phase and did not experience disruptions in their research activities.

The HSSU director set up a UWC 'pod' of two dozen volunteers in support of COVID-19 case follow-up and contact tracing. The pod follow-up several hundred cases before joining forces with the Khaya pod covering the Eastern and Khayelitsha sub-districts of the Cape Metro.

COVID-19 RELATED RESEARCH

- Profs Helen Schneider, Uta Lehmann with Lucy Gilson (UCT) conducted a Review of Adaptive Governance and the COVID-19 Response by the Western Cape Provincial Government over the first COVID-19 wave. The review was commissioned by the provincial health department and the findings were presented to a feedback session of 37 top managers in November 2020.
- Many van Ryneveld (researcher) was seconded to work with the community-based response to COVID-19 called Community Action Networks (CANs) that form part of a movement called Cape Town Together (CTT). Many's role has been to support reflective processes, document activities and create a digital archive of this unique mobilisation. Drawing on this material, she is embarking on a PhD comparing 'everyday care' during the COVID-19 pandemic and earlier AIDS epidemic.

- The HSSU director was part of a cross-continental writing team that authored a commentary in Health Policy and Planning entitled: What role can health policy and systems research play in supporting responses to COVID-19 that strengthen socially just health systems? <https://doi.org/10.1093/heapol/czaa112>
- Uta Lehmann and Lungiswa Tsolekile are conducting a review of the role of community-based services during the COVID-19 pandemic in the Western Cape Province, as part of a wider review of public health responses led by the provincial health department.

OPPORTUNITIES FOR INNOVATION

COVID-19 has necessitated collaborative action amongst societal actors in an unprecedented fashion, and has revealed both the possibilities and challenges of 'whole of government' and 'whole of society approaches' to major social and health challenges. Building on an earlier phase of research (conducted by doctoral candidate Ida Okeyo), we have drafted an 'outline proposal' to conduct longitudinal research on intersectoral collaboration prior to and during COVID-19 jointly with the Western Cape Provincial Health Department. This has been submitted to the UK HSRI funding call. We will also be drafting a chapter on this work for the next South African Health Review.

During 2020 the HSSU undertook the following research activities:

- Evaluation of the Mphatlalatsane Project (jointly with SAMRC's Health System Research Unit), a multi-partner and comprehensive maternal and new-born care strengthening initiative in three provinces. 30 baseline and follow-up interviews were completed telephonically with key project stakeholders, and a technical report written for the Project Management Committee (August 2020). As part of the Mphatlalatsane evaluation, we made significant headway on a scoping review of approaches to service delivery strengthening interventions for maternal and new-born health. The protocol of this review will shortly appear in BMJ Open.
- Completed and published a desk review of human resource for health governance in South Africa (<https://doi.org/10.1186/s12960-020-00536-1>).
- Completed a case study of the Western Cape's Whole of Society Approach which we were able to present at a report back workshop in Saldanha Bay in late October 2020 (technical report available).
- Significantly advanced a planned special journal issue (International Journal of Health Policy and Management) on community health systems, jointly edited with the Universities of Umea, Zambia, Muhimbili and Makerere.

- The HSSU Director contributed to a special issue of the WHO Bulletin on primary health care (<http://dx.doi.org/10.2471/BLT.20.252742>). In November 2020 she was invited as a discussant on a panel discussing research into PHC convened by the Alliance for Health Policy and Systems Research; and as a moderator of a panel discussion on governance at the launch of WHO's operational framework on PHC.

INNOVATIVE APPROACHES AND PROGRAMMES

The HSSU director leads the team in the SoPH that coordinates the doctoral programme (~50 students). Over the course of 2020 we continued to develop this programme into a holistic, 360-degree approach to student and supervisor development and support. We are currently writing up the experiences of this programme.

IMPACT ON POLICY AND PRACTICE

- The HRH review referred to above fed into the national task team developing the new 2030 HRH Strategy, on which Helen Schneider served.
- Research into district governance of maternal and child health outcomes (profiled in previous annual reports) has fed into the design of strategies of the follow-up Mphatlalatsane project referred to above.

CAPACITY DEVELOPMENT AND DIVERSITY MANAGEMENT

In addition to stewardship of the SoPH's doctoral programme, five PhD candidates made significant knowledge contributions in the following areas:

- Fidele Mukinda on local eco-systems of accountability for maternal-child health, including the application of social network methodology
- Tumelo Assegaai on the methodology of co-production
- Ida Okeyo on collaborative intersectoral governance
- Nondu Ncube on rational medicines use
- Sulakshana Nandi on an equity-based framework for evaluating publicly financed health insurance in India

Sulakshana Nandi graduated in April 2020, Nondu Ncube will graduate in April 2021 and the remaining three PhD candidates' dissertations are currently under examination

RESEARCH TRANSLATION

We actively disseminate our research through social media; staff in the unit wrote several opinion pieces based on their research for newspapers on topics of health workforce governance, the community mobilisation for COVID-19 and 'building back better'.

Whyte, van Ryneveld, Brady and Radebe. Sparks, flames and blazes: Epidemiological and social firefighting for Covid-19. <https://www.dailymaverick.co.za/article/2020-04-24-sparks-flames-and-blazes-epidemiological-and-social-firefighting-for-covid-19/>

Whyte, Brady, van Ryneveld & Loewenson. Putting the public back into public health: Communities organising solidarity responses to Covid-19. <https://www.dailymaverick.co.za/article/2020-12-16-putting-the-public-back-into-public-health-communities-organising-solidarity-responses-to-covid-19/>

van Ryneveld, Lehmann, Schneider. Stronger governance is at the heart of addressing the health workforce crisis. <https://www.dailymaverick.co.za/article/2020-09-08-stronger-governance-is-at-the-heart-of-addressing-the-health-workforce-crisis/>

Schneider. Reimagining health in the Eastern Cape: A dysfunctional public health system is not inevitable <https://www.spotlightsp.co.za/2020/11/20/reimagining-health-in-the-eastern-cape-a-dysfunctional-public-health-system-is-not-inevitable/>



REFLECTIONS ON 2020/21



Carnita Ernest,
Project Manager

There were various factors that played a role in the resilience of the Unit. The HSSU team (academic and administrators such as Tamlin Petersen) were part of the initial as well as ongoing public health responses and their continued reflections/presentations to the broader organisation confirmed a sense of meaning to our work in a time of intense anxiety. We adapted to working remotely relatively easily by also understanding and responding to the needs of the team, such as ensuring access to data and infrastructure (laptops and other devices), regular virtual team check-ins that included conversations around work and general well-being, and more digitally adaptive administration practices.



Fidele Kanyimbu Mukinda,
PhD candidate

COVID-19 came during my PhD thesis writing phase; I needed time to concentrate on my work, while my three daughters needed attention with their schoolwork. There were times when I felt unfocused and less productive while facing deadlines (e.g. manuscript submission) mixed up with the stress of losing my father knowing that I cannot attend the funerals because of COVID-19 related restrictions. I had to adapt my working patterns by becoming a day schoolteacher for my daughters and shifting most of my PhD-related work during the night. Through the HSSU I stayed connected with my PhD colleagues using 'PhD Accountability' WhatsApp group. Weekly virtual meetings of the Unit and encouragement from my supervisor were a key contributor to my resilience; I learnt to avoid negative thoughts, focus on my purpose, and keep up with small wins.

PURPOSE OF THE PROGRAMME

To promote the improvement of health and quality of life (impact prevention of ill health, improvement of public health and treatment) in the Republic of South Africa through innovation, and technology development and transfer

UNITS THAT CONSTITUTE THIS PROGRAMME

- | | |
|--|---|
| 1 SAMRC/UCT Drug Discovery and Development Research Unit | 3 The Biomedical Research and Innovation Platform |
| 2 Primate Unit and Delft Animal Centre | 4 SAMRC/TUT Herbal Drugs Research Unit |

PROGRAMME STRATEGIC OBJECTIVES

- To establish key modern technology (enabling) platforms to facilitate generation of new drug discovery knowledge through world-class applied research
- To establish and manage research laboratories and facilities as state-of-the-art national research facilities for research and development
- To train and mentor a new generation of high-quality postgraduate students and Postdoctoral Fellows in multi-disciplinary research, and in so doing, equip them to compete in the science and/or education sectors nationally and internationally
- To strengthening research and development to build on and enhance public health innovation
- To increase the body of scientific knowledge through research translation into products, patents, research papers, policy, practice and health promotion (including to the general public)
- To increase the number of health-care innovations and to produce patents based on new discoveries and new research methodologies

RESEARCH HIGHLIGHTS UNDER THIS PROGRAMME

SAMRC/UCT DRUG DISCOVERY & DEVELOPMENT RESEARCH UNIT



The Unit stayed resilient for two main reasons. First, the recognition that the pandemic was due to an infectious agent made us even more determined to contribute to infectious disease research. Second, the realisation that members of the unit are supported from soft-funded research funding linked to clearly defined deliverables for external entities, it was recognised that all of the funding was at risk if we did not push on.

Prof Kelly Chibale Unit Director
Kelly.Chibale@uct.ac.za

OVERVIEW

The unit's work is specifically focused on translating basic science knowledge into potential innovative new medicines to treat malaria, tuberculosis and antibiotic-resistant microbes in efforts to combat antimicrobial resistance (AMR). The inter-disciplinary drug discovery research undertaken in the Unit involves the integration of multiple disciplines, from basic to clinical sciences. It is positioned to contribute directly to health innovation, defined as the delivery of tangible outcomes useful to the improvement of health. The work of the unit advances the mission of the SAMRC to improve the health of South Africans and contribute to the development of the South African bio-economy while also at the same time further developing the established drug discovery infrastructure, technology platforms and capacity.

Since members of the unit are supported from soft-funded research funding linked to clearly defined deliverables for external entities, it was recognised that all of the funding was at risk if the lab-based research did not resume as a matter of high priority. The direct impact of the COVID-19 Pandemic for the Unit was a total shutdown of the laboratories from 27th March -22nd July 2020 when the South African government declared a state of disaster and instituted a national lockdown. From 23rd July-15th Sept 2020 the Unit's laboratories re-opened for selected staff members for shift work under strict COVID-19 protocols. From 16th Sept 2020 a further batch of staff were granted permission to return to campus and shift work, strict COVID-19 safety protocols and limited access to campus continue, meaning that all lab-based staff were able to return and we have since resorted to working in shifts for the lab-based researchers, including students.

RESILIENCE IN A TIME OF COVID-19

The unit navigated a challenging year through the effects of the COVID-19 pandemic and the resultant global instability. Despite the challenges, the Unit was able to maintain and strengthen its research base and international reputation as a world-class centre for infectious disease drug discovery in Africa.

Despite these challenges, the Unit had a productive year and used the lockdown to focus on fundraising, publication writing, strengthening data management systems and training through webinars and online workshops.



Medical chemist, Dr Jean Dam, setting up multiple reactions in her fumehood towards synthesizing compounds for a malaria project



State-of-the art drug discovery unit

OPPORTUNITIES AND INNOVATIVE APPROACHES

One opportunity that arose out of the pandemic was a BRICS (Brazil, Russia, India, China, South Africa) Response to COVID-19 pandemic coordinated call for BRICS multilateral projects 2020. In partnership with colleagues in Brazil and Russia, the Unit submitted an application titled 'Multidisciplinary Platform Based on Artificial Intelligence for Accelerating Drug Discovery and Repurposing for COVID-19'. The Unit and partners proposed a combined approach of investigating existing drugs for suitability against SARS-CoV-2 and accelerating the research and development of novel drugs by employing Artificial Intelligence (AI) and computational methods. Our response to this call was premised on the fact that the repurposing of several approved therapies, including antivirals, has been the focus of current clinical investigations. While these targeted repurposing strategies provide potentially rapid trajectories towards an approved treatment, additional therapies for SARS-CoV-2 are nevertheless still required to enhance clinical efficacy, contribute to a global drug pipeline, and address the potential emergence of viral resistance.

Our colleagues in Brazil and Russia have formally been notified of the successful outcome of our joint application from their respective funding agencies. Formal feedback from the South African side is still pending.

As already indicated above, the unit's work is specifically focused on translating basic science knowledge into potential innovative new medicines to treat malaria, tuberculosis, and antibiotic-resistant microbes in efforts to combat antimicrobial resistance (AMR). The Unit's work has been focused on harnessing modern innovative pharmaceutical industry skills and expertise in the drug discovery value chain – integrating medicinal chemistry, biology, pharmacology, including drug metabolism and pharmacokinetics studies. Together this has been creating a critical mass of South African scientists with the capabilities of developing clinical drug candidates, with a unique focus on the diseases afflicting South Africa. The Unit has been playing a critical key role in building capacity and competency in the relevant areas of drug discovery. The establishment of a state-of-the art drug discovery unit positions it to contribute directly to health innovation, defined as the delivery of tangible outcomes useful to the improvement of health. Therefore, the work of the unit contributed to the SAMRC strategic goals.

INFLUENCED FURTHER RESEARCH AND INNOVATION

The work of the Unit also led to the elucidation of the mechanism of action and mechanism of resistance of some TB drug leads. Furthermore, the Unit's work led to the identification of leads suitable for optimisation as potential

agents for the treatment of uncomplicated *Plasmodium falciparum* malaria, with the potential to also contribute to malaria eradication. On the other hand, the Unit's work has also led to the identification of leads suitable for optimisation and candidate selection as potential agents for the treatment of tuberculosis (TB) caused by replicating and non-replicating forms of *Mycobacterium tuberculosis* with activity against Multi-Drug Resistant forms of the disease and potential to contribute to new treatment shortening regimens.

CAPACITY DEVELOPMENT AND MANAGING DIVERSITY

The unit concluded a successful year of capacity building and training initiatives with diversity in mind. This has also resulted in an increased interest in drug discovery activities both in South Africa and the rest of the African continent. The following items are key highlights from the past year:

- The Unit's Global Health Mentorship programme continued throughout 2020. This programme, supported by the Bill and Melinda Gates Foundation, assigned 22 industry mentors to mid-career scientific staff at the Unit who are meeting regularly with their mentees for coaching in the following areas: the scientific process, scientific communication, personal interactions, career progression and scientific responsibility.
- The Unit continued to support the Walter Sisulu University capacity building project and hosted two short scientific exchange visits (6 weeks in total) for a WSU student to conclude her MSc project. This is within the context of the Unit's Historically Disadvantaged Institution (HDI) Drug Discovery Training programme.

RESEARCH TRANSLATION

The unit director regularly engaged with the public through various media. Achievements have received coverage in online, print (national and international, including the *Financial Times*, which featured the Unit Director through an invited Opinion Piece. The Unit Director also participated in several high-profile events both in the scientific communities and in the public to promote awareness around Drug Discovery in Africa. The Unit Director was also named as one of the world's top 60 most influential/inspirational leaders in the pharmaceutical industry (one of the top 20 inspirational medicine makers in the field of small molecules) on The Medicine Maker's 2020 Power List. One of the world's top 20 inspirational medicine makers in the field of small molecules (<https://themedicinemaker.com/power-list/2020>). Towards combating misinformation around African science and research and promote health innovation on the continent.

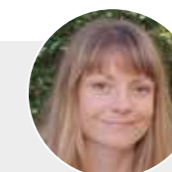


REFLECTIONS ON 2020/21



Dr Vinayak Singh,
Senior Research Officer

The sense of purpose, a hope of eventually overcoming the crisis, practicing gratitude towards what we have in life, an opportunity to build new project ideas, and most importantly, family kept us thriving through the Covid-19 pandemic.



Dr Lauren Arendse,
Research Officer

Positive leadership, a clear vision and good communication have been key during this time. Lockdown provided us with a unique opportunity to consolidate, reflect and plan for the future. New project ideas, collaborations and clear goals kept us motivated and productive even when we were unable to access the lab. Virtual seminars and meetings have provided us with a sense of community in the absence of face-to-face meetings. In the process we have learnt to be more sensitive to co-workers and students different personal situations, and more grateful for the opportunity to contribute to science.

PRIMATE UNIT AND DELFT ANIMAL CENTRE



COVID-19 crisis is not to be feared but understood to unlock true strength which has been evident at PUDAC.

Dr Chesa Chauke Unit Director
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OVERVIEW

Primate Unit and Delft Animal Centre (PUDAC) provides a facilitating platform concerning the supply of animal models, animal housing, and research infrastructure for biomedical research. All animal models are maintained according to a set of ethical standards as prescribed in the national policies on the care and use of research animals. The platform's primary mission is to engage in basic and applied collaborative contract research in association with academia and industry, conduct pre-clinical and translational research, support research and vaccine development, and provide animal resources and services. Therefore, PUDAC offers a unique contribution to health research, drug and traditional medicine development, innovation, and capacity development, which is aligned with the SAMRC's broader strategy.

RESILIENCE IN A TIME OF COVID-19

The COVID-19 crisis has significantly impacted animal subjects, research, animal care and the use of specific research programs. Difficult decisions resulted in disruptions to animal colonies, rationing personal protective equipment (PPE), and limited research-related animal interactions. Due to the nature of PUDAC's work which includes caring for animals on a daily-basis, PUDAC had to prioritize the care for animals and animal technician/technologist personnel's safety. The management team had to swiftly devise a strategy that will ensure that our staff

members and animals' lives are considered. The technical staff was divided into two rotating teams consisting of one supervising technologist and two technicians per team, and these individuals were on duty for up to 4 hours/day. This strategy was implemented to ensure that animals are fed and providing a more hygienic workplace. Although the COVID-19 pandemic threatened people's lives, PUDAC staff showed more resilience during this time and more compassion towards our animals. The Unit continued to let the staff work in teams and rotate the teams to reduce and avoid crowds in the workplace as per national lockdown COVID-19 restrictions.

COVID-19-RELATED RESEARCH

Our non-human primate models are limited in numbers for COVID-19 studies. However, the biggest hindrance to conducting COVID-19 related research was the lack of suitable infrastructure. The lack of a biosafety level 3 biocontainment facility limited PUDAC's role in conducting infectious studies related to COVID-19; however, the Unit can allow scientists to conduct the pre-clinical phase of such investigations. Collaboration between scientists and facility staff will include discussions about all the study stages, alternative models, depopulation, decontamination, and waste disposal afterward.

The COVID-19 pandemic has dramatically illustrated the critical role which contingency plans and collaboration at all levels should play in biomedical research. PUDAC constructed a contingency plan based upon the

assumption that 'what can go wrong will go wrong at some time' and that this will happen when it is least convenient, for example, during public holidays. Another essential factor is the attention to facility staff and includes their education and training, personal protection, workload, and always means of ensuring adequate staffing levels. Although the pandemic did not provide any tangible opportunities relating to COVID-19, the Unit has been approached by various research individuals interested in conducting studies at PUDAC. This growing interest will significantly improve the image of PUDAC, which will translate to infrastructural investment as well as financial stability of the Unit.

INNOVATIVE APPROACHES

PUDAC has contributed to SAMRC Goal 2 by conducting studies aimed at using NHP models to combat the burden of Non-Communicable Diseases/NCDs (Hypertension and cardiovascular) affecting South Africans and bridge the gap in HIV vaccine research in an attempt to accelerate the pace of HIV vaccine development in the country. The establishment of the SHIV/Rhesus monkey model at PUDAC has provided augmented research opportunities to other medical fields, such as testing medical discoveries/devices. PUDAC has also contributed to the SAMRC Goal 4 by accommodating postgraduate students (MSc and research interns) and offering training in reproductive biology, non-communicable, and infectious diseases through the capacity and development program. Currently, we have two Ph.D. students who are being trained in the molecular and virology/immunology laboratories. Therefore, the capacity development program is equipping these students with a wide array of experimental scientific skills ranging from extensive practical training, time and project management, critical thinking, presentation and writing skills. PUDAC is also collaborating with UWC (NCD and reproduction) and UCT (HIV) as part of this capacity development initiative.

IMPACT ON POLICY AND PRACTICE

PUDAC established a SHIV/Chinese Rhesus monkey model for testing the efficacy of candidate HIV vaccines to support HIV vaccine development in South Africa. This model can be used for HIV cure research and HIV coinfection studies with other tropical infectious diseases (TB and malaria), which are highly relevant medical problems in South Africa. In addition to studies conducted at PUDAC in diabetic obese mouse and rat models, the development of NCD NHP models (hypertension, obesity, and diabetes) are playing a significant role in influencing further research in the development of biomarkers to characterize and track disease progression.



Drug Discovery and Development Senior Animal Technologist preparing a special compound for sub-chronic toxicity using a mouse model



Res Scientist process Vervet monkey samples for DNA & RNA extractions for cardiovascular project



Animal Technician responsible for preparing animal's high fat diet for diabetic vervet monkeys



Senior Technologist and three Technicians preparing for intravenous glucose tolerance test procedure for an obesity study

CAPACITY DEVELOPMENT AND MANAGING DIVERSITY

Like any other unit at SAMRC, PUDAC has also been significantly affected by the COVID-19 crisis; however, this did not lead to unprecedented disruption as the other units might have experienced. During the hard lockdown (Level 5), PUDAC continued to operate with no interruptions. Due to the nature of PUDAC's work, staff have shown more resilience and compassion throughout all levels of COVID-19 to ensure that the health and well-being of animals remain uncompromised. The Unit's strength lies in our diverse staff composition consisting of talented scientists, SAVC registered technologists and authorized technicians. Furthermore, PUDAC has a mandate to build research capacity within the area of biomedical research and its use of appropriate animal models, aligned to the SAMRC research agenda. Through this, we have contributed towards developing and empowering young scientists and technologists with specialized and scarce skills to be well-trained within their respective fields. Our capacity development program has also equipped our students/interns with a wide array of experimental scientific skills ranging from extensive practical training, time and project management, critical thinking, presentation and writing skills. As part of this capacity development initiative, PUDAC is also collaborating with several academic institutions such as UWC (cardiovascular, reproduction), UKZN (Hypertension), NICD/WITS and UCT (HIV). Within this reporting period, four MSc students and one NRF intern were supported. Two of the MSc students completed their degrees and one has already registered for a Ph.D. The NRF intern has also shown interest in furthering her postgraduate studies, and the plan is to retain her as PUDAC's potential Ph.D. candidate through the SAMRC Researcher Development Grant.

RESEARCH TRANSLATION

Due to COVID-19 national lockdown restrictions, most of our staff members had to cancel their planned workshops and conferences for this reporting period. However, a senior scientific staff presented our work on evaluating locally made candidate HIV vaccines using our SHIV/rhesus monkey model in an international virtual conference (HIV R4P 2021) in an oral abstract session. As part of the capacity development initiative, which is in line with SAMRC strategic goals, students participated in webinars and local conferences virtually, thereby sharing their laboratory findings with relevant stakeholders. Additionally, two research papers from PUDAC were recently published



REFLECTIONS ON 2020/21



Zukile Mfengu

People who always learn from difficult circumstances like the COVID-19 turmoil, have discovered something positive about their potential.



Joritha Van Heerden

In the face of adversity, we have a choice. We can be bitter, or we can be better." The PUDAC team chose to stand together stronger and more resilient during the COVID-19 crisis.

in peer-reviewed journals. Furthermore, PUDAC continued to engage with relevant local and international stakeholders through virtual meetings/workshops to share research ideas and forge collaborations.

Recent PUDAC research translation activities:

- NHREC annual meeting, Department of Health.
- Animal Research Ethics Committee (AREC) Training Workshop.
- 14th Early Career Scientist 2020 Conference.
- R for Scientist online workshops.
- Going Beyond Compassion Fatigue Webinar, 16 April 2020, Animal Care Systems.
- The use of Computer Aided Sperm Analysis (CASA) in Research Webinar, 15 October 2020, Microptic.
- Virtual HIV Research for Protection (HIV R4P) 2021 conference.

BIOMEDICAL RESEARCH AND INNOVATION PLATFORM



COVID-19 has tested the mettle of human existence, bravery and collective effort is needed to fight this insidious enemy. Ingenuity and fortitude have endured, and BRIP is at the forefront of winning this fight.

Prof Christo Muller Unit Director
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OVERVIEW

Research at the Biomedical Research and Innovation Platform (BRIP) focuses on, but is not limited to, metabolic health challenges that are pertinent to South Africa, such as obesity, type 2 diabetes, gestational diabetes, hypertension, and cardiovascular diseases. These key research areas are aligned with 4 of the 5 strategic objectives of the SAMRC as set out in the 2020/21 Annual Strategic Plan. The Platform's objectives include the advancement of health through scientific excellence, collaboration, innovation, technology transfer, commercialization, and capacity development, whilst adhering to good corporate governance. The Platform generated a total income of R 8, 278, 386 from research grants in the current fiscal year, with 90% (excluding salaries) of its baseline funding spent on research. The Platform continued to ensure good governance and achieved a clean financial audit for the 2019/2020 financial year. With respect to knowledge production, The Platform is committed to the generation and dissemination of new knowledge through ISI-rated open-source publications that are relevant to South Africa's health challenges. Under this theme, The Platform disseminated and published 45 peer-reviewed scientific publications and one book chapter. In response to the COVID-19 pandemic, The Platform has played a leading role in establishing and validating a real-time quantitative

polymerase chain reaction (RT-qPCR) method for the detection and quantification of the SARS-CoV-2 virus in wastewater. The Platform is currently the reference and training laboratory for the SAMRC's wastewater epidemiology (WBE) program and has capacitated the participation of four other under-resourced universities into the SAMRC/WBE.

In the innovation space, BRIP remained committed to lessening the non-communicable disease (NCD) disease burden by performing cutting edge science and is currently playing an integral role in developing protocols to culture transplantable corneal epithelial limbal stem cell monolayers *ex vivo* to restore vision in limbal stem cell-deficient patients, such as those with Stevens-Johnson Syndrome. Additionally, BRIP has built long term sustainable partnerships with under-resourced institutions to build young, black scientific leadership in South Africa. Under this program, The Platform has trained and supervised 29 students, three Postdoctoral researchers, and graduated four PhDs and four MSc candidates in the 2020/2021 fiscal year. Additionally, BRIP's senior staff serves on various national and international bodies including the National Research Foundation Specialist Committee for Rated Researchers, as well as the international Editorial Board of Diabetes Nutrition and Dietetics.

RESILIENCE IN A TIME OF COVID-19

With the advent of the COVID-19 pandemic, The Platform had to swiftly respond and change its core focus to include wastewater-based epidemiology (WBE) as an early warning system (EWS) to monitor the spread and transmission of COVID-19. This swift response allowed The Platform to be at the forefront of detecting and quantifying SARS-CoV-2 within South Africa's wastewater systems, as well as being able to create an international footprint. Furthermore, in response to the pandemic, BRIP formed a wastewater consortium with various local and international stakeholders to develop an in-depth understanding of the complexity of quantifying viral loads in different wastewater matrixes. The Platform adapted its workflow and established a biosafety level 2 (BSL2) laboratory geared for researching SARS-CoV-2 in wastewater, which supplemented current ongoing estimates of SARS-CoV-2 prevalence amongst health authorities.

COVID-19-RELATED RESEARCH

The Platform contributed to scientific excellence by playing an integral role in the establishment and advancement of SARS-CoV-2 WBE research in South Africa. Research conducted within The Platform was the first in South Africa to establish and embark on a longitudinal surveillance system whereby the presence of SARS-CoV-2 viral RNA (qualitative analysis) was detected and the viral loads (quantitative analysis) in 24 wastewater treatment plants (WWTP) within the Western Cape estimated over a 6-week period during the peak of the first wave. The Platform also expanded its weekly surveillance programme to include wastewater monitoring within the Breede Valley and Theewaterskloof Municipalities with a total catchment population of approximately 150 000 inhabitants. As the National reference laboratory for the SAMRC WBE program, The Platform provides technical support, training and quality assurance in the Eastern Cape, Gauteng, and Limpopo Province. As such, current research on wastewater surveillance within the Platform will be expanded to include continuous monitoring for SARS-CoV-2 at vaccine sites, as a cost-effective tool to help monitor vaccination roll-out effectiveness. Importantly, research performed within The Platform is currently being revised to form part of the Western Cape Provincial Government's third wave surveillance strategy and as such will form an integral part of the decision-making processes related to the management of COVID-19.

INNOVATIVE APPROACHES

The current pandemic has allowed The Platform to rapidly apply its molecular expertise as a tool to detect and quantify SARS-CoV-2 viral load in wastewater. Within a month of conception, we were able to establish a validated workflow and infrastructure, able to report on the SARS-CoV-2 viral



One of the scientists analysing wastewater samples



Wastewater samples being extracted from the Bellville Wastewater Treatment Plant.

Picture Source: EWN

loads within various WWTPs within 48 hours of sampling. The Platform continues to advance knowledge through the implementation of its published and newly developed EWS protocol for monitoring of SARS-CoV-2 RNA signal levels in wastewater samples across four provinces, including the Western Cape, Limpopo, Gauteng and Eastern Cape. Through this project, The Platform was able to train young scientists from previously disadvantaged institutes in the relevant wastewater sampling and analysis techniques, with 56% of these scientists being black African women, highlighting the Platform's commitment to research transformation.

Research:

In response to the COVID-19 pandemic, The Platform established a comprehensive wastewater training program to transfer essential skills and expertise in RNA extraction and SARS-CoV-2 viral load quantification using the established RT-qPCR method. This capacitated five black African, one Indian, one Coloured and two White females, as well as five black African and two White males from six institutes across four provinces.

Innovation:

The Platform is developing novel protocols to culture corneal limbal stem cell epithelia to restore the sight of patients with limbal stem cell deficiencies of the cornea. This remains a major challenge in South Africa, especially in patients on antiretroviral treatment who develop Stevens-Johnson Syndrome. With limited treatment modalities currently available on the African continent to restore corneal epithelium, The Platform initiated a pilot, proof-of-concept study to independently culture corneal epithelium ex-vivo for transplantation onto limbal stem cell-deficient corneas. This pilot study aims to culture and produce viable corneal epithelia obtained from the remnant corneal buttons used for corneal transplantation. This research is envisioned to lead to the restoration of sight for many patients in South Africa, who would otherwise have remained severely visually impaired.

IMPACT ON POLICY AND PRACTICE

During the current reporting period, The Platform's data is presented weekly both on the SAMRC SARS-CoV-2 Wastewater Surveillance Dashboard as well as being reported to various health authorities, including the Western Cape's weekly health digital conference. Furthermore, WBE has broader implications as it led to the monitoring of SARS-CoV-2 RNA signals in defined communities, including frail care centres and university residences. Importantly, in future, The Platform will use the established technology to detect a resurgence or identify any new SARS-CoV-2 outbreaks.

CAPACITY DEVELOPMENT AND MANAGING DIVERSITY

During this fiscal year, The Platform's postgraduate capacity development programme excelled at training and supervising ten MScs, 19 PhDs and three Postdoctoral students, of whom 83% were female. The Platform values diversity as reflected by our student demographics, with 24 females and five males, of whom 20 are black African, three Indian, four Coloured and two White. The Platform has an excellent postgraduate program that comprises students from six under-resourced institutions, including the University of Zululand, University of Limpopo, University of the Western Cape, Walter Sisulu University, University of Fort Hare, and the University of Venda.

RESEARCH TRANSLATION

Publications: In this fiscal year BRIP has published 45 peer-reviewed articles in ISI-rated journals. To comply with the SAMRC's Plan S and to increase BRIP's visibility, marketability and H-index of scientists, all publications were published in open access format at a cost of R 546, 689.43.

Media communication: On the 16th of July 2020, Prof Rabia Johnson participated in a series of Discovery COVID-19 webinars and podcasts, which discussed the State of Play of COVID-19 in South Africa. During this webinar, Prof Gray and Dr Johnson discussed current treatment strategies and the role of WBE as an early warning system for monitoring and detection of COVID-19. Since then, The Platform and its transdisciplinary collaborative team have become the leading researchers in wastewater surveillance in South Africa and has established links with various international partners. Data from this study have been published on various platforms, including:

- The SAMRC dashboard <https://www.samrc.ac.za/wbe/>,
- Live Radio interviews with Prof Christo Muller on Pretoria FM and RSG, on 8 and 9 March 2021, respectively.
- Media releases on various digital platforms as part of the radio news bulletins on:
- Cape Talk – 567AM – DStv: 885 – Live Stream: <https://www.capetalk.co.za/>
- 702 – Live Stream <https://www.702.co.za/>
- 947 – <https://www.947.co.za/>
- kfm – <http://kfm.co.za/>
- Web: www.ewn.co.za
- Facebook (<https://www.facebook.com/EyewitnessNews>) and Twitter (@ewnreporter and @ewnupdates)



REFLECTIONS ON 2020/21



Dr Nireshni Chellan

According to the esteemed moral philosopher Socrates, "The secret of change is to focus all of your energy, not on fighting the old, but on building the new." With unity and compassion at the fore, the team at BRIP has been courageously led through a challenging year of immense change. And as a team, we look forward to building something new in the year to come.



Dr Rabia Johnson,
Senior Specialist
Scientist

The Covid-19 pandemic led to a tremendous struggle in maintaining health, social and economic wellbeing, but through our resilience as a team and willingness to take a conscious part in survival, The Platform was able to endure much more than what we thought we are capable of.

SAMRC/TUT HERBAL DRUGS RESEARCH UNIT



In times of adversity, creative thinking and a tenacious attitude yields positive solutions.

Prof Alvaro Viljoen Unit Director
ViljoenAM@tut.ac.za

OVERVIEW

The main aim of the Unit is to conduct technologically advanced scientific research, and to make basic knowledge readily available to stakeholders in order to promote the quality, safety and efficacy (QSE) of herbal medicines. The SAMRC aims to ensure, together with the scientists, that the research conducted is responsive to the needs of the country. It is estimated that 27 million people use herbal medicines in South Africa. The quality, safety, and efficacy (QSE) data on phytomedicines are far from sufficient to meet the criteria needed to support their extensive local and global use. Consequently, through establishing the Herbal Drugs Research Unit the SAMRC is committed to contribute to the education, training, and research in this area to ensure the safe and efficacious use of herbal medicines in South Africa.

COVID-19-RELATED RESEARCH

As scientists scrambled for an effective treatment against COVID-19 and its symptoms, several natural products, including traditional medicines, were identified as a potential treatment. Unfortunately, many of the claims relating to herbal medicines could not be substantiated due to a lack of scientifically validated data as well as the absence of clinical studies. The Unit was approached by several researchers and the media to offer guidance and perspective in this regard.

One of the medicinal plants that emerged during the pandemic as a potential “panacea” in the treatment of COVID-19 was *Artemisia annua* from Madagascar. This resulted in local interest in the South African counterpart, *Artemisia afra* (mhlonyane in isiZulu; lengana in Tswana) which was sold on the informal markets. Very little is known on the quality, safety, and efficacy of this species. Our group produced an herbal monograph on this species and a research publication which was published in *Fitoterapia*, a leading journal on plant medicine, to provide scientific data on this species.

OPPORTUNITIES AND INNOVATIVE APPROACHES

The pandemic illustrated the importance of traditional and herbal medicines as a healing modality and the need that exists to provide sound scientific data on these herbal treatments. During the pandemic year of 2020 the Unit members completed several herbal monographs as well as a book detailing the identification and standardisation of selected traditional medicines.

Southern Africa is richly endowed with natural resources and is internationally renowned for its biodiversity. Our natural resources are attractive to researchers worldwide, providing South Africans with international collaborative opportunities which, in turn, bring technology, scientific capacity and training to TUT. Indigenous Knowledge



Baudrey extracting the smoke of wild cannabis



Maxleen in new TUT SAMRC NRF DST Zebrafish facility

Systems (IKS) encourage research projects that integrate indigenous knowledge and pharmaceutical sciences. The potential outcomes of a research focus on herbal medicines are in alignment with national IKS objectives. These include the generation of new knowledge, bringing indigenous knowledge to the fore of national health delivery, to establish its potential and ensure its application for the benefit of society. In addition, the national IKS strategies are focused on the sustainable use of our natural heritage.

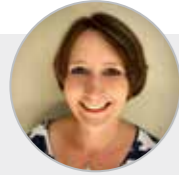
Broadly, the Unit builds capacity, increases research outputs, and trains postgraduate students. The Unit is involved in research translation to both the regulator and industry and acts as technical support for both. The SAMRC’s vision is to “build a healthy nation through research”, and the Unit’s work supports this vision in this under-researched area. Apart from translational research into policy and practice, the Unit aims to create intellectual property (IP), which may form the basis for new products, thereby adding value to South Africa’s biological resources.

IMPACT ON POLICY AND PRACTICE

The Unit conducts technologically advanced research in herbal medicines providing scientific knowledge to promote the commercial development and use of high quality, safe and efficacious herbal medicines. Paramount to the provision of quality healthcare is the need to ensure consistently high quality, unadulterated and correctly identified botanical raw materials. The Unit therefore focuses on developing and optimising quality control protocols for the correct identification and fingerprinting of important medicinal plants in South Africa. We achieve this by complementing conventional analytical methods used by pharmaceutical companies with new technologies that allow for the holistic analysis of botanical raw materials that inherently possess complex chemical profiles. Several SAMRC-affiliated articles have emanated from this research and these are published in high impact factor journals in the field. Parallel to this, the Unit has generated several monographs for some of the most important indigenous medicinal plants detailing identification (morphological and analytical), ethnobotany, commercialisation, safety, and toxicity aspects. The compilation of these monographs is a significant contribution towards the standardisation and regulation of herbal medicines in South Africa. These herbal monographs will provide a scientific basis for setting standards and establishing the quality of raw materials to manufacturers or product developers, regulatory authorities such as SAHPRA, producers and the public.



REFLECTIONS ON 2020/21



Dr Ilze Vermaak

It can be done, it will be done, it shall be done... on-line.

CAPACITY DEVELOPMENT AND MANAGING DIVERSITY

One of the objectives of the research unit is to build capacity for the long-term sustainability of the country's health research. The Unit has been actively involved in training postgraduate students as evidenced by the output of Masters and PhD students during the reporting period. The overwhelming majority of postgraduate students working in the Unit are females from previously disadvantaged sectors of our society. Furthermore, the Unit has hosted several international and local Postdoctoral fellows in the group, thereby allowing skills transfer and capacity development through this exchange. Undergraduate students have been exposed to the research culture and received training in specific areas in herbal drugs research through experiential learning and internship programs.

RESEARCH TRANSLATION

A chromatographic database of commercially important indigenous South African plants has been developed for use by industry in the quality assessment of raw materials used in herbal formulations. Using HPLC, GC and HPTLC various protocols and methods for chemical fingerprinting of commercially important South African plants has been completed and the information has been compiled into a chromatographic atlas of South African medicinal plants. Furthermore, an extensive literature review and phytochemical profiling of the plants led to the compilation of a set of extended monographs for the most important South African medicinal plants following a standard format. To date, we have developed monographs for 25 medicinal plants indigenous to South Africa. The Unit provides services to local and international companies by assisting with developing quality assurance protocols and chemical fingerprinting on raw materials and products. The SAMRC Unit continues to act as an incubator to develop research capacity and empower staff members with knowledge and expertise to contribute to academic and socio-economic development.

Programme

6

BIOMEDICAL RESEARCH

PURPOSE OF THE PROGRAMME

To conduct basic research, applied research and transactional research to determine predisposition to disease. This understanding is important for planning effective intervention and disease control.

UNITS THAT CONSTITUTE THIS PROGRAMME

- | | |
|---|---|
| 1 SAMRC/SANBI/UWC Bioinformatics Capacity Development Research Unit | 6 SAMRC/CPUT Cardiometabolic Health Research Unit |
| 2 SAMRC/UCT Immunology of Infectious Diseases Research Unit | 7 SAMRC/SU Genomics of Brain Disorders Research Unit |
| 3 SAMRC/UP Stem Cell Research and Therapy Unit | 8 SAMRC/UP Precision Prevention and Novel Drug Targets for HIV-Associated Cancers |
| 4 SAMRC/ WITS Antiviral Gene Therapy Research Unit | 9 SAMRC/UCT Wound and Keloid Scarring Translational Research Unit |
| 5 SAMRC/NICD Antibody Immunity Research Unit | |

PROGRAMME STRATEGIC OBJECTIVES

- To generate scientific knowledge in the field of biomedical science, which will provide insights into various diseases of national priority. This in turn will lead to novel diagnostic, preventive and therapeutic strategies
- To undertake original research of high quality, which will provide novel insights into acute and chronic inflammatory diseases of national priority, thus leading to novel diagnostic, preventive and therapeutic strategies
- To train and mentor high-quality postgraduate students who are able to compete in the science, health and/or education sectors locally and abroad
- To strengthen biomedical research through a policy of enabling researchers from other academic institutions to have access to sophisticated laboratory equipment and supervision. In addition, to provide assistance to national research funding agencies with respect to evaluating applications for research funding
- To translate research data into policy and practice regarding prevention, diagnosis, treatment and management of diseases
- To develop and test biomedical innovations that will address various conditions
- To develop health-care management systems and plan a 'gene therapy' intervention programme for retinal degenerative diseases

RESEARCH HIGHLIGHTS UNDER THIS PROGRAMME

SAMRC/SANBI/UWC BIOINFORMATICS CAPACITY DEVELOPMENT RESEARCH UNIT



As a Unit, we recognized the need to constantly revisit our initial roadmap for 2020 in response to the COVID-19 pandemic. This flexibility to change allowed us to adapt some of our deliverables and funding streams.

Prof Alan Christoffels Unit Director
alan@sanbi.ac.za

OVERVIEW

The SAMRC/UWC Bioinformatics Unit aims to train the next generation of computational biology in South Africa, while conducting research and development projects in collaboration with researchers on the continent and globally. The Unit is aligned with the SAMRC's Strategic Plan 2020/21 – 2024/25 which can be seen through the following objectives:

Development of Open-source analytical methods

We are leading technology development through an SAMRC-funded project (COMBAT-TB) that has now leveraged additional funding to implement a SARS-COV-2 analytical module for the Africa CDC. We continue to be a key contributor to international open-source projects such as GALAXY with measurable code submissions.

Lead knowledge production in the computational biology space

- Bioinformatics is an interdisciplinary field and evidenced by our collaborative publication outputs. Nevertheless, SAMRC Bioinformatics staff and students occupy leading roles in at least 40% of our outputs for the review period.
- Our staff provide leadership through the international programme, Public Health Alliance for Genomic Epidemiology (PHA4GE) that brings bioinformatics solutions closer to public health. Our role as principal investigators and working group chairs demonstrate our leadership role.
- Data management has become a central theme for universities and researchers. The SAMRC Bioinformatics Unit has representation on the POPIA code of conduct steering committee and drafting committee.

Translating research into Policy

Half of the SAMRC Bioinformatics Unit academic staff serve on 13 national and international committees and panels that develop research frameworks to accelerate data science and biomedical research.

RESILIENCE IN A TIME OF COVID-19

The Bioinformatics Unit had to respond rapidly at the level of university undergraduate teaching, provision for postgraduate training, realigning our international project goals and supporting staff and students in practical ways as follows:

- **Undergraduate teaching:** the SAMRC Bioinformatics Unit staff teach a third year bioinformatics course that had to migrate online and be sensitive to the data access limitations of our undergraduate students. The consequence for teaching was ensuring lightweight lectures/recordings and provisioning for tutors.
- **Postgraduate training:** Computational experiments can be done virtually but our students need technical assistance to get their data, protocols and equipment optimized. Careful negotiation at the university level allowed us to get ad hoc access to university premises to ensure smooth-running of our research projects as needed.
- **International Projects:** Our plans were realigned to COVID-19 surveillance to respond to the immediate global needs of public health. For example, in partnership with the African Society for Laboratory Medicine (ASLM), we produced a teaching module on genomic epidemiology.
- **Provisioning of data bundles for students and admin staff:** Critical to the continuity plan of the SAMRC Bioinformatics Unit was to ensure every student and admin staff member had access to the internet from their homes. A few international postgraduate students had to be accommodated in private accommodation because of a hard lockdown in 2020.
- Through all of these responses, the SAMRC Bioinformatics Unit continued its research mandate in a virtual environment.
- **International platform to advocate for pathogen sequencing:** SAMRC Bioinformatics Unit staff led and moderated a pathogen sequencing analysis session at the Grand Challenges 2020 conference in November 2020.

RESEARCH CONDUCTED RELATING TO COVID-19

Data analytics: In partnership with the Africa CDC, we have developed a data analysis protocol for analyzing SARS-COV2 genomes. Our technical team has been porting these tools to a user-friendly interface.

Strengthening laboratories: In partnership with the Africa CDC, we are customizing the Baobab LIMS (www.baobablms.org) to support laboratories that have to manage infectious disease samples and ensure audit trails. As part of this work, we are implementing SARS-COV2 meta data standard into the LIMS.

Development of a meta-data standard for SARS-COV-2 sample collection: In collaboration with global partners we have developed a standard for collecting data pertaining to COVID-19 samples.

Human-SARS-COV2 protein interactions: Using machine learning techniques, we are trying to unravel the various interaction pathways between human and SARS-COV-2.

Computational approaches to drug discovery: Identification of compounds with activity against the novel SARS-coronavirus and *in vitro* testing

OPPORTUNITIES FOR INNOVATION

New funding: Initial planning activities with the Africa CDC prior to the pandemic fed into discussions on accelerating tools for SARS-COV-2. Africa CDC funded us for 12 months to modify existing algorithms that can support a pan-African wide strengthening of laboratories.

The Public health alliance for genomic epidemiology opted to prioritize data standards for COVID-19 and this resulted in the SAMRC Bioinformatics Unit contributing to the development of a meta data standard for collecting SARS-COV-2 biospecimens (doi: 10.20944/preprints202008.0220.v1).

INNOVATIVE APPROACHES AND PROGRAMMES

The staff in the SAMRC Bioinformatics Unit are leading the global Public Health Alliance for Genomic Epidemiology (PHA4GE) consortium. Through this work we are directing and contributing to new tool development for analyzing SARS-COV-2 genomes, and tracking virus samples in the laboratory. The secretariat of PHA4GE is coordinating international scientific engagement conferences and webinars related to disease surveillance with reference to emerging pathogens.

The only open-source Laboratory information management system for infectious disease samples (www.baobablims.org) has been developed by the SAMRC Bioinformatics Unit and is now starting its continental-wide training and roll out.

The training of 30 postgraduate bioinformatics students (50% female) through our postgraduate programme contributes to the SAMRC's goal of building human capital.

National leadership on data security at universities was demonstrated by an empirical study by the SAMRC Bioinformatics unit to delineate the factors affecting data security. This study has produced draft policies that were handed to the University of the Western Cape and for consideration as part of the POPIA code of conduct.

IMPACT ON POLICY AND PRACTICE

Policy: Through involvement in the African Academy of Science Biospecimen and Data access expert panel, using the analysis tools developed in the SAMRC Bioinformatics Unit, we have contributed to the drafting of a data and biospecimen sharing policy framework (bit.ly/AAS_dataGovernance).

Influencing further research: The previously funded SAMRC Flagship project (COMBAT-TB) has initiated a new project with the Africa CDC to support SARS-CoV-2 analysis.

CAPACITY DEVELOPMENT AND RESEARCH TRANSLATION

The SAMRC Bioinformatics Unit has strategically facilitated the training and supervision of 30 postgraduate students at the level of MSc and PhD. Half of these students are female and majority of our students represent historically disadvantaged communities. We have used journal commentaries and news media as avenues to communicate our research as it applies to current issues affecting South Africa and beyond.

Commentary in the Lancet:

A global announcement of using biospecimens in Nigeria by a commercial entity resulted in a commentary by the SAMRC Bioinformatics Unit to raise awareness of the implications and criteria for governing biobanks in Africa. ([https://doi.org/10.1016/S0140-6736\(19\)32624-8](https://doi.org/10.1016/S0140-6736(19)32624-8)).

Another commentary in partnership with the Africa CDC highlighted a continental response to COVID-19 ([https://doi.org/10.1016/S2666-5247\(20\)30117-8](https://doi.org/10.1016/S2666-5247(20)30117-8)).

Communication related to COVID-19 appeared in different media:

1. National Research Foundation Newsletter commentary

- A reflection on SA's first SARS-COV-2 genome sequence and analysis. In this piece I (Alan Christoffels) outlines the potential roll out of a coordinated effort to manage SARS-COV-2 data in South Africa (bit.ly/SACOVIdseqChristoffels)

2. Television comment on Newzroom on 19th May 2020

- Alignment of academics with policymakers and implementers in government is crucial to be able to track the spread of COVID-19
<https://www.youtube.com/watch?v=CdKTEc5RZnl>

3. Radio interviews

- Peter van Heusden took part in radio interviews immediately following the publication of the first SARS-COV-2 genome sequencing in South Africa.
- During another radio discussion on the 17th November 2020, Peter Van Heusden joined a panel with Profs Lynn Morris (NICD) and Glenda Gray (SAMRC), the late journalist Karima Brown and WHO Epidemiologist Dr Otim Patrick Ramadan. Hosted by a TV show WIM TV, the discussion was helpful in spreading a positive message about vaccines during the COVID-19 global pandemic.
- <https://www.youtube.com/watch?v=uR5TNesuQg4&feature=youtu.be>

Newspaper article: Maverick citizen op-ed

- Glimmer of hope: Africa CDC launches guidelines to make Covid-19 tests more affordable and accessible
- Peter van Heusden, 18 December 2020
- <https://www.dailymaverick.co.za/article/2020-12-18-glimmer-of-hope-africa-cdc-launches-guidelines-to-make-covid-19-tests-more-affordable-and-accessible/>



REFLECTIONS ON 2020/21



Dr Dominique Anderson

My research group navigated COVID-19 by maintaining open channels of communication. We stayed resilient in the time of COVID-19 by understanding the challenges we faced, both personally and professionally, and we supported and motivated each other. We collectively kept our eye on the ball and utilised opportunities for capacity development.



Dr Ruben Cloete

We navigated the COVID-19 pandemic by having regular zoom meetings to get feedback on the progress of students w.r.t their research projects. I encouraged students to talk to other students and share their challenges with each other if they were not comfortable talking to me. I communicated often with my students to make sure they had the necessary access to research facilities from outside SANBI to avoid unnecessary delays in thesis submissions.



SAMRC/UCT IMMUNOLOGY OF INFECTIOUS DISEASES RESEARCH UNIT



Science always moves forward!

Prof Frank Brombacher Unit Director
brombacherfrank@gmail.com

OVERVIEW

The work of the SAMRC/UCT Immunology of Infectious Diseases Research Unit has international and national impact of fundamental Immunology and disease with translation to human research. The science within subtropical diseases is broad and deep, which benefit South Africa as well as many developing countries in the world.

The objectives of the Immunology and Infectious Diseases Research Unit are basic and clinical research in immunology and infectious diseases by studying their similarities and the factors influencing immunity to disease. The objectives of the Unit include:

- i. Discovering ways to identify the genes and bacteria involved in both immunity and infection
- ii. Developing vaccines for infectious diseases in Africa
- iii. Producing effective and affordable treatments; and
- iv. Embracing a wide range of research methods to build capacity and training in infectious disease research.

INNOVATIVE APPROACHES

Research

Our main research is focused on the understanding of host protective immune responses in relevant human diseases.

We investigate important regulatory mechanisms, including pattern recognition receptors, cytokine network and cellular crosstalk during innate immunity, which may lead to subsequent adaptive immunity or failure thereof.

The Unit investigates fundamental immunological mechanisms in human diseases, including Tuberculosis, African trypanosomiasis, Leishmaniasis and Helminth infections, including Schistosomiasis (Bilharzia) – **four of the top ten WHO declared human threats to combat**. In addition, the team also investigates chronic diseases, like allergic Asthma and Colitis.

WORLD HEALTH ORGANIZATION TOP TEN HUMAN THREATS

The world population faces multiple health challenges, ranging from serious virus outbreaks and antimicrobial resistance, to an increase in non-communicable diseases like obesity and heart disease.

While some parts of the world have limited access to vaccines, patients in other regions are hesitant to use them, partly because of the anti-vaccine (vaxxer) movement. The effects of pollution and climate change are another area of concern for population health.

These are the top ten threats to human health:

- 1 Air pollution and climate change
- 2 Non-communicable diseases
- 3 Global influenza pandemic
- 4 Fragile and vulnerable settings
- 5 Antimicrobial resistance
- 6 Ebola and other high-threat pathogens
- 7 Weak primary healthcare
- 8 Vaccine hesitancy
- 9 Dengue fever
- 10 HIV

Our research strategy is based on knowledge by gain or loss of function approaches in experimental transgenic mouse models. This allows us to a better understanding not only in mice but in humans.

IMPACT ON POLICY AND PRACTICE

- We produced unique spatial and temporal knockdown mouse models.
- Currently we have 150 collaborations on these mouse models on the 4 continents.
- With these mouse models we are able to understand the role of Interleukin IL-4, IL-13 and its receptor in mice and human.

The leadership structure is flat and based on experts on different diseases, including Tuberculosis, Listeriosis, Helminths, Allergy and Leishmaniasis.

H- INDEX (SCOPUS) OF UD AND CORE RESEARCHERS

NAME	NRF RATING
Frank Brombacher	78
Ramona Hurdal/Leishmania	11
Suraj Parihar/Tb & Listeriosis	11
Reto Guler/Tuberculosis	18
Justin Nono/Schistosomiasis	09
Sabelo Hadebe/Allergy	03

The director serves on four international bodies/committees: Wellcome Trust, Wellcome CIDRI, Coordinator ICGEB, IDM, including two national Keystone, ICGEB workshop.

SAMRC/UP STEM CELL RESEARCH AND THERAPY RESEARCH UNIT



COVID-19 provided us with the opportunity to draw closer to one another as a group and to meet each other at our points of vulnerability. The saying that "no woman/man is an island" is highly pertinent in the current context. The opportunity that COVID-19 has provided to exercise our humanity more effectively is one of the silver linings to emerge from the pandemic.

Prof Michael Pepper Unit Director
michael.pepper@up.ac.za

OVERVIEW

Our Extramural Unit is now in its second 5-year cycle, and the funding provided has allowed us to establish ourselves as the leading stem cell group in the country. Our primary goal is to apply stem cell technologies to understanding physiological processes and disease pathogenesis, and from a therapeutic perspective in terms of cell and gene therapy. We have several projects underway, which can be grouped as follows:

- Mesenchymal stromal/stem cell (MSC) differentiation: adipogenesis, osteogenesis and myogenesis
- Effect of MSCs on tumorigenesis
- Immune modulatory properties of MSCs
- HIV and haematopoiesis
- Development of hematopoietic stem cell (HSC) and MSC therapeutic products, including HIV gene therapy
- Identification of biomarkers for "birth asphyxia" with a view to applying neuroprotective therapies including cell-based therapies
- Ethical, legal and social implications of cell- and gene-based therapy in South Africa.

RESILIENCE IN A TIME OF COVID-19

Our group has initiated two major projects related to COVID-19 in the last year.

1. Mesenchymal stromal/stem cells for the treatment of acute respiratory distress syndrome

Mesenchymal stromal/stem cells (MSCs) have been shown to improve outcomes in patients with severe COVID-19. Our group has extensive experience with harvesting, culturing and characterizing MSCs. We aim to establish a platform from which a GMP compliant MSC product will be developed and administered to COVID-19 patients with Acute Respiratory Distress Syndrome (ARDS). This platform will be developed as a standalone entity outside of the University.

2. Genetic determinants of variability in the cytokine release syndrome in SARS-CoV-2 positive patients

We will determine whether there is a genetic predisposition to poor outcomes in patients who are SARS-CoV-2 positive. We will align our data collection to the phenotypes agreed upon by the COVID-19 Host Genome Initiative (<https://www.covid19hg.org/>) with whom we are collaborating. We will use bespoke arrays and whole genome sequencing. Our specific interests include the cytokine release syndrome and HLA. This is a multi-institutional project.

Publications

Some of the publications that have emanated out of this work include:

Viljoen I.M., Castelyn C.deV., Pope A., Botes M. and Pepper M.S.	Contact Tracing during the COVID-19 disaster: Protection of Personal Information in South Africa.	S. Afr. J. Bioethics Law 13(1): 15-20 (2020)
Pepper M.S. and Burton S.G.	Research in COVID-19 times: the way forward.	S. Afr. Med. J. 110(8): 756-758 (2020)
Castelyn C. deV., Viljoen I.M., Dhali A. and Pepper M.S.	Resource allocation during COVID-19: a focus on vulnerable populations.	S. Afr. J. Bioethics Law 13(2): 83-86 (2020)
Hendricks C., Mustafa F., Green R.J. and Pepper M.S.	Paediatric inflammatory multi-system syndrome. What should we look out for in South Africa?	S. Afr. Med. J. 110(9): 832-834 (2020)
Hendricks C. and Green R.J.	COVID-19 in children: Should we be worried?	S. Afr. Med. J. 110(9): 864-868 (2020)
Green R.J., van Bruwaene L., Mustafa F. and van Niekerk A.	Protecting asthmatics from COVID-19	Curr. Allergy Clin. Immunol. 33(2): 68-73 (2020)
Mustafa F., Giles R. and Pepper M.S.	Rapid evolution of our understanding of the pathogenesis of COVID-19 – implications for therapy	S. Afr. Med. J. 110(12): 1180-1185 (2020)
Pepper M.S.	Access to novel therapies for COVID-19 – distributive justice and Russian roulette.	S. Afr. Med. J. 110(12): 1156-1157 (2020)
Dhanraj, D., Pitere, R. and Pepper, M.S.	The impact of obesity on the cellular and molecular pathophysiology of COVID-19	S. Afr. Med. J. 11(3): 211-214 (2020)
Mellet J. and Pepper M.S.	A COVID-19 vaccine: Big strides come with big challenges.	Vaccines 9, 39 (14 pages) https://doi.org/10.3390/vaccines9010039 (2021)
Hendricks C.L., Herd C.L., Nel M., Tintinger G. and Pepper M.S.	The COVID-19 treatment landscape: A South African perspective on the race against time.	Frontiers in Medicine 8, 604087 (13 pages) https://doi.org/10.3389/fmed.2021.604087 (2021)
Cowan D.A., Burton S.G., Rybicki E.P., Williamson A.L., Dorrington R. and Pepper M.S.	Viruses, variants and vaccines.	S. Afr. Med. J. In press (2021)

The Conversation

- Pepper M.S. and Burton S. Sheer volume of misinformation risks diverting focus from fighting coronavirus. 29 April 2020. <https://theconversation.com/sheer-volume-of-misinformation-risks-diverting-focus-from-fighting-coronavirus-137408>
- Burton S.G. and Pepper M.S. Lockdowns and research: what we lost and what we stand to gain. 12 May 2020. <https://theconversation.com/lockdowns-and-research-what-we-lost-and-what-we-stand-to-gain-138355>
- Pepper M.S., Botes, M., Pope A., Castelyn, C. and Viljoen I.M. Balancing privacy with public health: how well is South Africa doing? 24 June 2020. <https://theconversation.com/balancing-privacy-with-public-health-how-well-is-south-africa-doing-140759>

Media

Radio 702 – afternoon drive with Joanne Joseph	2020, 26 June	Talking about covid19: Balancing privacy with public health rights	Prof Pepper Interview with Nicolas Bauer
France 24 TV	2021, 14 January	Covid19 and Obesity	Prof Pepper Interview with Caroline Dumay (Southern Africa correspondent)

Other media

Castelyn C. Non-COVID-19 Patients Left out in the Cold: Inevitable Outcome of Pandemic Ethics? Voices in Bioethics; an Online Journal. May 2020

<http://www.voicesinbioethics.net/voices-in-bioethics/2020/5/29/non-covid-19-patients-left-out-in-the-cold-inevitable-outcome-of-pandemic-ethics?format=amp>

OPPORTUNITIES FOR INNOVATION

The diseases we are studying, namely HIV, COVID-19, obesity, cancer and “birth asphyxia”, are all major contributors to morbidity and mortality, both in South Africa and abroad. Our work is contributing to understanding their pathogenesis and will hopefully also result in the development of therapies that can be successfully applied to reduce the burden of these diseases.

Translation is a key aim of our work, and we have been involved in several entrepreneurial endeavours aimed at bringing products and services to the market.

IMPACT ON POLICY AND PRACTICE

- Professor Pepper chaired a group that worked on a consensus study for the Academy of Science of South Africa (ASSAf) the final report of which was launched in December 2018. The details of the report are as follows: Pepper M.S., Dandara C., de Vries J., Dhali A., Labuschaigne M., Mnyongani F., Moodley K., Olckers A., Pope A., Ramesar R., Ramsay M., Soodyall H. and Towers, W. Human Genetics and Genomics in South Africa: Ethical, Legal and Social Implications. Consensus Study conducted on behalf of the Academy of Science of South Africa. December 2018. (117 pages).
- Prof Pepper is currently leading a group working on the ethical, legal, and social implications of gene therapy, also for the Academy of Science of South Africa.

CAPACITY DEVELOPMENT AND MANAGING DIVERSITY

Prof Pepper is the Director of the Institute for Cellular and Molecular Medicine (ICMM) at the Faculty of Health Sciences, University of Pretoria, which includes the SAMRC Extramural Unit for Stem Cell Research and Therapy. The ICMM and the SAMRC EMU both are both representative of South African demographics, and most of the members are women. Currently there are 30 post-graduate students in the ICMM and EMU, and 15 research personnel working directly on the “birth asphyxia” project.

RESEARCH TRANSLATION

ENTITY	DATE	TITLE	COMMENT
Printed and e-media			
Pretoria News	2020, 22 December	Obese patients at bigger risk of Covid-19	By: Bongani Nkosi
https://www.pressreader.com/south-africa/pretoria-news/20201222/281582358233622			
Technology Networks	2020, 01 May	Freezing Life: The Current Trends in Cryopreservation	By: Maya Chergova
Sunday Times	2020, 19 January	Gay couple who fathered twins are a picture of the modern family	By: Claire Keeton
Television			
France24	2021, 13 January	Coronavirus pandemic in S. Africa: Link between Covid-19 deaths and obesity	Interviewer: Caroline Dumay
https://www.france24.com/en/video/20210113-coronavirus-pandemic-in-s-africa-link-between-covid-19-deaths-and-obesity?ref=wa			
Radio			
Radio 702 – afternoon drive with Joanne Joseph	2020, 26 June	Talking about covid19: Balancing privacy with public health rights	Interview with Nicolas Bauer
https://storage.googleapis.com/clientclipsr/20200626/2791574-11~15ED548.mp3			
SAfm	2020, 04 March	Genetic editing	Interview with Phumelo Motene

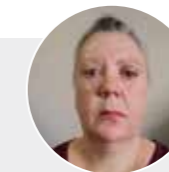


REFLECTIONS ON 2020/21



Dr Melvin Ambele, Senior Research Officer, ICMM

Our weekly zoom meetings, which allowed us to share our individual experiences and challenges of working during a pandemic, served as a major catalyst for us (staff and students) to bring together our individual expertise and work closely with each other in a way that would not have been possible before in addressing issues relating to Covid-19 from a multidisciplinary perspective relevant to the ICMM research focus areas.



Dr Chrisna Durandt, Senior Researcher, ICMM

In my opinion the Covid-19 pandemic highlighted the importance of clinical-based research. Although the impact of Covid19 on research activities was highly frustrating at times, the increased awareness of the importance of medical scientists to find solutions to clinical challenges was also motivational and encouraging to push through and find solutions to key challenges such as the persistence of HIV, one of the key challenges that need to be resolved in order to completely eradicate HIV.

SAMRC/WITS ANTIVIRAL GENE THERAPY RESEARCH UNIT



Challenges posed by the pandemic and associated restrictions on research activity initially restricted work of the SAMRC/Wits AGTRU. However, the team was able to adapt to the situation promptly, and protocols were put in place to ensure safety in the workplace. Procedures that are now commonplace were quickly implemented and disruptions could thus be minimised. We also pivoted our focus to adapt research activities to contribute to South African capacity for vaccine production.

Patrick Arbuthnot Unit Director
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OVERVIEW

The SAMRC/WITS Antiviral Gene Therapy Research Unit (AGTRU) works on developing use of nucleic acids (gene therapy) to treat and prevent serious viral infections of public health importance in sub-Saharan Africa. Gene therapy is based on rational drug design, which in turn is informed by knowledge about DNA sequences. With impressive advances in sequencing technology, there is now a wealth of information that may be applied to advancing this innovative approach to treating and preventing diseases of global importance, including infection with hepatitis B virus (HBV) and SARS-CoV-2, the virus that causes COVID-19.

With the emergence of the COVID-19 pandemic, it became clear that gene therapy technology may be repurposed for vaccination against SARS-CoV-2. The approach is being applied by leading international vaccine manufacturers such as Johnson & Johnson and Pfizer/BioNTech. The Wits/SAMRC AGTRU focuses on developing basic technology to treat and vaccinate against viral infections. The focus is on countering chronic infection with hepatitis B virus (HBV). This virus is hyperendemic to sub-Saharan Africa and continues to be a significant but underappreciated cause of public health problems. An important goal of the SAMRC/WITS AGTRU is to build capacity that enables South African participation in gene therapy-based technologies that are required to address serious local health problems.

IMPACT ON POLICY AND PRACTICE

The SAMRC/Wits AGTRU strives to employ modern and innovative technology to address serious health problems in South Africa that relate to viral infection. Gene transfer technology is now gaining acceptance as a viable means to prevent and treat viral infections and our unit is applying this technology to advance new methods of treating and preventing illness. As indicated elsewhere in this report, work has been entailed pivoting of research focus to repurpose technology originally intended for application to countering HBV infection to preventing threats of COVID-19. Particularly this is through generation of new vaccines that use recombinant adenoviral vectors and mRNA as sequences that encode immunogens. A guiding principle of the work we do is to produce publishable work of high quality that has practical utility.

Leadership in generation of new knowledge

Training and mentoring of younger scientists are a priority of the work of the SAMRC/Wits AGTRU. This is vital to build capacity in the modern technology. Details of this work of the unit is described in more detail.

Translation of research findings

COVID-19-related research is aimed at building capacity to ensure that South Africa can tackle health problems with the resources necessary to advance relevant technology. Our team has contributed through building of human and technology capacity that is needed to produce vaccines to prevent transmission of the SARS-CoV-2 virus. By transferring technology to a local vaccine producer, BIOVAC, the SAMRC/Wits AGTRU is helping to translate its research.

Long Term sustainability

Our unit is working to ensure long term sustainability through commercialisation of its work, protection of intellectual property and building research capacity among young scientists representing the South African demography.

Research that has contributed to innovation

Advancing gene therapy for treatment and prevention of viral infections is transitioning from an emergent technology to being part of the mainstream. Our research towards developing gene therapy for HBV infection has entailed establishing a variety of technologies that can be applied more widely and innovatively to other diseases. The significance of this for generation of vaccines, especially to counter SARS-CoV-2 comprising recombinant adenoviruses or mRNA, and this has been explained in more detail elsewhere in this report. Access to powerful modern technologies is vital to ensuring that the knowledge can be used for innovative approaches to translate basic research to preventing and treating modern public health problems.

OPPORTUNITIES FOR INNOVATION

The Wits/SAMRC AGTRU applies fundamental molecular biology to tackling serious diseases that are of relevance to South Africa. The technology in use is broadly applicable and has been adapted to addressing challenges posed by the COVID-19 pandemic. Gene transfer using recombinant adenoviral vectors has emerged as very useful for prevention of infection with SARS-CoV-2. Vaccines produced by Astra-Zeneca, Johnson & Johnson and the Sputnik vaccine all employ recombinant adenoviruses to deliver sequences encoding the spike protein of SARS-CoV-2. The approach has the important advantage of inducing cell mediated as well as humoral immunity. Generating recombinant adenoviruses is specialized, and to the best of our knowledge our facility is the only one within the country that has this capacity. We have responded to the COVID-19 pandemic by engaging with BIOVAC, a South African vaccine manufacturer, to build capacity to enable generation of recombinant viruses for generation of vaccines.

In addition to work on engineered viruses, our laboratory is also advancing use of mRNA vaccines. Initially the research was focused on making mRNA vaccines that would be effective against HBV. However, the technology is again being adapted to meeting challenges of COVID-19. Promising vaccines against SARS-CoV-2 that have shown good efficacy and which has also recently been licensed comprise mRNA. These are the vaccines produced by Pfizer/BioNTech and Moderna. To focus on the problem as it is presenting in South Africa, we are in the process of developing mRNA vaccines that would work against the 501Y.V2 variant that is now very common and was first described in South Africa.

RESEARCH CONDUCTED RELATING TO COVID-19

As indicated above, we are pivoting our research to adapt the valuable gene therapy technology to tackling challenges posed by COVID-19. The focus is to adapt nucleic acid transfer, using recombinant adenoviruses and mRNA vectored in lipid nanoparticle formulations, to build South African capacity for vaccine production. Adenoviruses are being propagated and this technology is being transferred to BIOVAC, the South African vaccine production company. In addition, we are partnering with researchers at the National Institute for Infectious Diseases, particularly Prof Penny Moore and members of her team, to develop mRNA as a vaccine against the 501Y.V2 variant.

FURTHER OPPORTUNITIES FOR INNOVATION

The work described above has been developed because of nurturing new partnerships. Collaborating with industry (BIOVAC) and other research entities have presented valuable opportunities. The partnership with BIOVAC has been particularly valuable as we have been made aware of considerations that need to be considered when advancing basic research to clinical application.

CAPACITY DEVELOPMENT AND DIVERSITY MANAGEMENT

One of the major purposes of the Wits/SAMRC-supported Antiviral Gene Therapy Research Unit is the training of new intellectual leadership and capacity development. This activity is particularly important within the specific context of advancing gene therapy and harnessing the technology to counter emerging pathogens such as the SARS-CoV-2 and for treatment of other viral infections. Currently the expertise in the field is deficient in South Africa and given the enormous potential to overcome diseases of South African importance, developing this expertise will be valuable. To grow and sustain this research endeavour, a major goal of our research unit is professional development



of the next generation of researchers and scholars. In achieving this objective, the SAMRC/WITS AGTRU pays particular attention to ensuring that prevailing race and gender imbalances in the demographic composition of researchers in the country are addressed. Two senior members of the research unit, Associate Professor Abdullah Ely and Dr Mohube Betty Maepa are from designated groups and are rapidly establishing themselves as independent researchers. They are developing their own programmes in the field of gene therapy and are making valuable contributions to COVID vaccination. Both are leading our efforts to assist with vaccine capacity development.

The student body of the SAMRC/WITS Antiviral Gene Therapy Research Unit broadly reflects the demography of South Africa and has a preponderance of women. Based within the School of Pathology, the Unit is well positioned to recruit students. In addition to recruiting local students, regional and overseas students have and will continue to be enlisted. Postdoctoral fellows and PhD students who have received training at other South African universities (e.g. University of Cape Town and Rhodes) and abroad (e.g. UK and India) have been members of the SAMRC/WITS AGTRU. Exchange of students between partner research institutions is actively supported through funding from the SAMRC, NRF and overseas agencies.

Activities that are aligned with institutional and national strategic research priorities and include 1) tackling diseases of South African importance, 2) training of young researchers, particularly from designated groups, and 3) commercial development of proprietary intellectual property.

RESEARCH TRANSLATION

Members of the Wits/SAMRC regularly engage with the public through various fora. During 2020/21, members of the team have given interviews for television (eNCA morning magazine programme with Jane Dutton) and also on Carte Blanche with Claire Mawisa. Patrick Arbutnot gave a radio interview on PowerFM during March 2021. In all cases the topic of discussion was advancing vaccination against SARS-CoV-2 and contributions that the SAMRC/WITS AGTRU are making to building capacity to ensure South Africa has the resources that are needed to tackle the challenges of the COVID-19 pandemic. This contribution was also reported in Business Day newspaper on 19 March 2021.

In addition to the above contributions, members of our unit regularly hosts learners, students from other divisions or faculties and other interested parties to explain the potential of gene therapy to counter HBV infection and the COVID-19 pandemic.



REFLECTIONS ON 2020/21



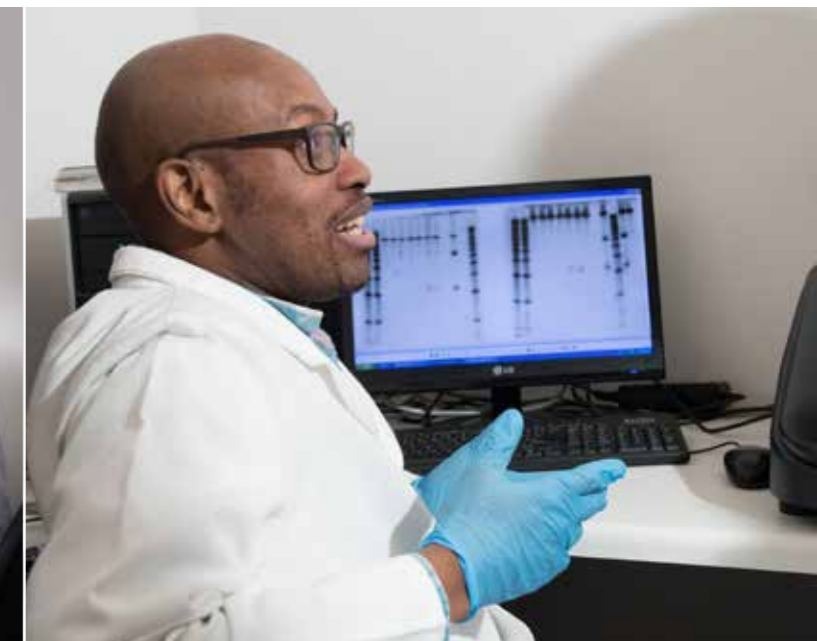
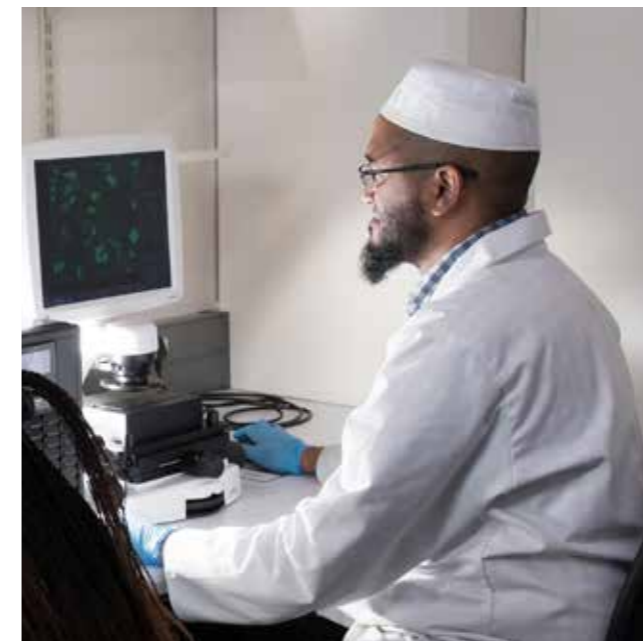
**Associate Professor
Abdullah Ely**

The pandemic has highlighted how gene therapy research can provide solutions to serious medical problems. Viral vaccines (AstraZeneca and Johnson & Johnson) and mRNA vaccines (Pfizer and Moderna) have dominated media coverage of late and it is only through gene therapy research that these technologies were developed. It is gratifying to be able to actively engage in gene therapy research, the only of its kind in the country and continent that has the potential to significantly contribute to human well-being.



**Dr Betty Maepa,
Senior Lecturer**

National lockdown had a direct negative impact on the progress of research bench work; however, the time was used to focus on other aspects of research e.g. brainstorming new and old ideas, writing manuscripts, planning around current funding management and future funding etc. It is however becoming very clear that the pandemic is and will for a long-time result in scarce research funding as funds are diverted from research that is not obviously directly linked to COVID-19. This is having a negative impact on all aspects of the research and will consequently affect COVID-19 research and management, as COVID-19 research can only rely on other research fields.



SAMRC/NICD ANTIBODY IMMUNITY RESEARCH UNIT



It has been very satisfying to know that the vision to set up this Unit has paid off during this time of COVID-19, and with this talented and highly motivated team led by Prof Penny Moore I have no doubt that AIRU will continue to play a leading role, locally and globally in the ongoing challenge of COVID-19.

Prof Lynn Morris Unit Director
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OVERVIEW

The use of vaccination to control infectious diseases remains one of the most significant public health interventions. However, emerging viral pathogens such as SARS-CoV-2 pose an ongoing public health threat that requires the rapid development of new vaccines and therapies. Antibodies are a critical component of the host immune response to infection. A deeper understanding of the antibody response to infection combined with mechanistic studies to identify the correlates of protection is critical to inform these approaches. The AIRU has played a key role in the national COVID-19 response and additional SAMRC funding was awarded to Prof Penny Moore to conduct this work.

For new pathogens or those that have proven refractory to vaccine development, the use of passively infused monoclonal antibodies for prevention and treatment is gaining momentum. The instant protection afforded by pathogen-specific antibodies makes this approach particularly appealing for outbreak situations such as COVID-19. Thus, efforts to identify and isolate anti-viral antibodies with therapeutic potential could assist in the fight against infectious diseases and help to identify better targets for vaccine design.

COVID-19 RELATED RESEARCH

Despite the lockdown restrictions imposed by the COVID-19 pandemic, the AIRU continued to function and indeed thrived in this period. During the initial stages non-essential research activities were put on hold but

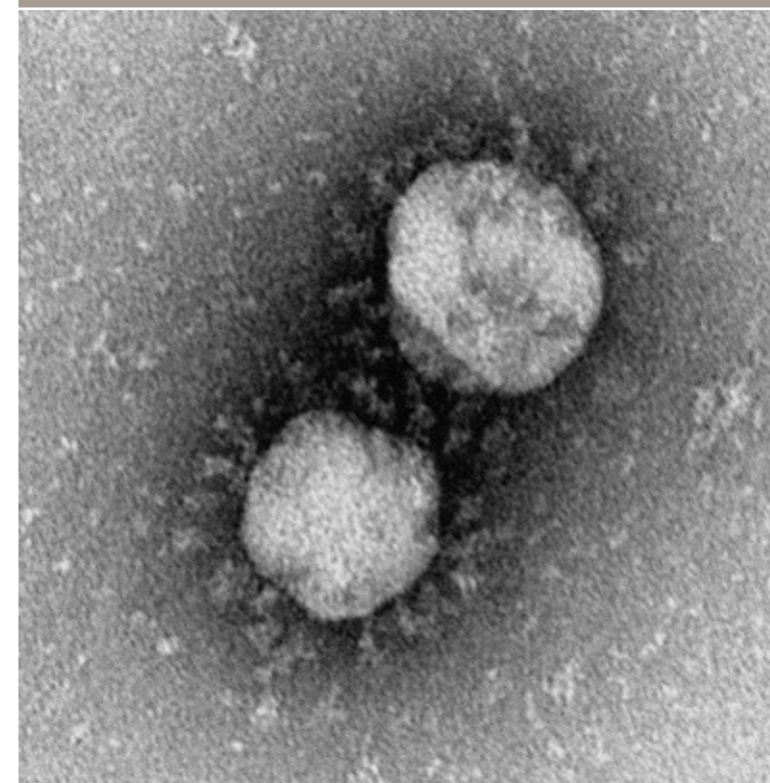
staff were allowed on-site to conduct COVID-19 related research. Risk-reduction protocols were implemented to enable staff and students to conduct research under safe COVID-19 compliant work conditions. The SARS-CoV-2 related research conducted in the AIRU in the past year has played an important role in understanding immunological responses in SARS-CoV-2 infected and vaccinated South Africans.

SARS-CoV-2 has been a major focus of the AIRU in the past year and is likely to dominate activities in the foreseeable future. Many of the pre-existing technologies and assays developed over the years by the AIRU laboratory for HIV-related research were adapted to studying SARS-CoV-2. Research activities included determining the titers, kinetics and durability of neutralizing antibodies to SARS-CoV-2 in longitudinal samples from individuals with mild disease and severe disease. The laboratory also investigated Fc effector functions, which are not well understood in coronavirus infections. We have also adapted our existing HIV platforms to isolate monoclonal antibodies from individuals previously shown to have potent neutralizing and/or Fc activity. Recombinant antibodies will be expressed and tested for neutralization capacity, epitope specificity and Fc effector function.

The pandemic has provided an opportunity to establish new collaborations, share resources and reagents and generate research data of national importance in a timescale never previously achieved. Although travel to congress and meetings has not been possible, virtual webinars and meetings have become accessible to a much larger audience enabling staff and students to easily participate and increase their knowledge base.



Lynn Morris vaccinated.



Corona=crown or circle of light Monica Birkhead NICD.

INNOVATIVE APPROACHES

The AIRU played a key role in generating the data for the Antibody Mediated Prevention (AMP) trial conducted in southern Africa (HVTN 703). AMP is the first efficacy trial of an HIV broadly neutralizing antibody – called VRC01 that targets the CD4 binding site. While the trial failed to show overall efficacy, it demonstrated that VRC01 blocked infection of highly sensitive viruses; important information for future passive antibody and vaccine trials. The data provided by AIRU was critical for assessments of neutralization sieving effects as a measure of protective efficacy and assisted in estimating protective neutralization titres.

Results were presented at the recent Research for Prevention (R4P) meeting and published in the **New England Journal of Medicine** in March 2021. As part of a new NIH grant with Prof Carolyn Williamson, we aim to understand why viruses sensitive to VRC01 established infection in individuals in the presence of VRC01 and to explore pathways to VRC01 resistance. The AIRU has also contributed to the assessments of antibody levels in the CAPRISA 012 trial that is testing CAP256-VRC26.25 for HIV prevention (led by Prof Salim Abdool Karim). Several additional studies using this antibody (many in combination with VRC07-523LS) are planned for both treatment and prevention in adults and children which the AIRU is actively participating in.

IMPACT ON POLICY AND PRACTICE

The ability to measure neutralizing antibodies to SARS-CoV-2 has become a critical factor in understanding COVID-19 pathology and vaccine efficacy. Fortunately, the team led by Prof Penny Moore was able to rapidly adapt the HIV pseudovirus neutralization assay to measure neutralization of SARS-CoV-2. Our years of experience in validating assays and the access to expertise and reagents through our collaborative networks was key. This assay was used to show that people who have recovered from SARS-CoV-2 infection all developed good levels of neutralizing antibodies. However, interrogation of viral sequences and using structural modeling Dr Kurt Wibmer and Dr Jinal Bhiman from the NICD hypothesized that the 501Y.V2 virus had acquired neutralization escape mutations. The team rapidly cloned and generated 501Y.V2 variant pseudoviruses and produced mutated proteins and antibodies to confirm this. Good titers were either lost or were severely affected when tested against the 501Y.V2 variant. This ground-breaking work was published in **Nature Medicine** and caused immediate concern for reinfection risk and COVID-19 vaccine efficacy. Devastatingly, these laboratory data were predictive of poor efficacy of the AstraZeneca vaccine which failed to block infection by the 501Y.V2 variant – published in **New England Journal of Medicine** by Prof Shabir Madhi and co-authored by Prof Penny Moore.

CAPACITY DEVELOPMENT AND MANAGING DIVERSITY

The laboratory actively trains postgraduate students (one Honours, seven Masters and five PhDs) and there is on-going training of staff most recently on SARS-CoV-2 neutralization assays. Over the last year the AIRU has hired 6 additional staff of whom 100% are black African and 68% are female. In addition, we have contracted three former staff members to work after-hours shifts to assist with the additional workload of COVID-19.

Dr Simone Richardson was awarded the L’Oreal UNESCO Women in Science South Africa Young Talents Postdoctoral award at the end of 2020. Dr Thandeka Moyo represented the Unit at a number of symposia on structural biology work she conducted as part of the START (Synchrotron Techniques for African Research and Technology) programme which included a talk titled “The structural biology landscape in South Africa: what role do synchrotrons play in African science?” at the African Light Source 2020 Virtual Workshop, 20 November 2020.

RESEARCH TRANSLATION

Research findings generated within the AIRU have been disseminated to the scientific community by both staff and students who presented data at virtual meetings and congresses (28 presentations in the 2020-2021 period). The AIRU receives funding from a number of agencies (SAMRC, NRF, NIH, Gates Foundation, IAVI and RCUK) and it is a requirement that we provide them with progress reports for the duration of the funding period.

In the past year Prof Penny Moore and Lynn Morris have engaged with local and international media on research undertaken in the AIRU relating to the SARS-CoV-2 pandemic. Unit scientists presented an interactive webinar to grade 11 and grade 12 scholars at the King’s School in Johannesburg and spoke about HIV, coronavirus and vaccine research. Dr Cathrine Scheepers gave COVID related presentations to St Catherine’ School, Standard Bank Retail/Design team and Neuropsychiatric Genetics Unit at the University of Stellenbosch. Prof Lynn Morris delivered the annual AJ Orenstein lecture at the University of the Witwatersrand. She also gave a TED Talk that has been viewed over 7,000 times.

- (https://www.ted.com/talks/lynn_morris_an_hiv_vaccine_is_what_the_world_needs_now).



REFLECTIONS ON 2020/21



Prof Penny Moore

The members of the AIRU have shown dedication and ingenuity in redeploying their skills, platforms and knowledge to make truly world-class contributions to understanding SARS-CoV-2 in South Africa. To manage to do this, while continuing to study pathogens such as HIV, influenza and cytomegalovirus is an incredible feat.



Dr Thandeka Moyo-Gwete

The past year has been a challenging time where adaptation was key. We have successfully transferred the skills we had already developed to tackle HIV-related antibody research to SARS-CoV-2 research. Our team managed to respond to the pandemic in a timely manner, expressing and purifying SARS-CoV-2 proteins within three months of the virus first being identified in South Africa and setting up our serology assays at the same time. I am excited to continue to contribute towards the fight against this novel virus.

SAMRC/CPUT CARDIOMETABOLIC HEALTH RESEARCH UNIT



Challenges are a part of the research environment and those that confront them are the ones that succeed. Every problem presents itself with opportunities, winners are those who find and act on those opportunities.

Prof Tandi Matsha Unit Director
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OVERVIEW

The SAMRC Extramural Unit for Cardiometabolic Health Research aims to employ a holistic approach to investigate the context specific pathophysiological factors associated with diabetes and related cardiometabolic traits. Thus, it provides a platform from which a team of researchers collaborate to provide an integrated research programme focusing on cardiometabolic traits (obesity, diabetes, hypertension, metabolic syndrome, and chronic kidney diseases): all with respect to inflammation, genetics, epigenetics, microbiome periodontal diseases and oxidative mechanisms.

RESEARCH CONDUCTED RELATING TO COVID-19

The unit has been very mindful of the effect of COVID-19 on the performance of the unit and its outputs. Because of limited laboratory exposure (due to lockdowns) leading to a significant decrease in laboratory related experiments and analysis, we have engaged in multiple academic activities on a weekly basis with all members of the unit using virtual platforms. These specifically include weekly meetings with staff and feedback from each postgraduate student in the unit. These activities ensure that staff and students continue to engage with each other and ensure that research outputs continue to be maintained. We have also used this opportunity to plan webinars and conferences that will take place in 2021.

The unit has been very active in COVID-19 related studies by collaborating in an international project that seeks to study COVID-19 patients being admitted either to hospitals or Intensive Care Units at the University of Nairobi (Jomo Kenyatta National Hospital, Nairobi, Kenya, Limpopo University, South Africa and Stellenbosch University Tygerberg Hospital, SAMRC/CPUT/Cardiometabolic Health Research Unit). The project seeks to establish amongst other things the microRNAs, biochemical and demographic factors associated with morbidity and mortality and specifically if specific microRNAs and biochemical markers including immunological ones can be used to stratify these risks. The pandemic allowed the unit to make use of media tools that allowed meetings between our external collaborators and ourselves.

The pandemic allowed the unit to self-reflect, strategise for its development. More importantly, it allowed time for extensive engagement with the students and mentors.

INNOVATIVE APPROACHES

By continuing to support research and capacity building despite severe limitations the unit has been able to assist two doctoral students in completing their theses and these are due to graduate in April 2021. Another two theses will be submitted by the 31st of March by two staff members. The unit during the reporting period has also organized webinars on Ethical Laboratory Practice, a national conference on point of care testing and published more than 15 peer reviewed publications.



CPUT/Cardiometabolic Health unit, oral health day March 2020.

IMPACT ON POLICY AND PRACTICE

Our research on novel biomarkers (glycated albumin) has resulted in an external collaboration with researchers from NIH. This collaboration has resulted in an accepted abstract by the American Diabetes Association's 81st Scientific Sessions. We believe that our research on microRNAs is paving the way ahead for other international researchers to validate our novel observations using large sample sizes and to determine how these results can be translated into making these biomarkers more specific by combining them with other biomarkers. We recently reported on microRNAs that performed superior to standard tests from assessing prediabetes. Our continued involvement with the NCD Risk Factor Collaboration has resulted in three publications in high impact factor journals such as the Lancet.

CAPACITY DEVELOPMENT AND MANAGING DIVERSITY

The unit has successfully completed supervision of four doctoral candidates. All these doctoral candidates are from diverse communities and have gender parity (two coloured females and two black males). The unit has made

a significant contribution to staff development in that two of these candidates are staff within the institution. The two completed doctoral students are expected to join the unit as postdoctoral fellows and therefore increase the staff capacity which in turn will promote productivity. The unit has been successful in having a diverse team of staff and students which is both gender and equity sensitive.

RESEARCH TRANSLATION

Our studies are community based, as such we take the responsibility of disseminating our findings to the community very seriously. At least twice a year we meet with the councillors and arrange slots to speak at community gatherings, or informal discussions. This year, members of the unit participated during the Oral Health Day, 20th March 2021. The unit in conjunction with Cape Peninsula University of Technology (CPUT) has also initiated a community project that is earmarked to be the Flagship project of CPUT. This project is based on the current activities of the unit.

SAMRC/SU GENOMICS OF BRAIN DISORDERS RESEARCH UNIT



Being resilient and taking care of ourselves has been essential in this turbulent time. Developing resiliency and providing support to others is equally important. We set up a Resiliency Clinic at Tygerberg Hospital/ Stellenbosch Hospital to support frontline staff.

Prof Soraya Seedat Unit Director
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OVERVIEW

The SAMRC Unit on Genomics of Brain Disorders (GBD) aims to identify genomic biomarkers, using a systems biology approach, for a suite of brain disorders (BDs) across the lifespan. Our aim to build sustainable research capacity in the genomics of BDs is facilitated by the highly collaborative nature of the Unit, which provides opportunities that contribute to the development of scientific maturity and independence in early-career scientists, and equips them with the skills necessary to conduct high-impact science.

- We also aim to secure funding for new projects, establish new African and international collaborations, produce scholarly outputs, and establish community partnerships (this has been initiated with the 'community science' SANeurogut project). SANeurogut has also initiated engagements within the private sector.
- In addition, Profs Hemmings and Seedat are members of the International Society of Psychiatric Genetics (ISPG) Global Diversity Task Force (<https://ispg.net/membership/committees/>) which Prof Seedat chairs. Prof Seedat has also been appointed as a member of ISPG Strategic Plan Task Force for 2021. Through the GBD we intend to intensify our involvement with the ISPG in 2021/2022.

OPPORTUNITIES FOR INNOVATION

Since March 2020, our monthly Unit meetings have been conducted virtually. We have found that, whilst not a substitute for in-person meetings, virtual meetings have facilitated increased participation and engagement at

meetings. Laboratory work and clinical research activities were suspended for many months in 2020. However, during this period, the Unit's focus was on data analysis and production of output. Currently, entry into the laboratory is carefully monitored, with timetables set up in advance to limit the number of individuals and adhere to social distancing regulations.

RESEARCH CONDUCTED RELATING TO COVID-19

- COH-FIT** (Collaborative Outcomes study on Health and Functioning during Infection Times), which tracks physical and mental health. To date, more than 121,000 participants have participated, with more than 2,500 SA participants. (SA PI: Prof S Seedat; coPI: Dr G Spies)
- COMET** (COVID-19 international survey on mental health) which includes COMET SA. This study is led by Vrije University in the Netherlands and examines the longitudinal course of mental health in the general population, to identify stresses that contribute to mental illness – depression, anxiety, PTSD, domestic violence, financial impacts, substance abuse, self-identified stressors. This study has assessed mental health in >7,700 people, including 525 South Africans, and shows early trends that SA experienced a much greater reduction in income without government support. Baseline assessment in May-June 2020 showed that SA had a significantly higher level of depression, anxiety and PTSD compared to 13 other countries. (PI: Prof S Seedat; coPI: Ms L Butler-Kruger)

- (iii) **Co-SPACE** (COVID-19: Supporting Parents, Adolescents and Children during Epidemics) led by Oxford University examines how families are coping during COVID-19, using parent-child surveys, with approximately 175 participants in South Africa. This study tracks the mental health of children and adolescents through the COVID-19 crisis, and seeks to identify what parental responses and actions protect children/adolescents from deteriorating mental health (over time, and at stress points) and how this may vary according to child and family characteristics. (SA coPI: Prof S Seedat)
- (iv) Pilot randomised controlled trial to test the effectiveness of a mobile app intervention to prevent COVID-19 related mental health sequelae in frontline clinicians. (PIs Prof S Seedat and Dr L vd Heuvel)
- (v) Prof Hemmings is currently part of a team investigating the genetics of COVID-19 in South Africa, and will be conducting a study on the mental health aspects of COVID-19 as part of this collaboration (pending ethics approval).

OPPORTUNITIES FOR INNOVATION

The pandemic and the subsequent “stay-at-home” regulations have allowed Unit members to navigate their way around virtual meetings, which has improved communication. In addition, it has provided members with the opportunity to “attend” virtual conferences and symposia that they would not have had the opportunity to attend in-person due to travel and accommodation costs abroad. Many of the members of our group have also been provided the opportunity to present at these conferences and symposia, which has widened the interest in our research, and has also facilitated networking with international colleagues.

The development and familiarity with online meeting platforms have also provided an opportunity for the Unit (in collaboration with Stellenbosch University’s Centre for Collaboration in Africa) to host a blended workshop which aims to map out needs, priorities, and teaching and training activities necessary to build effective and sustainable neuropsychiatric genomics capacity in Africa.

Our approach to investigating bipolar disorders (BDs) in South Africa is innovative as we aim to think beyond current clinical and diagnostic classification, and to facilitate phenotyping and analysis of cross-disorder subgroups and subtypes that have biological validity and may be able to better predict disease development or treatment response. Our molecular innovative approaches to investigating BDs include:

- conducting the first population-based study across South Africa to investigate gut microbial alterations in individuals with PTSD, anxiety and depression

- creating cellular models of Parkinson’s Disease (PD) and using these to study the functional effects of novel putative mutations that we identify. This is an important step as it is necessary to understand the mechanisms underlying PD to develop more effective drug targets
- investigating the blood microbiome in schizophrenia, PD and PTSD the first study investigating alterations in maternal and infant gut microbiome that associate with FASD development
- investigating the role of plasma-derived microRNA in PTSD
- investigating biological ageing constructs in PTSD, schizophrenia, and PD in South Africa
- initiating and optimising the establishment of induced pluripotent stem cells to investigate the molecular aetiology of PTSD, schizophrenia and PD.

IMPACT ON POLICY AND PRACTICE

We have initiated a number of projects that will lead to impactful results. These include:

1. investigating the role of functional dopamine- and serotonin-related genetic variants in reward and affective processing
2. optimising full-length 16S rRNA amplicon short-read sequencing and assembly on the Illumina iSeq100
3. exploring genetic and epigenetic regulation of genes ADCYAP1 and BRSK2 in rape-exposed women
4. investigating biological ageing constructs in PTSD
5. investigating the development of neuropsychiatric disorders using stem cell models
6. exploring the role of extracellular plasma and serum microRNA in predicting PTSD

These projects are highly innovative and have much potential to influence further research, and lead to collaborations on a global scale.

We are currently in the final stages of applying for an MSc in Neuroscience degree programme at Stellenbosch University. This programme will focus on genomics, imaging, bioinformatics, neuro-informatics, data mining and analysis of high-throughput ‘omics’ data and will be instrumental in establishing capacity in the neurosciences in South Africa. It will speak to the Department of Science and Innovation’s Research Infrastructure Roadmap, which has encouraged “omics” research and ensuring researchers’ access to world-class scientific knowledge.

CAPACITY DEVELOPMENT AND MANAGING DIVERSITY

The unit has welcomed three new MSc students (2021), and celebrated the graduation of two PhD students, Mr Sylvanus Toikumo and Miss Jani Nothling. In addition, two MSc students have recently submitted their theses for examination, with expected graduation in December 2021. Both students (one white male, one Indian female) will be pursuing PhD studies in the Unit. Two Ugandan prospective PhD candidates will be conducting molecular genetics studies in collaboration and under the supervision of the GBD Unit (Profs Hemmings and Seedat).

Prof Seedat, at the request of the Africa CDC, organized and co-hosted an 8- part webinar series between October-December 2020, inviting expert speakers from around the world, including from the African continent. The series was developed for mental health professionals and health care workers (HCWs) in general on the African continent and beyond, to build capacity in the screening, diagnosis and management of mental health sequelae of COVID-19 in their patients as well as providing HCWs with a toolkit to manage their own mental health and well-being.

RESEARCH TRANSLATION

As in-person meetings and conferences have not been possible for much of 2020, we have made use of social media accounts to engage with the public, and to relay information pertaining to the projects to the public. For example, the SANeurogut Facebook page (<https://www.facebook.com/saNeuroGut>) has 229 followers, and the Twitter account (@SANeuroGut) has 122 followers. These accounts provide information on study recruitment, the gut microbiome and mental health. The Parkinson’s Disease Twitter account (@PDresearchSU) has approximately, 186 followers with a possibility of a higher reach when tweets are retweeted/ liked. These accounts have facilitated student interest in our research and have also facilitated dissemination of information on BDs to the public.



REFLECTIONS ON 2020/21



Prof Soraya Bardien

2020 was a challenging year as we had to find different ways to continue to be productive while not being able to engage face-to-face with other students and staff members. Continuing to meet regularly via online platforms was important to keep up the ‘team spirit’ and to help some people cope with feelings of loneliness and depression. But the lockdown period presented a rather unique opportunity for final year students to work on completing their theses. Also, other students used the lockdown to work on and publish literature reviews related to their projects which will now become part of their theses.



**Prof Soraya Seedat,
Unit Director**

It was important early in the pandemic to alleviate anxiety by providing ready access to informational resources on mental and emotional well-being. We set up a webpage for staff, students and the public to access on the Department of Psychiatry website: <http://www.sun.ac.za/english/faculty/healthsciences/psychiatry/covid-19-resources>.

SAMRC/UP PRECISION PREVENTION AND NOVEL DRUG TARGETS FOR HIV-ASSOCIATED CANCERS RESEARCH UNIT



A time of Covid-19 has reminded us of what resilience is all about. Staying resilient in this era has rather become mandatory. Indeed, working together as a team, was important to maintain networks and work relationships through virtual meetings to track individual progress and outputs, to address challenges we may be facing and for support, and this brought extraordinary success to the unit. Furthermore, great leadership of the unit has brought forth extraordinary achievements from ordinary people like us.

Prof Zodwa Dlamini Unit Director
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OVERVIEW

The Precision Prevention and Novel Drug Targets for HIV Associate Cancers Extramural Research Unit (PPNDTHAC) seeks to map the landscape of cervical and oesophageal cancer in order to understand the underlying causes of these cancers and to discover targets for the development of novel and more effective targeted therapeutics.

The Unit is in line with the SAMRC Strategic Plan 2025 – Advancing the nation's health and quality of life is addressed by research in the unit that aims to discover targets and biomarkers for the development of novel and more effective targeted therapeutics. The unit has enrolled two PhDs and a postdoctoral fellow under this project which is aimed at developing capacity and building a critical mass in this area of research and both PhD candidates are medical specialists and this also is building capacity for clinician scientists working in the cutting edge area of cancer research. These are all black and therefore addressing inequity in capacity development and also research in this unit is aimed at "Reducing Cancer Health Disparities" which is a key challenge in the development of effective personalized cancer treatment strategies and better understanding of the mechanisms involved in these racial disparities in South Africa and the region.

Research in the unit also aligns to the SAMRC vision and mission by addressing innovation and research translation by working closely with clinicians who lead the projects and identify the problems in the clinic and discovery of targeted treatments innovations is done in the laboratory in collaboration with basic scientists. This "from bench to bedside and back" kind of research is cancer translational research.

RESILIENCE IN A TIME OF COVID-19

The unit suffered a very big setback as 2020 was the year when laboratories were going to be built to accommodate its research. Funds had to be directed to Covid-19 by the University and due to the lockdown, this was not going to be possible. The entire 2020/2021 was therefore just ruled out in terms of laboratory space. The construction will start in April which is the 2021/2022 SAMRC Financial Year and budgets have been approved by UP Executive Committee.

The Unit therefore adapted the working from home strategy and embarked on writing publications on some work that had already been done, recruited PhD students, and worked more on proposal writing, developing capacity by conducting online workshops for proposal writing, grant writing and offering an online course on Cancer Genomics 101 to the postgraduate students so that they are familiar with the cutting edge oncogenomics research that is conducted in this unit.

COVID-19-RELATED RESEARCH

- (a) The Unit Director is collaboratively applying for a National Institute for Health Research Global Health Research Centre (NIHR GHRC): **Cancer and Pre-Cancerous Conditions – Intersection of Lifestyle, Environment and Genetics Causing NCDs in Africa.** The Unit Director is going to be the LMIC (Low Middle Income Country) Lead Director while University of Nottingham will co-direct this Global Health Research Centre. The GHRC's broad objective is to determine, trial and test early detection mechanisms for cancer in at risk patients in Southern Africa using novel liquid biopsy, digital pathology, and AI informed screening. This will span from molecular and radiological testing to community-based projects and public health and policy initiatives. One of its five arms is the: Early detection of lung cancer using autoantibody screening and AI and remote assessment of CT scanning in patients with symptomatic lung disease including long term smokers, chronic cough, **long-haul Covid**, and chronic obstructive pulmonary disease(COPD). This is not dependant on whether we get funding or not and we are forging ahead and have built a team across many departments at the University of Pretoria, University of KwaZulu-Natal, Walter Sisulu University, University of Limpopo and the Sefako Makgatho Health Science University (SMU) and University of Nottingham and we will continue to apply for other funding. The main objective here is to build a critical mass in the area of this NCD. The Unit has a resident pathologist who has built her PhD proposal around Covid-19 and Lung disease and this falls under this GHRC and she is applying for an NRF Thuthulka grant for this and will also apply for the SAMRC Clinician Scientist Fellowship.
- (b) There has been an opportunity presented to the Unit by being approached by the University of Nottingham to coordinate and get involved in the Scancell Covid-19 Vaccine. The Unit Director first coordinated the signing of a partnership agreement between the University of Pretoria and University of Nottingham to make it easy to implement this project. This vaccine was repurposed for Covid-19 from a melanoma vaccine by the collaborators of the Unit Director at the University of Nottingham. Two meetings have occurred in taking this vaccine forward which takes account of the current South African variant and the next meeting was on the 30th of March to give an update and agree on the Clinical Trials Phase 2 and 3 in South Africa.

INNOVATIVE APPROACHES

All the ten (10) registered PhD projects are implementing innovative approaches or programmes in AI and precision oncology including convergence oncology. This is in support of the SAMRC Strategic Goal 3 "Support, through funding and other mechanisms, technology development and implementation, translation of research into policy and practice, and innovations in health and technology delivery to improve health" by having a number of ongoing PhD innovation and technology projects aimed at developing, testing and/or implementing new or improved health solutions. All projects in the Unit are translational cancer research projects aimed at bringing new solutions and improved health outcomes and influencing policy. Given time this unit will be able to contribute immensely to SAMRC Strategic Goals as it has delivered within its shortest time of its existence and challenges of laboratory space.

IMPACT ON POLICY AND PRACTICE

Having to concede that this Unit is new and started around 6 months (September 2019) into Covid-19 challenges but it really made an impact especially in influencing new research. This unit has played a huge role and formed the basis in the creation of the Pan African Cancer Research Institute (PACRI) at the University of Pretoria and contributed to capacity building funding in this project. The unit also has formed the basis for the grant application for the proposed Global Health Research Centre between the University of Nottingham and the University of Pretoria and the Unit Director being the LMIC PI and Director for this GHRC. This will focus on early detection and precision medicine in cancers linked to their pre-cancerous states, including lung and COPD including Covid long haulers, cervical (HIV and HPV infection), by piloting/evaluating community based screening programmes including improved existing systems such as molecular technologies of liquid biopsy for community-based risk stratification. This will have a long-term impact of this NIHR-CHRC in improving health outcomes and reducing health inequalities, capacity building for early detection and precision medicine, strengthening health systems and the long-term sustainable growth of the Africa research ecosystem and strengthening economic development in Africa in support of UN SDGs. This unit also has brought an opportunity of an additional Covid-19 Scancell Vaccine to the University of Pretoria for possible clinical trials and also, this may have a long term impact on improving the health of the nation and internationally.

CAPACITY DEVELOPMENT AND MANAGING DIVERSITY

Currently the Unit has managed to register 10 PhD and one Masters student and nine being clinician scientists and that is implementing of building a critical mass of cancer researchers in the country. All the 11 students are South African Black and two Indian/Asian in origin which brings diversity to cutting edge cancer research in the country. One of the Unit's postdocs, Dr Flavia Francies, young Indian female, got awarded the prestigious DST Innovation postdoctoral award for 2021. Three PhD candidates also got an NRF PhD Scholarships (two black South African males and one black South African female), two got Discovery Health PhD Scholarships (one young black South African and one black South African young male) and one got SAMRC Clinician Scientist Fellowship (one young black South African male).

As the Director of the Unit, I contributed to the success of these funding awards as I was involved in all the applications and proposals writing and guidance for all. All this is the way of enhancing capacity development. Dr Rahaba Marima, the Unit's Senior Scientific Officer, also a black young female, has been awarded the Global Scholar In Training Award (GSITA) 2021 by the American Association for Cancer Research (AACR) and that was through my mentorship as the Director of the Unit and guided her to apply for the scholar in training and submit an abstract to the AACR which was accepted and will be presented in April 2021 during this international Annual Meeting.

I took it upon myself to train my team to publish and made sure that I give them support and they increased their publication outputs and were first authors in where they lead the publications and they published in peer reviewed international journals with reasonably good impact factors and I made them understand the importance of all this in developing their careers. As A Director I also conducted workshops for grant writing and proposal writing for all staff and PhD Students especially those who qualify to apply for NRF Thuthuka Programmes, SAMRC fellowships and Discovery Fellowships. Most of them have no grant writing skills and now their capacities have been developed in that area for the benefit of their research now and in the future.

RESEARCH TRANSLATION

I have become involved in 2020 with the partnership between Steve Biko Academic Hospital and AstraZeneca Phakamisa project which is for cancer awareness and screening, control, and prevention. I gave a talk in the launch at Steve Biko Hospital in November 2020. I will continue getting involved and the proposed Global Cancer Research Centre (GHRC) between University of Nottingham will also enhance translating research in the unit especially cervical cancer by running a large scale trial of home HPV testing followed by tele-digital pathology compared with standard smear tests, as well as involvement in completing the build of the African Cancer Genome Atlas (ACGA) and studies to investigate risk and susceptibility databases for African cancers.

SAMRC/UCT WOUND HEALING AND KELOID SCARRING RESEARCH UNIT



Adaptability is the name of the pandemic game.

Prof Nonhlanhla Khumalo Unit Director
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OVERVIEW

Wounds heal with flat or raised disfiguring scars called keloids. Keloids are unsightly, itchy and impair the quality of life. The prevalence is highest in people of African ancestry (> 10 %). There is no effective medical treatment and with >80% recurrence rate after surgery, most keloid patients are left untreated. Therefore, keloids constitute a major clinical challenge and a substantial health care burden.

South African dermatology has a well-established clinical training programme but a non-existent laboratory research culture in exploring the pathophysiology of skin diseases. This SAMRC Unit in Wound and Keloid Research offers a unique opportunity to establish the first African translational research programme in cutaneous scarring within a dermatology department in Africa.

IMPACTFUL RESEARCH AND CAPACITY DEVELOPMENT

The unit has participated in clinical patient management in medical wards. Research is conducted on Venous stasis ulcer – to look at hospital admission for COVID-19 and influence to wound healing. One of our PhD students has recently completed major work that has culminated in the identification of four potential treatments and/or prognosis targets for keloids. We are in the process of confirming initial validations and planning functional work for these targets.

This Unit is part of the Hair and Skin Research (HSR) Lab which the Director founded in 2014 and was officially launched in 2015. The HSR Lab is the first dedicated hair and skin research in the country. In a few years it has grown from one Principal Investigator (PI) and one technician to five Lead Investigators (Principal Investigators) supervising two Masters students, 20 PhD students, three technicians



REFLECTIONS ON 2020/21



Rele Matobole
(PhD Student – thesis submitted March 2021)

Keeping an open mind, unlearning and learning new skills is the key to success.



Philisiwe Molefe (PhD Student – started 2020)

It's backbreaking to try to recover lost time working under strict social distancing schedules.

and three postdocs – all but one is black African and of mixed-race ancestry. We are also the first to register a formal university training programme for scientists to produce cosmetics.

For this Advanced Diploma in Cosmetic Formulation Science program, we preferentially enrol unemployed chemistry graduates. In the first three years we graduated 32 students all of whom are now in employment – with a handful starting small companies. We expect to graduate an additional 14 diploma students in 2021.



SAMRC COLLABORATING CENTRES & TB REPORT SA

SAMRC TB HIV COLLABORATING CENTRES

The South African Medical Research Council (SAMRC) has HIV/TB Centres based at various universities in South Africa focusing on research into one of the four major epidemics facing the country, HIV and Tuberculosis (TB). The Centres were established in 2015 for multidisciplinary

research to reduce the HIV/AIDS and TB burden. To ensure the Centres' sustainability, a joint programme with the National Institutes for Health was established to create RePORTSA, for these centres to apply for TB RePORT SA and RePORT requests for applications.

 <p>TUBERCULOSIS COLLABORATING CENTRE FOR CHILD HEALTH (TB-CHILD) Contact: Prof Mark Nicol mark.nicol@uct.ac.za</p>	 <p>ADVANCING CARE AND TREATMENT (ACT) FOR TB/HIV Contact: Prof Gavin Churchyard GChurchyard@auruminstitute.org</p>
 <p>SOWETO MATLOSANA SAMRC COLLABORATING CENTRE FOR HIV/AIDS AND TB Contact: Dr Neil Martinson Martinson@phru.co.za</p>	 <p>CENTRE FOR TUBERCULOSIS BIOMARKER-TARGETED INTERVENTION Contact: Ass Prof Mark Hatherill mark.hatherill@uct.ac.za</p>
 <p>CLINICAL AND COMMUNITY HIV-TUBERCULOSIS RESEARCH COLLABORATING CENTRE Contact: Prof Graeme Meintjes graeme.meintjes@uct.ac.za</p>	 <p>WITS CLINICAL HIV/TB RESEARCH UNIT Contact: Ass Prof Ian Sanne isanne@witshealth.co.za</p>
 <p>WITS RHI COLLABORATING CENTRE FOR HIV/AIDS Contact: Prof Helen Rees hrees@wrhi.ac.za</p>	 <p>TB FREE THROUGH RESEARCH AND INNOVATION Contact: Prof Keertan Dheda keertan.dheda@uct.ac.za</p>
 <p>CENTRE FOR BASIC AND TRANSLATIONAL HUMAN TB RESEARCH Contact: Prof Adrie Steyn adrie.steyn@k-rith.org</p>	 <p>TYGERBERG SAMRC COLLABORATING CENTRE FOR HIV LABORATORY RESEARCH Contact: Prof Wolfgang preiser@sun.ac.za</p>

CLINICAL CANCER RESEARCH CENTRES

Also in 2015, two Clinical Cancer Research Centres (CCRCs) at medical schools/hospitals were established to integrate cancer-related research programmes in fields such as basic laboratory and clinical sciences, prevention and control methodologies, as well as population-based studies for a transdisciplinary cancer research centre that straddles departmental and institutional boundaries.

- SAMRC/UCT Gynaecological Cancer Research Centre (GCRC)
- SAMRC/Wits Common Epithelial Cancer Research Centre



COMMUNICATIONS AND STAKEHOLDER ENGAGEMENTS

COLLABORATING WITH STAKEHOLDERS TO DELIVER ON OUR BRAND PROMISE

The Corporate and Marketing Communications Division in partnership with internal and external stakeholders, adapted to the new norm and continued to deliver on its mandate during the 2020/21 reporting period.

Regular networking and collaborative opportunities brought about increased value and knowledge, which ultimately aimed at finding solutions to health challenges.

Testimony to the SAMRC's unwavering need to advance life, the organisation was able to host several webinars, virtual events, and meetings, to collectively bring experts together and pioneer the way forward.

2020 International Year of the Nurse and Midwife campaign

Corporate and Marketing Communications on behalf of the SAMRC, together with The Department of Nursing and Midwifery Stellenbosch University, partnered on a campaign to observe the call by WHO to highlight and celebrate Nurses and Midwives. This presented a unique opportunity to recognise and showcase the work and contributions of nurses and midwives to patients and to the health system more broadly.

As part of the campaign a webinar discussion titled "Engaged Citizenship" was led by Minister Nomafrench Mbombo – Western Cape Provincial Minister of Health and Prof Glenda Gray, President and CEO of the SAMRC.

Mbombo and Gray were joined by Prof Hester Klopper, Deputy Vice Chancellor for Strategy and Internationalisation at Stellenbosch University, Prof Eunice Ndirangu, Dean of the School of Nursing and Midwifery, Aga Khan University, East Africa, Prof Lydia Aziato, Dean at the School of Nursing and Midwifery, University of Ghana, Prof Portia Jordan, Board member of FUNDISA.



Carron Finnan, Corporate and Marketing Communications SAMRC, Prof Julia Blitz, Deputy Dean, Teaching and Learning, Faculty of Medicine and Health Sciences, Nomafrench Mbombo, Western Cape Provincial Minister of Health, Prof Glenda Gray, President and CEO SAMRC, Prof Hester Klopper, Deputy Vice Chancellor, SU: Strategy, Prof Portia Jordan – Board member FUNDISA, Executive Head, Department of Nursing and Midwifery SU and Prof Doreen Social Impact, Department of Nursing and Midwifery, SU.

Champion Women

Champion Women Campaign 2020

In August of 2020, we recognised through a range of communication platforms, over 30 exceptional women through the Champion Women's Month campaign. The nominated women represented various research units, platforms, and divisions.



Youth month Campaign

During the 2020 Youth Month, the SAMRC recognised some of its amazing young and emerging science leaders poised to make a difference by improving the health of South Africans. We shared their journeys and current research projects on different SAMRC platforms, including social media, with the aim to inspire the youth to enter the field of science. The campaign demonstrated the impact of supporting and investing in young scientists.



Our world needs you campaign

Themed "OUR WORLD NEEDS YOU", the campaign's overarching aim was to show how protecting our own health goes hand-in-hand with protecting the health of our environment. Elements of the campaign included the production of a poster encouraging everyone to decrease energy consumption by using the stairs often – in turn leading to being more active and healthier while reducing the risk of obesity and other lifestyle diseases.

World Environment Day 2020

The campaign highlighted how COVID-19 is directly linked to interactions between humans and the environment, and how we need to protect and respect biodiversity and protect our ecosystems, to protect our health and preserve the planet for future posterity.





HIGHLIGHTS OF SOME WEBINAR ENGAGEMENTS

A Collaborative Medical Profession Response to the COVID-19 Pandemic

Hosted by: SAMRC & Progressive Health Forum (PHF)

The webinar focused on the need for an integrated public-private clinician-led response to the crisis, covering the necessary ethical imperatives and modalities of collaboration, as well as an enabling framework for an integrated response.

SAMRC President, Prof Glenda Gray, presented under the topic: A Public-Private Clinician-led Response to COVID-19.



Clinical Collaboration in the time of COVID-19, 2 July 2020

Co-hosted by: Professors Glenda Gray and Lydia Cairncross

The objective of the webinar was to share the experiences of the Western Cape response to COVID-19 in an effort to support the responses of other provinces. To build synergies and coherence of approach in the public and private sector to ensure equity in patient care.

Panelists: Marc Mendelson, Ivan Joubert, Usha Lalla, Helen van der Plas, Ayanda Mnguni, Coenie Koegelenberg; Greg Calligaro, Neshaad Schrueder.

COVID-19 and the paradigm shift in facility management, 3 July 2020

Facilitated by Professor Marti van der Walt, SAMRC TB Platform Director & Ms Peta der Jager – CSIR

Presenters: Dr Adrian Duse, Dr Leslie Davenish, Mr Tobias van Reenem and Mr Mark Williams

SAMRC and the Council for Scientific and Industrial Research (CSIR) hosted three webinars on COVID-19 and the workplace. The webinars focused on the realities and challenges of facilities management and safeguarding employees as South Africans return to work.

Airborne transmission of tuberculosis in the built environment, the microbiome of the office environment, cleaning of surfaces and risk management.

Presenter: Professor Anton Stoltz from CSIR

Travel between office and home- the Singapore case study and non-chemical disinfection, 10 July 2020

The unanticipated costs of Covid-19 to the NCD burden of South Africa and the whole of the continent

Theme: Human development in the time of COVID-19: July 29

Hosted by DSI-NRF Centre of Excellence in Human Development, Global Health Research Institute at the University of Southampton, in partnership with SAMRC-Wits Developmental Pathways for Health Research Unit, SAMRC and DOHaD Africa.



COVID-19 and TB, 3 August 2020

Hosted by Professor Martie van de Walt, SAMRC Director for TB Platform

What is the role of health promotion in the Covid era, 7 August 2020

Topic: Promoting Health in a pandemic: What can we learn from Covid-19?

Hosted by: SAMRC and Public Health Association of South Africa (PHASA)

Emerging Research and Practice on GBV in the time of COVID-19, 27 August 2020

Hosted by the SAMRC Gender & Health Research Unit

Topic: Emerging research and practice on gender-based violence in the time of COVID-19

Presenters: Dr Pinky Mahlangu and Professor Rachel Jewkes, Mr Dumisani Rebombo from Yanani and Ms Laura Washington from Project Empower



2020 International Year of the Nurse and Midwife – Engaged Citizenship, 19 October 2020

The SAMRC, together with Stellenbosch University, hosted a webinar under the theme: Engaged Citizenship, acknowledging the contribution of Nurses and Midwives in combating the Covid-19 pandemic.

A (K)new World Reimagined Webinar Series, 17 September 2020

This webinar focused on Post COVID-19: Vaccine development, distribution and justice

Moderator:

Tanya Charles, Program and Impact Lead: Atlantic Institute.



MEDIA BRIEFING
Important Update On Vaccines
Date: **Sunday, 07 February 2021**
Time: **19:00**

Panelists include:

- Prof Shabir Madhi
- Prof Glenda Gray
- Prof Barry Schoub
- Prof Salim Abdool Karim

Chaired by:
Minister of Health, Dr Zweli Mkhize

Broadcast Platforms:
Major news linear channels and live-streaming on DOH Facebook

Presenters

Prof Glenda Gray, President and CEO: SAMRC
Prof Allen Buchanan, Distinguished Professor Emeritus of Philosophy: Duke University
Tian Johnson, Convenor: Global Civil Society Platform for COVID-19 Research and Advocacy

Promoting an understanding of the intersections between violence against women and children, 22 September 2020

Topic: *How do INSPIRE and RESPECT support an intersectional approach?*

Moderator:

Shanaaz Mathews, Children's Institute (University of Cape Town)

Speakers:

Alessandra Guedes, UNICEF Office of Research, Innocenti Elizabeth Dartnall and Anik Gevers, Sexual Violence Research Initiative

Rape survivors need comprehensive, long-term support to prevent HIV, 1 December 2020

This webinar discussed evidence from The Rape Impact Cohort Evaluation (RICE) Study.

Chair

Prof Glenda Gray, President and CEO, SAMRC

Q & A Facilitator

Dr Nwabisa Shai, Specialist Scientist, Gender and Health Research Unit

Speakers

Prof Naeemah Abrahams, Director, Gender and Health Research Unit, Dr Tlaleng Mofokeng, UN Special Rapporteur on the Right to Health, Dr Claudia Garcia-Moreno, WHO, Lead on Violence Against Women.

Dr Thato Chidarikire, Director of HIV Prevention Programmes, NDoH, South Africa, Adv Pierre Smith, Acting Special Director of Public Prosecution, NPA.

Accelerating Access to Palliative Care COVID & Beyond Webinar, 24 January 2021

This webinar was co-hosted by the SAMRC and the Palliative Care Action Group, with the aim to highlight the imperative for a concerted and collaborative effort to access palliative care. Furthermore, to spotlight current issues of dignity of care and patients dying in isolation.

Guest speakers

Ms. Juanita Arendse, Chief Director: Emergency & Clinical Services Support at Western Cape Government Mrs. Nancy Mini, Professional Nurse, Mrs Tersia Burger, CEO of Stepping Stones Hospice, Ms. Shivani Ranchod, Health Actuary and CEO: Percept Health, Mark Heywood, Editor: Maverick Citizen, Prof Glenda Gray, President and CEO: SAMRC.

Pharmacogenomics Portfolio in Precision Medicine Virtual Brief Webinar, 8 February 2021

This webinar showcased the cutting-edge precision medicine research and innovation portfolio of the SAMRC, supported by the Department of Science and Innovation (DSI) through the Strategic Health Innovation Partnerships (SHIP) funding program.

Key Speakers

Prof Glenda Gray, President and CEO: SAMRC, Dr Glaudina Loots, Director: Health Innovation, DSI Dr Timothy Newman, Manager: DIPLOMICS, Prof Collet Dandara, Division of Human Genetics, Department of Pathology and Institute of Infectious Disease and Molecular Medicine (IDM), Prof Paul Ruff, Division of Medical Oncology, Department of Medicine: Wits, Dr Iman van den Bout, Centre for euroendocrinology: UP, Prof Robert Millar, Department of Immunology: UP, Prof Maritha Kotze, Division of Chemical Pathology: SU, Prof Jonathan Peter, The Lung Institute: UCT.

Violence Against Women Prevalence Estimates – Webinar, 15 March 2021

This webinar focused on new prevalence estimates on violence against women, including global, regional, and national prevalence estimates for both intimate partner and non-partner sexual violence against women. Speakers from Canada, Pacific Islands, Egypt, Brazil and the UN.

MEDIA RELATIONS MANAGEMENT

Press Releases

SAMRC issued 31 press releases during the 2020/21 reporting period, which can be accessed on the SAMRC website: www.samrc.ac.za/media

Media Performance

The independently measured media performance of the SAMRC is reflected below:

TITLE	AVE VALUE MEASURED
AVE generated for print media	R19 453 242
AVE generated for broadcast media	R6 149 679
AVE generated for online media	R6 398 610
Total AVE generated by the SAMRC (1 April 2019 – 31 March 2020)	R32 001 531



PART C GOVERNANCE

INTRODUCTION

Corporate governance embodies processes and systems by which an organisation is directed, controlled, and held to account. As a Section 3A public entity, corporate governance at the SAMRC is guided by its enabling legislation, the SAMRC Act 58 of 1991, the precepts of the Public Finance Management Act 1 of 1999, as amended and the principles contained within the King Report on Corporate Governance. The SAMRC is accountable to Parliament for its performance and management of its budget.

The SAMRC Act provides for the appointment of a Board by its executive authority, the National Minister of Health. The Board as the accounting authority, in turn, is responsible for the corporate governance of the SAMRC. This includes fiduciary responsibilities and ensuring compliance with legislative and regulatory requirements. Furthermore, the SAMRC Board appoints the SAMRC President, who carries the responsibility for implementing the Board's mandate. The SAMRC President heads the SAMRC Executive Management Committee, which the SAMRC Act assigns responsibility for the day-to-day management of the organisation.

OUR LEGAL CONTEXT

Constitutional mandate

The Constitutional (Constitution of the Republic of South Africa Act, 1996 (Act 108 of 1996, as amended) base that supports the SAMRC's mandate is:

- Section 10 (right to human dignity);
- Section 11 (right to life);
- Section 12 (right to freedom and security of the person);
- Section 14 (right to privacy)
- Section 24 (right to environment that is not harmful to health)
- Section 27 (right to healthcare, food, water, and social security).

In the Constitutional context, the outcome of SAMRC work must translate to some tangible/realisable proposition addressing one of these areas.

Statutory & other mandates

The Legal & Compliance Services Division of the SAMRC has identified 49 Acts of Parliament (with 23 of those characterised as primary (i.e. non-compliance therewith or parts thereof would be catastrophic to the business/mandate of the SAMRC). Further to that, 7 Good Practice Standards (local and international) have been identified to be applicable to the SAMRC. Last, 10 Regulatory Authorities have been identified to have authority over the business or conduct of the SAMRC.

The 51 Acts include the following:

- SAMRC Act 58 of 1991, as amended
This is the enabling and founding legislation creating the SAMRC. It is instructive on the mandate of the SAMRC and the prioritisation of its research programmes. The SAMRC Act empowers the functional and authoritative structures of the SAMRC to source/employ such resources and engage the Executive Authority and such other key stakeholders as may be appropriate to give effect to the mandate of the SAMRC. The SAMRC Act is currently under review. The SAMRC Board, the NDoH, the NDoST and the Parliamentary Portfolio Committee of Health have been briefed about the contemplated review of the SAMRC Act.
- The National Health Act 61 of 2003
- Intellectual Property, Rights from Publicly Financed Research and Development Act, 2008
- Employment Equity Act 55 of 1998
- Labour Relations Act 66 of 1995, as amended
- Employment Equity Act 55 of 1998, as amended
- Basic Conditions of Employment Act 75 of 1997, as amended
- Public Finance Management Act (No.1 of 1999 as amended by Act 29 of 1999)
- The Patents Act 57 of 1978
- Copyright Act 98 of 1978 Trademarks Act 194 of 1993
- Designs Act 195 of 1993
- Implementation of Official Languages Act 12 of 2012
- Protection of Personal Information Act 4 of 2013

The Good Practice Codes include:

- King Code on Corporate Governance
- Good Clinical Practices (GCP)
- Good Laboratory Practices (GLP)

The Regulatory Authorities include:

- Information Regulator created in terms of the Protection of Personal Information Act
- South African Revenue Services
- Health Professions Council of South Africa

All these instruments are constantly monitored to attend to necessary reviews as and when public policy, professional practice and legislative changes are initiated.

Corporate governance embodies processes and systems by which public entities are directed, controlled and held to account. In addition to legislative requirements based on a public entity's enabling legislation and Companies Act, corporate governance, with regard to public entities, is applied through the precepts of the PFMA and run in tandem with the principles contained within the King Report on Corporate Governance.

All these instruments are constantly monitored to attend to necessary reviews as and when public policy, professional practice and legislative changes are initiated.

OUR BOARD

The role of our Board is set out in the South African Medical Research Council Act of 1991 and states that "the affairs of the SAMRC shall be managed and controlled by a Board, which shall, subject to the provisions of this Act, determine the policy and objectives of the SAMRC and exercise control generally over the performance of its functions, the exercise of its powers and the execution of its duties".

The Board Charter details the role and responsibilities of the Board, as follows –

1. The Board is ultimately accountable and responsible for the management and control of the affairs of the SAMRC subject to the provisions of the SAMRC Act. The Board determines the policies and objectives of the SAMRC and exercises control generally over the performance of its functions, the exercise of its powers and the execution of its duties.
2. To the extent that it is not contrary to the provisions enabling legislation or the powers of the Executive Authority, the Board or its Committees have the responsibility to manage the conduct of individual members of the Board/Board Committee as the case may be, including referral to the Executive Authority for appropriate intervention.
3. The Board constitutes the focal point and custodian of corporate governance in the SAMRC by managing its relationship with management and stakeholders along sound corporate governance principles. Accordingly, the SAMRC must be headed and controlled by an effective and efficient Board, comprising of Executive and Non-Executive members in order to ensure independence and objectivity in decision-making.

4. The Board must appreciate that strategy, risk, performance and sustainability are inseparable and to give effect to this by:
 - a) Contributing to and approving the SAMRC's strategy
 - b) Satisfying itself that the strategy and business plans do not give rise to risks that have not been thoroughly assessed by management
 - c) Identifying key performance and risk areas
 - d) Ensuring that the strategy will result in sustainable outcomes
 - e) Considering sustainability as a business opportunity that guides strategy formulation
5. The Board has absolute responsibility for the performance of the entity and is accountable for such Performance. As a result, the Board should give strategic direction to the SAMRC.
6. The Board must appoint and evaluate the performance of the President, Vice Presidents, the Chief Financial Officer and other members of the EMC and ensure that an effective succession plan is in place and adhered to for all key executive posts.
7. The Board must retain full and effective control over the SAMRC and monitor management in implementing Board decisions, plans and strategies.
8. The Board must ensure that the SAMRC is and is seen to be a responsible corporate citizen by having regard to not only the financial aspects of the business of the SAMRC but also the impact that business operations have on the environment and the society within which it operates.
9. The Board must ensure that the SAMRC ethics are managed effectively.

10. The Board must ensure that the SAMRC establishes and maintains:
 - a) effective, efficient, and transparent systems of financial management, risk management and internal control
 - b) a system of internal audit under the control and direction of an audit committee complying with, and operating in accordance with, the regulations and instructions which are set out in Sections 76 and 77 of the PFMA
 - c) an appropriate procurement and provisioning system that is fair, equitable, transparent, competitive and cost effective;
 - d) a system for properly evaluating all major capital projects prior to the final decision on a project.
11. The Board is responsible for the governance of risk.
12. The Board is responsible for information technology (IT) governance.
13. The Board must ensure that the SAMRC complies with applicable laws and considers adherence to non-binding rules and standards.
14. The Board must approve and ensure that the SAMRC submits all reports, returns, notices and other information required by Parliament, the Executive Authority and Treasury.
15. The Board must appreciate that stakeholder's perceptions affect the SAMRC's reputation.
16. The Board must approve the SAMRC's five-year Strategic Plan before submission to the Executive Authority.
17. The Board must approve the SAMRC's Annual Report, Compliance Report(s), Strategic Plan and Annual Performance Plan before submission to the Executive Authority.
18. The Board must approve the SAMRC's Annual Financial Statements before submission to the Auditor General and subsequently to the executive authority.
19. The Board must approve the SAMRC's budget for the financial year in the prescribed format before submission to Treasury and the executive authority.
20. The Board must take effective and appropriate steps to prevent irregular and fruitless and wasteful expenditure, losses resulting from criminal conduct, and expenditure not complying with the operational policies of the SAMRC.

21. The Board must ensure that the SAMRC conducts an independent institutional review every five years.
22. The Board must act in the best interests of the SAMRC by ensuring that individual members of the Board:
 - a) adhere to legal standards of conduct
 - b) are permitted to take independent advice in connection with their duties following an agreed procedure
 - c) participate in the deliberations and are enabled to vote for the approval or rejection of a motion/proposal/or recommendation placed before them
 - d) disclose real or perceived conflicts to the Board and deal with them accordingly. As such, the Board must compile and retain a register of interests for all Board members and update this register once every year.
23. The Board should do everything necessary to fulfil its role set out above.

The Act furthermore mandates the Board to designate an Executive Management Committee, consisting of the President and other members who are employees of the SAMRC, and who, subject to the directives and control of the Board, are responsible for managing the affairs of the organisation in accordance with the objects and policy of the SAMRC.

BOARD CHARTER

The Board Charter sets out the Board's role and responsibilities, as well as the requirements for its composition and meeting procedures.

The Charter is reviewed annually to ensure that the Board remains compliant with legislation and trends in corporate governance. The review of the Charter took place at the Board meeting held on 30 July 2020 and no amendments to the Charter were deemed necessary.

The Board Charter requires an annual assessment to be conducted of the Board, its Sub-Committees and individual members, including the Chairperson. The evaluation is in the form of a self-assessment completed by every member of the Board and was conducted in December 2020.

BOARD MEMBERS

1 NOVEMBER 2020 – 31 MARCH 2021



PROF JOHNNY MAHLANGU
CHAIRPERSON



PROF LINDA SKAAL
VICE CHAIRPERSON



PROF SITHEMBISO VELAPHI



PROF BRANDON SHAW



PROF THOLENE SODI



PROF LINDIWE ZUNGU



PROF WILLIAM RAE



PROF COLLET DANDARA



DR MZIWANDILE MADIKIZELA



PROF EMMANUEL MUKWEVHO



PROF RONELLE CAROLISSEN



PROF THANDISIZWE MAVUNDLA



PROF TIMOTHY TUCKER



PROF EUNICE SEEKOE



ADV DOROTHY KHOSA



MS JUNE WILLIAMS



PROF GLENDA GRAY

COMPOSITION OF BOARD: 1 APRIL 2020 – 31 MARCH 2021

NAME	DESIGNATION (In terms of the Public Entity Board structure)	DATE APPOINTED	DATE RESIGNED	QUALIFICATIONS	AREA OF EXPERTISE	BOARD DIRECTORSHIPS (LIST THE ENTITIES)	OTHER COMMITTEES OR TASK TEAMS (e.g.: Audit Committee/ Ministerial Task Team)		NO. OF MEETINGS ATTENDED
							Board	Exco	
Prof J Mahlangu	Chairperson	1 Nov 2016	n/a	MMed (Haem), clinical haematology subspecialist; Cert Clin Haem, Clinical haematology subspecialist; FCPATH, Haematologist; MBChB, Medical practitioner; BSc (Lab Med), Scientist	Clinical Haematologist with special interest in haemostasis and thrombosis, clinical trials and other aspects of clinical and diagnostic haematology and pathology.	<ul style="list-style-type: none"> Polymyelitis Research Foundation Board. WITS Health Consortium Board 	Board	Exco	8 1
Prof L Zungu	Member	1 Nov 2016	n/a	BCur; Diploma in Nursing Education and Administration; Primary Health Care Certificate; BCur (Hons) in Community Health Nursing; Evaluation, MCur in Community Health Nursing; PhD in Occupational Health Nursing; Health Practitioner's Dispensing Course; Post Graduate Diploma in International Research Ethic	Occupational health and safety; Community Health	<ul style="list-style-type: none"> Member of the Examination Board at Texila American University (TAU) in India 	Board	REMCO	8 5
Prof W Rae	Member	1 Nov 2016	n/a	PhD (UFS); MMedSc (UCT); Medical Physicist; MBChB (Wits) Medical Practitioner; BSc (Rhodes).	Imaging Medical Physics, Quantitative Image Analysis	n/a	Board	RI&D	8 2
Prof B Shaw	Member	1 Nov 2016	n/a	D.Phil (Biokinetics); M.Phil (Biokinetics); B.A. Honours (Biokinetics) cum laude; B.A. Honours (Sport Science); B.A. (Humanities)	Exercise Science and Biokinetics: cardiopulmonary disease; non-communicable disease (NCD); hypokinetic disease	<ul style="list-style-type: none"> Co-Director: Non-Communicable Disease Intervention Research Unit (NCDIRU) Executive Director: Africa & Vice-President: Publications and Communication – International Physical Activity Projects (IPAP) 	Board	EXCO ARIC	8 1 6
Prof L Skaal	Member	1 Nov 2016	n/a	Doctor of Public Health (DrPH); Master of Public Health (MPH); BSc Physiotherapy; Assessment and Moderation Certificate	Social & Behavioural Studies; Addictive behaviours and Obesity Prevention	<ul style="list-style-type: none"> SAIDS Board PHASA Exec 	Board	Exco ARIC	7 1 6

NAME	DESIGNATION (In terms of the Public Entity Board structure)	DATE APPOINTED	DATE RESIGNED	QUALIFICATIONS	AREA OF EXPERTISE	BOARD DIRECTORSHIPS (LIST THE ENTITIES)	OTHER COMMITTEES OR TASK TEAMS (e.g.: Audit Committee/ Ministerial Task Team)		NO. OF MEETINGS ATTENDED
							Committee/ Ministerial Task Team)	Team)	
Prof T Sodi	Member	1 Nov 2016	n/a	Honours Degree in Psychology; Masters Degree in Clinical Psychology; PhD (Psychology); Registered Clinical Psychologist	Culture and mental illness/ health; Mental retardation; Mental health policy; Culture and ethics; Suicide; Health and behaviour; Archival research; Phenomenological and phenomenological research.	<ul style="list-style-type: none"> Tholene Sodi and Partners Inc. (Clinical Psychologists) ResilientMinds NPC Member of the Ministerial Advisory Committee on Mental Health (Department of Health) 	Board REMCO	8 7	
Prof S Velaphi	Member	1 Nov 2016	n/a	MBChB; MMed; FC Paed. Fellowship in Perinatal Neonatal Medicine; PhD	Paediatrics and Child Health	<ul style="list-style-type: none"> Clothing Company for Church Clothes/Uniform 	Board R&D	7 2	
Prof E Seekoe	Member	1 Nov 2019	n/a	D Cur; MBA (Health); M SocSc (Nursing Education); Advanced Diploma in Psychiatric Nursing Science; B A Cur (Nursing Education and Community Health Nursing); Diploma in General Nursing Science and Midwifery; Certificate in Reproductive Health (Family Planning); Certificate in Quality of Health Services; Certificate in Decentralisation of Health Services; Certificate in Strengthening Human Resource in Health	Health Systems strengthening through mentoring and leadership.	<ul style="list-style-type: none"> Sub-Saharan-FAIMER Regional Institute (SAFRI) – Vice Chair Albertina Sisulu Executive Leadership Programme in Health (ASELPH) SMT – Co Director Joint Fundraising Committee of PHASA and UFH Faculty of Health Sciences – Chair Oversight Committee of (PHASA) and UFH Faculty of Health Sciences – Co Chair Planning, Organising and Fundraising Committee, International Centenary Transformation in Higher Education, UFH – Chair EDHE Entrepreneurial Universities CoP Future Professors Programme Phase 2 National Advisory board National Health Research Ethics Council Sefako Makgatho Health Sciences University Council Committees; Council Bid Adjudication Committee Senate 	Board EXCO R&D	7 1 2	

NAME	DESIGNATION (In terms of the Public Entity Board structure)	DATE APPOINTED	DATE RESIGNED	QUALIFICATIONS	AREA OF EXPERTISE	BOARD DIRECTORSHIPS (LIST THE ENTITIES)	OTHER COMMITTEES OR TASK TEAMS (e.g.: Audit Committee/ Ministerial Task Team)		NO. OF MEETINGS ATTENDED
							Committee/ Ministerial Task Team)	Team)	
Prof E Mukwevho	Member	1 Nov 2019	n/a	PhD Anatomy & Cell Biology; MSc Molecular & Cell Biology; BSc (Honours) Biochemistry; Bachelor of Science; Certificate in Project Management; Certificate in Financial Management; MBA	Obesity and Diabetes Metabolic syndrome Mitochondrial Energy metabolism Epigenetics of the Obesogenes	n/a	Board R&D	8 2	
Prof C Dandara	Member	1 Nov 2019	n/a	PhD Biochemistry; MPhil Biochemistry; BSc (Hons) Biochemistry; Bachelor of Science	Human Genetics Pharmacogenomics Molecular biology Drug metabolism	<ul style="list-style-type: none"> HPSCA registered member Southern African Society for Human Genetics (SASHG) member African Society for Human Genetics (AFSHG) Fellow of the Academy of Sciences South Africa (ASSAf) Fellow of the African Academy of Sciences (AAS) Director (non-Exec), Sunrise Small Business Enterprise (SSBE) 	Board R&D	8 2	
Prof T Tucker	Member	1 Nov 2019	n/a	MBChB; PhD; F.C.Path (SA)Viro;	Clinical Virology Health Systems Strengthening Pathology Laboratory Service Clinic-Laboratory-Interface Public-private-partnerships	<ul style="list-style-type: none"> National Health Laboratory Service – Board Member SEAD Consulting (Pty) Ltd – Shareholder and board member Champagne Valley Trust – Trustee Tucker Family Trust – Trustee NIH Strategy Working group on HIV/AIDS – US Gov – Committee Member UCT School of Public Health and Family Medicine – Adjunct Assoc. Professor 	Board REMCO	8 7	

NAME	DESIGNATION (In terms of the Public Entity Board structure)	DATE APPOINTED	DATE RESIGNED	QUALIFICATIONS	AREA OF EXPERTISE	BOARD DIRECTORSHIPS (LIST THE ENTITIES)	OTHER COMMITTEES OR TASK TEAMS (e.g.: Audit Committee/ Ministerial Task Team)	NO. OF MEETINGS ATTENDED
Prof R Carolissen	Member	1 Nov 2019	n/a	DPhil (Psychology); MA (Clin. Psych); Higher Diploma in Education (H.D.E.); BA Hons (Psychology); Bachelor of Arts Registered Clinical Psychologist	Feminist social justice approaches to teaching and learning and critical community psychology perspectives on youth citizenship, identities, belonging and community engagement in educational contexts.	<ul style="list-style-type: none"> Stellenbosch University, Maties Gemeenskapdiens (Community Engagement); Chair of Board; Psychological Association of South Africa: executive member of Division of Community and Social Psychology (Sept 2019-Sept 2022) 	Board REMCO	7 6
Adv D Khosa	Member	1 Nov 2019	n/a	Bachelor of Laws (LLB); Master of Management; Labour Dispute Resolution Practice; Certificate in Principles of Business and Management; Diploma in Labour; Certificate in Gender Policy Management; BA Honours in Human Resource Management; Labour Relations; Post Higher Education Diploma; Bachelor of Arts	Human Resource Management Law Mediation and Negotiation Research	<ul style="list-style-type: none"> Bula Maseve Trading CC (Directorship) Constructive Employment Relations Services (Directorship) Sedibeng TVET College (Board membership) South African Board for People Practices (Professional Affiliation) The Legal Practice Council (Professional Affiliation) South African Maritime Safety Authority (SAMSA) from August 2020. 	Board REMCO	8 7

NAME	DESIGNATION (In terms of the Public Entity Board structure)	DATE APPOINTED	DATE RESIGNED	QUALIFICATIONS	AREA OF EXPERTISE	BOARD DIRECTORSHIPS (LIST THE ENTITIES)	OTHER COMMITTEES OR TASK TEAMS (e.g.: Audit Committee/ Ministerial Task Team)	NO. OF MEETINGS ATTENDED
Ms J Williams	Member	1 Nov 2019	n/a	Bachelor of Science; Higher Diploma in Education; BSc Honours; Postgraduate Diploma in Accounting; B Comm Hons in Accounting; CA(SA)	Audit and Finance	<ul style="list-style-type: none"> Boland TVET College Council Robben Island Museum Audit, Risk & IT Committee Western Cape Gambling and Racing Board Audit Committee Breede River Municipality Audit and Performance Audit Committee Stellenbosch Audit and Performance Audit Committee 	Board ARIC	8 6
Prof T Mavundla	Member	1 Nov 2019	n/a	B Cur Nursing Education; IPHC Intensive Primary Health Care; M Cur Advanced Psych-Mental Health; AUDNE Nursing Education; PhD Mental Health	Male Sexual and Reproductive Health Psychiatric-Mental Health Qualitative Research and Theory Development	Africa Journal of Nursing and Midwifery (AJNM)	Board ARIC	8 6
Dr M Madikizela	Member	1 Nov 2019	n/a	BSc (Biochemistry); BSc Honours (Biochemistry); MSc (Biochemistry); PhD (Biochemistry); MBA	Bio-economy, Life Sciences, Technology management and commercialization of public research results and Business management	Technology Innovation Agency – Board Member	Board ARIC	8 6

COMMITTEES: 1 APRIL 2020 – 31 MARCH 2021

COMMITTEE	NO OF MEETINGS HELD	NO OF MEMBERS	NAME OF MEMBERS
Board	8	16	Prof J Mahlangu
			Prof L Zungu
			Dr Z Kwitshana
			Prof J Mahlangu
			Prof W Rae
			Prof B Shaw
			Prof L Skaal
			Prof T Sodi
			Prof S Velaphi
			Prof E Seekoe
			Prof E Mukwevho
			Prof C Dandara
			Prof T Tucker
			Prof R Carolissen
Adv Khosa			
Ms June Williams			
Prof T Mavundla			
Dr M Madikizela			
ARIC	6	6	Prof B Shaw
			Prof L Skaal
			Ms J Williams
			Prof T Mavundla
			Dr M Madikizela
			Mr J Watson
REMCO	7	5	Prof T Sodi
			Prof L Zungu
			Prof T Tucker
			Prof R Carolissen
			Adv Khosa
EXCO	1	4	Prof J Mahlangu
			Prof B Shaw
			Prof E Seekoe
			Prof T Sodi

ENTERPRISE RISK MANAGEMENT

The Board is ultimately responsible for overall oversight of the SAMRC's risk management practices and processes, and system of internal control. It has delegated responsibility to the Audit and Risk and IT Committee (ARIC) for overseeing and reviewing the efficacy of these arrangements as well as that of the SAMRC's internal and external auditors.

The Board receives regular updates on the activities of the ARIC and reports on its review in the organisation's Annual Report.

The objective of risk management in the SAMRC is to establish an integrated and effective risk management framework wherein important and emerging risks are identified, quantified and managed organisation wide. To this end the SAMRC has a dedicated Enterprise Risk Management (ERM) Division that reports directly to the ARIC.

The SAMRC's ERM policy is reviewed annually and follows the framework set by the COSO (Committee of Sponsoring Organisations of the Treadway Commission) Enterprise Risk Management – Integrated Framework 2017. The ERM policy and framework defines the risk appetite, risk management objectives, methodology, risk identification, assessment and treatment processes and the responsibilities of the various risk management role-players in the organisation.

The ERM Divisions continues to embed risk management principles and the methodology and continues with the implementation of a process to ensure follow-up by management of their risk intervention action plans to reduce the risk exposure to the SAMRC. Further support is provided by internal audit in the form of assurance on the effectiveness of control procedures in place to reduce the possibility and outcome of the known risks.

PRINCIPAL RISKS & MITIGATION ACTIVITIES

A key objective of risk management is to ensure that all potentially significant risks facing SAMRC and opportunities associated with realising the strategic objectives are identified, proactively assessed, and managed in such a way that its impact is maintained in accordance with the SAMRC's risk appetite.

The SAMRC's principal risks and opportunities are determined through a strategic risk review process where the SAMRC Executive Management and Board re-assess the key risks which could impact on the achievement of strategic objectives. Related risks are aggregated and grouped to determine the principal risks. Selected principal risks (grouped by strategic priorities), together with key measures taken to mitigate these risks, are listed in the table below.

PRINCIPAL RISK	RISK DESCRIPTION	KEY RESPONSE MEASURES
STRATEGIC FOCUS AREA: Administer health research effectively and efficiently in South Africa		
Health , Safety & Environment (HSE)	HSE not fully embedded into the business	<ul style="list-style-type: none"> • Policies, processes, SOPs • Ongoing engagement/assistance to Units on HSE
Delft Site	Revitalisation of site infrastructure and security required, including informal settlement and illegal farmers on unused land	<ul style="list-style-type: none"> • Defined strategies for the upgrading of the facilities • Capex identified to address infrastructure upgrades
COVID-19 Pandemic	H&S exposures on premises and community-based research programmes, delays programmes/project and adverse impact on future funding	<ul style="list-style-type: none"> • COVID-19 preparedness plans • National and international COVID-19 research funding • Sisonke Clinical Research Trial
Inefficiencies in Corporate Processes	The risks of delayed support/slow response times by support functions to assist research units in executing the SAMRC mandate	<ul style="list-style-type: none"> • Management oversight • Online helpdesk services and technology • Contracts for major procurement spends • Policies, processes, SOPs
Insufficient facility management, including movable and immovable assets	Infrastructure deterioration and aging buildings and research assets	<ul style="list-style-type: none"> • Asset management and verification • Capital project refurbishment • Revamping of office space
Sustainability of the Defined Benefit (DB) fund	Market performance of investments below salary increase rates	<ul style="list-style-type: none"> • Freezing of increase in DB pensionable salary in excess of annual increase • Statutory actuarial valuation in place
Business continuity programme	Lack of a broader SAMRC business continuity programme	<ul style="list-style-type: none"> • Comprehensive IT Business Continuity Programme • High IT dependency and contingency plans of identified critical business processes
Inefficiencies in Research Processes	The risks of slow response times/ ineffective support by research support functions to assist research units in executing the SAMRC mandate	<ul style="list-style-type: none"> • Management oversight • Manual interventions • Policies, processes, SOPs
Loss/theft of data	Cyberthreats and loss of SAMRC research data/intellectual property	<ul style="list-style-type: none"> • Firewall protection • Management monitoring and oversight • Policies, processes, SOPs
STRATEGIC FOCUS AREA: Lead the generation of new knowledge		
Poor research governance	The risk of poor oversight over research conducted, data protection and resource constraints	<ul style="list-style-type: none"> • Establish Research Integrity Office • Human and animal ethics committees • Policies, guidelines and SOPs
Maintaining research integrity	The risk involves weak project scoping, poorly conducted research, application of inconsistent research methodology and inadequate mentorship	<ul style="list-style-type: none"> • External and internal quality review processes • Scientific advisory committees • Research Integrity Office • Oversight over the conduct of human and animal research
Sustained leadership at EMC level	Early migration of EMC members	<ul style="list-style-type: none"> • Policies and guidelines • Succession planning
Moratorium on changes of employment terms and conditions	Loss of critical skilled staff and senior team members due to public sector salary freeze	<ul style="list-style-type: none"> • Development of retention strategies in progress

PRINCIPAL RISK	RISK DESCRIPTION	KEY RESPONSE MEASURES
STRATEGIC FOCUS AREA: Lead the generation of new knowledge		
Transformation and diversity challenges	Progression of staff transformation across the organisation at senior research level impacted by various factors, including limited pool of public health scientists, behavioural scientist and medical clinical research scientists	<ul style="list-style-type: none"> • EE Strategy and Plan • Appointment of Intra-mural Unit Deputy Directors • Diversity intervention initiatives/programs • Succession planning
Inability to sustainably grow funding	Failure to appropriately utilise available funding to generate future funding opportunities Uncertainty about the extent to which the SAMRC can develop funding opportunities in the private sector	<ul style="list-style-type: none"> • Dedicated on-going investigation for further international funding opportunities
Changes in long term future focus of research funding required	New emerging/re-emerging epidemics and pandemics. Effect of climate change on health and increased prevalence of NCDs	<ul style="list-style-type: none"> • Realigned research focus • Increase capacity development funding aligned to the 20/21-24/25 Strategic Plan
STRATEGIC FOCUS AREA: Support, through funding and other mechanisms, technology development and implementation, translation of research into policy and practice, and innovations in health and technology delivery to improve health		
Lack of further development and commercialization of (a) SAMRC-owned and (b) SAMRC-funded innovations	Limited funding for/value proposition of the innovation reducing interest from industry to commercialize or target market to implement the innovation	<ul style="list-style-type: none"> • IP and Commercialization Policy, Strategy and Procedures • External partnering to pursue commercialization opportunities
STRATEGIC FOCUS AREA: Build human capacity for the long-term sustainability of the South African health research		
Limited research capacity	Inattention to the strategic development of research scientists thus failing to assist in growing the pool of South African HDI medical research scientists	<ul style="list-style-type: none"> • Capacity building strategy for supporting the development of HDI research scientists • Scholarship and bursary programs • Strategic relations with institutions for collaboration and accessing researchers to build clinical research capacity
Funding scientific excellence	Risk of a poor scientific review and oversight, i.e. project owners not understanding the science	<ul style="list-style-type: none"> • Implemented a quality review process for all externally funded projects • Scientific advisory committees established
STRATEGIC FOCUS AREA: Translate new knowledge into policies and practices to improve health		
Lack of research impact on strengthened policy and practice	The risk of researchers not understanding the policy and practice environment leading to poor funding decisions/sub-optimally designed studies not meeting key stakeholder requirements	<ul style="list-style-type: none"> • SAMRC strategic and business plans in place • Oversight and leadership support by executive team • Ongoing guidance and training on research translation

INTERNAL CONTROL & ASSURANCE

The SAMRC has a comprehensive risk management and internal control system in place. The system is designed to identify and appropriately mitigate the emerging and principal risks of the business and ensure the accuracy and reliability of the SAMRC's financial reporting, while facilitating the delivery and sustainability of the strategic goals.

The Board acknowledges that they are ultimately responsible for the organisation's system of internal financial control and place considerable importance on maintaining a strong control environment. To meet these responsibilities, the Board sets standards for internal control aimed at reducing the risk of error or loss in a cost-effective manner. As such, the organisation has implemented and maintained a number of internal control systems and governance structures to provide assurance on the status of governance and internal control. Key features of the SAMRC's internal control system include:

- clearly defined delegations of authority and lines of accountability;
- policies and procedures governing financial resource management, financial reporting and ICT security; and
- periodic checks conducted by the internal audit function

The internal audit function is a key element of the organisation's internal control environment and works closely with the ERM Unit. The function is overseen by the Internal Audit Charter, which is reviewed and approved by the Board. The SAMRC makes use of an outsourced internal audit function and reports functionally to the ARIC. Internal audit has unrestricted access to the Chairperson of the ARIC and SAMRC President.

The work of internal audit focuses primarily on areas that present the greatest risk to the SAMRC. This is achieved by following a risk-based assurance approach, focus on the key risk exposure as approved by the Board. The internal audit function is responsible for providing Executive Management and the Board with independent, objective assurance on the adequacy and effectiveness of the risk management, internal financial controls, the effectiveness of internal control over operational and compliance activities and governance processes across the SAMRC. The ARIC receives regular reports on progress against the internal audit plan and corrective actions taken by management in response to internal audit findings.

The Auditor-General South Africa (AGSA) is responsible for expressing an opinion on the financial statements and to report on findings relating to the audit predetermined objectives, and material non-compliance with specific requirements in key applicable legislation. The AGSA is invited to all ARIC meetings and receives copies of all relevant papers and meeting minutes.

ETHICS AND INTEGRITY MANAGEMENT

The SAMRC's commitment to ethical standards is set out in the SAMRC's values and is supported by the Board approved Code of Business Conduct Framework Policy (Code). In this regard the Code provides a framework of ethical practices and business conduct that are applicable to the Board, employees and external stakeholders, such as suppliers. The Code is available to all employees on SAMRC's in-house intranet and to external stakeholders on the SAMRC external website. In an event where an employee breaches the provisions of the policy, this will be addressed in terms of the SAMRC's Employment Relations Policy.

The Code as well as a formal Gifts Policy also provides strict policies regarding gifts, invitations or favours received from suppliers or any other party. The offering of favours to gain unfair commercial advantages is also strictly prohibited.

The ARIC monitors compliance with the Code and addresses instances of fraud or irregularities. The SAMRC has an effective fraud prevention and detection process and ensures compliance and risk mitigation.

Each SAMRC employee is required to declare any interest and potential conflicts of interest on an annual basis via an on-line declaration of interest system. All outside work, financial and private interest, and any other business activities, including gifts, must be declared when completing the SAMRC staff annual On-line Declaration of Interest. Failure to disclose interests, or the wilful provision of incorrect or misleading details can lead to charges of misconduct.

The SAMRC has a zero tolerance to fraudulent behaviour and is committed to fighting fraudulent behaviour at all levels of the organisation. The SAMRC Fraud Prevention Policy addresses fraud risk management both proactively and reactively, and the Fraud Prevention Plan developed includes a fraud strategy as one of the outputs of the plan.

A key control within SAMRC's is an on-line whistle-blower hotline where staff can report fraudulent activities/incidents, knowledge of perceived and alleged irregular or unethical behaviour in a confidential and controlled environment anonymously. The webpage, 'Report fraudulent activities at the SAMRC', is available to all staff via the SAMRC Intranet home page.

SAMRC's MATERIALITY AND SIGNIFICANCE FRAMEWORK: 2020/2021

The proposed Materiality and Significance Framework for the SAMRC, in terms of the Treasury Regulation 28.3.1 and the National Treasury Practice Note on Applications under Section 54 of the Public Finance Management Act (PFMA), is as follows –

SECTION 50: FIDUCIARY DUTIES OF ACCOUNTING AUTHORITIES:

1) The accounting authority for a public entity must –

PFMA SECTION	QUANTITATIVE [AMOUNT]	QUALITATIVE [NATURE]
(c) on request, disclose to the executive authority responsible for that public entity or the legislature to which the public entity is accountable, all material facts, including those reasonably discoverable, which in any way may influence the decisions or action of the executive authority or that legislature;	Disclose all material facts.	The Board will disclose to the National Department of Health all material facts as requested and all material facts not requested, including those reasonably discoverable, which in any way may influence the decisions or action of the National Department of Health, at the discretion of the Board.

SECTION 51: GENERAL RESPONSIBILITIES OF ACCOUNTING AUTHORITIES:

1) An accounting authority for a public entity –

PFMA SECTION	QUANTITATIVE [AMOUNT]	QUALITATIVE [NATURE]
(g) must promptly inform the National Treasury on any new entity which that public entity intends to establish or in the establishment of which it takes the initiative, and allow the National Treasury a reasonable time to submit its decision prior to formal establishment; and	Disclose all material facts timeously.	Full particulars to be disclosed to the Minister of Health for approval after which it is to be presented to Treasury.

SECTION 54: INFORMATION TO BE SUBMITTED BY ACCOUNTING AUTHORITIES:

- 2) Before a Public Entity concludes any of the following transactions, the Accounting Authority for the Public Entity must promptly and in writing inform the relevant Treasury of the transaction and submit relevant particulars of the transaction to its Executive Authority for approval of the transaction:

PFMA SECTION	QUANTITATIVE [AMOUNT]	QUALITATIVE [NATURE]
a) establishment of a company;	Any proposed establishment of a legal entity.	Full particulars to be disclosed to the Minister of Health and Minister of Finance (National Treasury) for approval (simultaneous submission).
b) participation in a significant partnership, trust, unincorporated joint venture or similar arrangement;	Qualifying transactions exceeds R15Mil (based on 2% of total average SAMRC assets, as at 31 March 2019). This includes research collaborative arrangements	
c) acquisition or disposal of a significant shareholding in a company;	Greater than 20% of shareholding.	

PFMA SECTION	QUANTITATIVE [AMOUNT]	QUALITATIVE [NATURE]
d) acquisition or disposal of a significant asset;	Qualifying transactions exceeds R15Mil (based on 2% of total average SAMRC assets, as at 31 March 2019). Including Financial Leases	Any asset that would increase or decrease the overall operational functions of the SAMRC, outside of the approved strategic plan and budget.
e) commencement or cessation of a significant business activity; and	Any activity not covered by the mandate/core business of the SAMRC and that exceeds the R15Mil transaction value (based on 2% of total average SAMRC assets, as at 31 March 2019).	Full particulars to be disclosed to the Minister of Health and Minister of Finance (National Treasury) for approval (simultaneous submission).
f) a significant change in the nature or extent of its interest in a significant partnership, trust, unincorporated joint venture or similar arrangement.	Qualifying transactions exceeds R15Mil (based on 2% of total SAMRC assets, as at 31 March 2019)	

SECTION 55: ANNUAL REPORT AND FINANCIAL STATEMENTS

- 3) The annual report and financial statements referred to in subsection (1) (d) ("financial statements") must –
- fairly present the state of affairs of the Public Entity, its business, its financial results, its performance against predetermined objectives and its financial position as at the end of the financial year concerned;
 - include particulars of –

PFMA SECTION	QUANTITATIVE [AMOUNT]	QUALITATIVE [NATURE]
(i) any material losses through criminal conduct and any irregular expenditure and fruitless and wasteful expenditure that occurred during the financial year;	All instances	<ul style="list-style-type: none"> Report quarterly to the Minister of Health. Report annually in the Annual Financial Statements
(ii) any criminal or disciplinary steps taken as a consequence of such losses or irregular expenditure or fruitless and wasteful expenditure;		
(iii) any losses recovered or written off;		
(iv) any financial assistance received from the state and commitments made by the state on its behalf; and		
(v) any other matters that may be prescribed.	All instances, as prescribed	

SECTION 56: ASSIGNMENT OF POWERS AND DUTIES BY ACCOUNTING AUTHORITIES

PFMA SECTION	QUANTITATIVE [AMOUNT]	QUALITATIVE [NATURE]
1) The accounting authority for a public entity may –	Values excluded from the Delegation of Authority Framework Policy.	Instances that are excluded from the Delegation of Authority Framework Policy.
(a) In writing delegate any of the powers entrusted or delegated to the accounting authority in terms of this Act, to an official in that public entity		
(b) Instruct an official in that public entity to perform any of the duties assigned to the accounting authority in terms of this Act.		
2) A delegation or instruction to an official in terms of subsection (1) –	Values excluded from the Delegation of Authority Framework Policy.	Instances that are excluded from the Delegation of Authority Framework Policy.
(c) Is subject to any limitations and conditions the accounting authority may impose;		
(d) May either be to a specific individual or to the holder of a specific post in the relevant public entity; and		
(e) Does not divest the accounting authority of the responsibility concerning the exercise of the delegated power or the performance of the assigned duty.		

TREASURY CIRCULARS AND GUIDELINES RELATED TO SUPPLY CHAIN MANAGEMENT

- 1) National Department of Health and National Treasury are to be notified of procurement transactions exceeding R15 Million;
- 2) Obtained prior written approval from National Treasury for variation amounts in excess of:
 - a. 20% or R20 Million (including applicable taxes) for construction related orders; and
 - b. 15% or R15 Million (including applicable taxes) for goods/service related orders

The materiality level mentioned above was calculated using the guidance practice note of the National Treasury. Using these parameters the SAMRC materiality level calculation outcomes were as follows:

ELEMENT	MAX. % TO BE APPLIED AGAINST R VALUE	UNAUDITED VALUE AT 31 MARCH 2019	MAX. CALCULATED MATERIALITY & SIGNIFICANCE VALUE
Total Assets (1%-2%)	2%	R770 852 959	R15 417 059


The SAMRC materiality and significance value will be R15 Million based on the percentage range of the total asset element and the significant fluctuations in the month-to-month total asset value. This is the most stable element, given the performance statement outcomes associated with the current economic climate challenges.

B-BBEE COMPLIANCE PERFORMANCE INFORMATION

The SAMRC 's compliance report in terms of section 13G(1) of the Broad Based Black Economic Empowerment (B-BBEE) Act, No 46 of 2013, read with section 12(1) of the B-BBEE Regulations of 2016 and B-BBEE Explanatory Notice 01 of 2018 is detailed below.

As contained in the annual report guide for Schedule 3A and 3C public entities, the SAMRC has applied the relevant code of Good Practice in the following manner.

CRITERIA	RESPONSE (YES/NO)	DISCUSSION
Determining qualification criteria for the issuing of licences, concessions or other authorisations in respect of economic activity in terms of any law?	No	Not applicable
Developing and implementing a preferential procurement policy?	Yes	SAMRC complies with the Preferential Procurement Regulations of 2017
Determining qualification criteria for the sale of state-owned enterprises?	No	Not applicable
Developing criteria for entering into partnerships with the private sector?	No	Any public private partnerships (PPP) that SAMRC may enter into will be in line with the Treasury Regulations. However, SAMRC receives some funding from the private sector, and these funds do not constitute PPP
Determining criteria for the awarding of incentives, grants and investment schemes in support of Broad Based Black Economic Empowerment?	No	However, two of the indicators of Program 4 address the issue of capacitating black/historically disadvantaged individuals



Broad-Based Black Economic Empowerment Generic Certificate

Issued to:

SOUTH AFRICAN MEDICAL RESEARCH COUNCIL

LEVEL 7 CONTRIBUTOR


Measured Entity:

Entity Name: SOUTH AFRICAN MEDICAL RESEARCH COUNCIL
 Trading Name: SAMRC
 Address: Francio Van Zijl Drive, Parrowvalley, 7503
 Registration Number: Schedule 3A Public Entity
 Vat Number: 4890103718
 Certificate Number: 1 NVA G10 REV 0


Issued in accordance with the Codes of Good Practice issued in terms of section 9(1) of the Broad-Based Black Economic Empowerment Act, 2003 (Act 53 of 2003) on 1 December 2017 – 38766 – Specialised Codes

Element	Actual Score	Target Score	BBBEE Status	
Management Control	11.95	20	Black Ownership	N/A
Skills Development	15.50	25	Black Female Ownership	N/A
Enterprise & Supplier Development	30.50	50	Black Designated Group	N/A
Socio-Economic Development	05.00	05	Black Disabled	N/A
			Black Unemployed	N/A
Total Points	62.95	100	Black People living in Rural Areas	N/A
			Black Military Veterans	N/A
			Procurement Recognition Level	50%
			Financial Period	31 March 2020
			Issued Date	17 September 2020
			Expiry Date	16 September 2021

Modified flow has been applied	No
Exclusion Principle Used	No
Discounting Principle Used	No
Empowering Supplier	Yes
Y.E.S Participation	No
Achieve Y.E.S-Target 2.5%	No
Achieve Y.E.S- Target 1.5%	No
Achieve Double Y.E.S- 5% Absorption	No



Technical Signatory
Sibongile



BVA244

1Ntsikelelo Verification Agency (Pty) Ltd; Reg Number 2012/221535/07; Tel: (031) 701 5269

PART D HUMAN RESOURCES MANAGEMENT

SAMRC ORGANOGRAM

EXECUTIVE MANAGEMENT COMMITTEE

The SAMRC President heads the SAMRC Executive Management Committee, which the SAMRC Act assigns responsibility for the day-to-day management of the SAMRC.



PROF GLENDA E GRAY
SAMRC PRESIDENT AND CEO



PROF JEFFREY MPHAHLELE
VICE PRESIDENT OF RESEARCH



PROF RACHEL JEWKES
EXECUTIVE DIRECTOR RESEARCH
STRATEGY



PROF RICHARD GORDON
EXECUTIVE DIRECTOR GRANTS,
INNOVATION AND PRODUCT
DEVELOPMENT



MR NICK BUICK
CHIEF FINANCIAL OFFICER



MR BRINTON SPIES
EXECUTIVE DIRECTOR
HUMAN RESOURCES



MR MZIMHLE POPO
LEGAL COUNSEL



DR MONGEZI MDHLULI
CHIEF RESEARCH OPERATIONS
OFFICER

EXECUTIVE SUMMARY

The purpose of the South African Medical Research Councils (SAMRC) Human Resources function is to manage and support numerous needs of the employees in order for the SAMRC to deliver on its mission of advancing the nation's health and quality of life and addressing inequity by conducting and funding relevant and responsive health research, capacity development, innovation and research translation. Our responsibilities span three areas, namely, individual, business units and organizational. These areas cover aspects such as (1) acquiring, developing and retaining talent, (2) aligning staff responsibilities with business requirements, (3) administration of employee remuneration, recognition, benefits, performance and rewards, (4) managing employee wellness, (5) transformation and diversity management, (6) fair employment relations practices and (7) contributing to the SAMRC strategic plan/priorities and annual performance plan. In this section, we highlight what HR achieved during 2020/21 in the spheres of transformation, recruitment, organizational development (employment relations, career development and performance management) and human capacity development (through numerous study assistance and training programmes).

HR continued to offer services to all employees including during the lockdown periods, such payment of staff, managing temporary employee contracts and payments and new appointments.

TRANSFORMATION

The SAMRC is committed to transformation, aligned to the national agenda to systemically redress past inequalities through a long-term process of growing and transforming the current and future knowledge economy, and thereby ensuring succession and sustainability. The Human Resources Division of the SAMRC is integral to the organization's commitment to transformation. In line with the aforementioned, the SAMRC has made and will strive to make progress in redressing the past inequalities.

CAREER/CAPACITY DEVELOPMENT

The SAMRC capacity development initiatives continued to grow the intramural critical mass through funding of Masters and PhD studies, Post-doctoral opportunities and management development through the Accelerated Development Programme.

Diversity

The SAMRC has implemented a tool which addresses the Employment Equity profile of the new recruits with a view towards addressing diversity within the organisation. The SAMRC is committed towards fostering an inclusive culture that values diversity for all its employees. To this end, in the year under review, a diversity and inclusive culture survey was conducted which informed engagements on topics related to diversity management.

Succession

The SAMRC identified the need and developed a framework to manage the succession from middle to top management. One of the strategies for addressing succession, as an example, is the continuation of internal appointments of Deputy Directors within research units.

EMPLOYEE PERFORMANCE MANAGEMENT

Performance Management is a philosophy that enables every employee, irrespective of rank, to meaningfully contribute to and make a difference to the success of the SAMRC through the fulfilment of its mission. SAMRC employees have performance contracts, and performance discussions and/or reviews between managers and persons reporting are held twice a year. In some areas, this process was setback as a result of COVID-19, since most of our employees were working from home. Performance management outcomes are used to inform corrective interventions, recognition and reward.

EMPLOYEE WELLNESS PROGRAMME

The SAMRC cares about the health and social wellbeing of its employees and recognises that there are several personal and related problems which may impact negatively on the employee's personal and work lives. The organisation therefore strives to promote the importance of the well-being of its employees (in terms of the work-life balance) through acknowledging that employees may experience difficulties in their personal and work lives.

The wellness of employees remains a high priority, and the focus of the Employee Wellness Programme has been broadened with emphasis on smaller groups, trauma and other debriefing sessions, disability awareness and regular awareness programmes in support of national health days. During the lock down period the Wellness programme was a supporting resource assisting staff in dealing with Covid-related challenges, including trauma debriefing.

The Employee Wellness Programme (EWP) provided for individual counselling, trauma and other debriefing, HIV and chronic disease management, life management and work-related issues, management assistance, ill health, incapacity and absenteeism management. EWP has a 24/7/365 call centre and offers face-to-face counselling services where needed or possible. During the 2020/21, the utilisation of the EWP was above the industry norms and very much focused around the challenges related to COVID-19. Unfortunately, due to the lock down and COVID-19 regulations we could not hold the wellness days.

COACHING OF EXECUTIVE AND SENIOR MANAGEMENT

The 2020/21 financial year cohort completed its coaching program which was mostly delivered online due to COVID-19. There were interventions to assist staff in all SAMRC Units during the transition from 'the work from home arrangement' and the 'return to the office'. The new cohort, consisting of 15 managers who embarked on their coaching journey as from 1 March 2021.

RELATIONSHIP WITH ORGANISED LABOUR

The relationship between SAMRC and the Union remained sound and co-operative and the Union is involved in many of HR processes of mutual interest. A renewed Recognition Agreement guides the relationship between the parties.

HR MANAGEMENT AND INFORMATION SYSTEM

A new Human Resource Information System was successfully implemented, notwithstanding the challenges of lockdown. The migration to a new Human Resource Information System and Recruitment system, will ensure greater effectiveness and efficiencies in reporting and data management.

MORATORIUM ON CONDITIONS OF SERVICE AND BENEFITS

The SAMRC received a directive from Government to implement a moratorium on any changes to the conditions of service and benefits to any employee was received. As a result, salary negotiations and career development opportunities had to be halted.



HUMAN RESOURCES STATISTICS

REMUNERATION

The SAMRC provides a total cost to company package. Tables 1 A, B and C below summarise the personnel expenditure related to guaranteed remuneration packages. Table 1 D below summarise the allowances (non-guaranteed) that were paid to employees. Tables 2 A summarises personnel expenditure for overtime work.

Table 1 A: Personnel expenditure by Occupational Category, 2020/21 (excluding personnel highlighted in tables 1 B and 1 C)

PUBLIC SECTOR SALARY LEVELS	SAMRC EQUIVALENT OCCUPATIONAL CATEGORY	PERSONNEL EXPENDITURE (R)	PERSONNEL EXPENDITURE (%)	NO OF POSTS FILLED	AVERAGE REMUNERATION EXPENDITURE PER EMPLOYEE (R)
Lower skilled (levels 1-2)	Unskilled and defined decision making (Paterson A)	4,882,885.00	1.5	40	122,072.13
Skilled (level 3-5)	Semi-skilled & discretionary decision making (Paterson B)	19,797,547.00	5.9	108	183,310.62
Highly skilled production (levels 6-8)	Skilled technical & academically qualified (Paterson C)	97,729,033.00	29.4	257	380,268.61
Highly skilled supervision (levels 9-12)	Professionally qualified & specialists (Paterson D)	130,052,510	39.1	164	793,003.11
Senior Management (levels 13-16)	Senior and Top Management (Paterson E & F)	80,083,377.25	24.1	55	1,456,061.40
Total		332,545,352.25	100.00	624	2,934,715.87

Table 1 B: Personnel expenditure for Postdocs, Interns, European and Developing Countries Clinical Trials Partnership (EDCTP) and Post retirement contracts 2020/21

FUNCTION/AREA/STATUS	PERSONNEL EXPENDITURE (R)	PERSONNEL EXPENDITURE (%)	NO OF EMPLOYEES	AVERAGE REMUNERATION EXPENDITURE PER EMPLOYEE (R)
Postdocs/Interns	3,177,164.00	19.8	4	794,291.00
European and Developing Countries Clinical Trials Partnership (EDCTP)	7,723,643.32	48.2	6	1,287,273.89
Post retirement contracts	5,118,535.00	32.0	16	319,908.44
Total	16,019,342.32	100	26	2,401,473.32

Table 1 C: Personnel expenditure for Temporary employees, 2020/21

TEMPORARY EMPLOYEES	PERSONNEL EXPENDITURE (R)
Total	20,246,370.86

Table 1 D: Personnel expenditure: Allowances 2020/21

	TOTAL (R)
Allowances	4,806,451.20

Note: The SAMRC pay allowance is in line with the remuneration policy and other approved guidelines.

Table 2 A: Personnel expenditure: Overtime by Occupational Category, 2020/21

PUBLIC SECTOR SALARY LEVELS	SAMRC EQUIVALENT OCCUPATIONAL CATEGORY	OVERTIME	
		AMOUNT (R)	OVERTIME AS A % OF PERSONNEL EXPENDITURE
Lower skilled (Levels 1-2)	Unskilled and defined decision making (Paterson A)	0.00	0.0
Skilled (Levels 3-5)	Semi-skilled & discretionary decision making (Paterson B)	329,386.27	0.1
Highly skilled production (Levels 6-8)	Skilled technical & academically qualified (Paterson C)	693,358.69	0.2
Highly skilled supervision (Levels 9-12)	Professionally qualified & specialists (Paterson D)	281,523.80	0.1
Senior Management (Levels 13-16)	Senior and Top Management (Paterson E & F)	0.00	0.0
Total		1,304,268.76	0.4

EMPLOYMENT

The following table summarises the number of filled and vacant posts.

Table 3: Employment and vacancies by occupational categories as at 31 March 2021 (includes permanent and contract staff)

PUBLIC SECTOR SALARY LEVELS	SAMRC EQUIVALENT OCCUPATIONAL CATEGORY	NUMBER OF POSTS	NUMBER OF POSTS FILLED	NO OF VACANT POSTS	VACANCY RATE (%) (NO OF VACANT POSTS/ NO OF POSTS X 100)
Lower skilled (Levels 1-2)	Unskilled and defined decision making (Paterson A)	41	40	1	2.4
Skilled (Levels 3-5)	Semi-skilled & discretionary decision making (Paterson B)	109	108	1	0.9
Highly skilled production (Levels 6-8)	Skilled technical & academically qualified (Paterson C)	266	257	9	3.4
Highly skilled supervision (Levels 9-12)	Professionally qualified & specialists (Paterson D)	170	164	6	3.5
Senior Management (Levels 13-16)	Senior and Top Management (Paterson E & F)	62	55	7	11.3
TOTAL		648	624	24	3.7

JOB EVALUATION

Table 4 below summarises the number of jobs that were evaluated (graded) during the year under review.

Table 4: Job evaluation, 1 April 2020 to 31 March 2021

PUBLIC SECTOR SALARY LEVELS	SAMRC EQUIVALENT OCCUPATIONAL CATEGORY	NUMBER OF POSTS FILLED	NUMBER OF POSTS EVALUATED	% OF POSTS EVALUATED BY SALARY LEVELS	POSTS EVALUATED	
					NUMBER	% OF TOTAL POSTS EVALUATED
Lower skilled (Levels 1-2)	Unskilled and defined decision making (Paterson A)	40	0	0.0	0	0.0
Skilled (Levels 3-5)	Semi-skilled & discretionary decision making (Paterson B)	108	0	0.0	0	0.0
Highly skilled production (Levels 6-8)	Skilled technical & academically qualified (Paterson C)	257	1	0.4	1	33.3
Highly skilled supervision (Levels 9-12)	Professionally qualified & specialists (Paterson D)	164	1	0.6	1	33.3
Senior management	Senior and Top Management (Paterson E & F)	55	1	1.8	1	33.3
Total		624	3	0.5	3	100.0

Note: Posts were only evaluated for recruitment purposes.

EMPLOYMENT EQUITY

Table 5 A: Total number of employees (including employees with disabilities) in each of the following occupational levels as at 31 March 2021

OCCUPATIONAL LEVELS	MALE				FEMALE				FOREIGN NATIONALS		TOTAL
	AFRICAN	COLOURED	INDIAN	WHITE	AFRICAN	COLOURED	INDIAN	WHITE	MALE	FEMALE	
Top Management	3	0	0	1	0	0	0	2	0	0	6
Senior Management	1	4	4	11	2	6	4	11	4	2	49
Professionally qualified and experienced specialists and mid-management	15	8	5	3	40	26	25	27	6	9	164
Skilled technical and academically qualified workers, junior management, supervisors, foremen, and superintendents	26	25	12	3	110	45	28	6	0	2	257
Semi-skilled and discretionary decision making	39	5	2	2	47	8	2	2	1	0	108
Unskilled and defined decision making	10	3	0	0	17	10	0	0	0	0	40
Total	94	45	23	20	216	95	59	48	11	13	624

Note: Top Management: 1 white male exited 31 Dec 2020 and 1 coloured male deceased in Oct 2020. They are not included in the figures above.

Table 5 B: Total number of employees with disabilities only as at 31 March 2021

OCCUPATIONAL LEVELS	MALE				FEMALE				FOREIGN NATIONAL		TOTAL
	AFRICAN	COLOURED	INDIAN	WHITE	AFRICAN	COLOURED	INDIAN	WHITE	MALE	FEMALE	
Top Management	0	0	0	0	0	0	0	0	0	0	0
Senior Management	0	0	0	1	0	0	0	0	0	0	1
Professionally qualified and experienced specialists and mid-management	0	0	0	0	0	0	1	1	0	0	2
Skilled technical and academically qualified workers, junior management, supervisors, foremen, and superintendents	0	0	0	0	0	0	0	0	0	0	0
Semi-skilled and discretionary decision making	0	0	0	0	1	0	0	0	0	0	1
Unskilled and defined decision making	0	0	0	0	0	1	0	0	0	0	1
Total	0	0	0	1	1	1	1	1	0	0	5

Table 6: Recruitment (new recruits), 1 April 2020 to 31 March 2021

OCCUPATIONAL LEVEL	MALE				FEMALE				FOREIGN NATIONAL		TOTAL
	AFRICAN	COLOURED	INDIAN	WHITE	AFRICAN	COLOURED	INDIAN	WHITE	MALE	FEMALE	
Top Management	0	0	0	0	0	0	0	0	0	0	0
Senior Management	0	0	0	0	0	0	0	0	0	0	0
Professionally qualified and experienced specialists and mid-management	3	0	0	0	2	1	3	1	0	0	10
Skilled technical and academically qualified workers, junior management, supervisors, foreman and superintendents	3	0	0	0	25	0	2	0	0	0	30
Semi-skilled and discretionary decision making	3	0	1	0	19	0	0	0	0	0	23
Unskilled and defined decision making	2	0	0	0	1	0	0	0	0	0	3
Total	11	0	1	0	47	1	5	1	0	0	66

Note: The table above excludes postdocs, interns and EDCTP.

Table 7: Career Progression and Advancement by race and gender, 1 April 2020 to 31 March 2021

Table 7 below provides similar information on career progression and advancements by race and gender.

OCCUPATIONAL CATEGORY	MALE				FEMALE				FOREIGN NATIONAL		TOTAL
	AFRICAN	COLOURED	INDIAN	WHITE	AFRICAN	COLOURED	INDIAN	WHITE	MALE	FEMALE	
	Lower skilled (Levels 1-2) – Pat A	0	0	0	0	0	0	0	0	0	
Skilled (Levels 3-5) – Pat B	0	0	0	0	0	0	0	0	0	0	0
Highly skilled production – Pat C (Levels 6-8)	0	0	0	0	0	0	0	0	0	0	0
Highly skilled supervision (Levels 9-12) – Pat D	0	0	0	0	0	0	0	0	0	0	0
Senior Management – Pat E & F	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0

Note: Due to a directive from Government to implement a moratorium on any changes to the conditions of service and benefits to any employee, there has been no career progression and advancement opportunities.

Tables 8 A and B below details all staff exiting the organisation including the reasons.

Table 8 A: Exits by race, gender, and occupational level (including people with disabilities), 1 April 2020 to 31 March 2021

OCCUPATIONAL LEVEL	MALE				FEMALE				FOREIGN NATIONAL		TOTAL
	AFRICAN	COLOURED	INDIAN	WHITE	AFRICAN	COLOURED	INDIAN	WHITE	MALE	FEMALE	
	Top Management	0	1	0	0	0	0	0	0	0	
Senior Management	0	1	0	0	0	1	0	1	0	0	3
Professionally qualified and experienced specialists and mid-management	1	2	1	0	8	2	3	2	1	0	20
Skilled technical and academically qualified workers, junior management, supervisors, foreman and superintendents	9	0	0	0	10	4	6	1	0	0	30
Semi-skilled and discretionary decision making	3	0	0	0	9	3	0	0	0	0	15
Unskilled and defined decision making	0	0	0	0	1	0	0	0	0	0	1
Total	13	4	1	0	28	10	9	4	1	0	70

Table 8 B: Reasons why staff are leaving the organisation, 1 April 2020 to 31 March 2021

TERMINATION TYPE	NUMBER OF TERMINATIONS	% OF TOTAL TERMINATIONS
Death	2	2.8
Resignation	42	60.0
Expiry of contract	20	28.6
Retrenchment – operational requirements	0	0.0
Dismissal: Misconduct	0	0.0
Poor performance	0	0.0
Discharged due to ill-health	0	0.0
Retirement	3	4.3
Transfers to tertiary institution	3	4.3
Total	70	100.0
Total number of employees who left as a % of the total employment Formula used: terminations/total no of employees x 100 = turnover rate (%) for organisation		11.0
Total number of employees who left excluding natural end of contract as a % of the total employment Formula used: terminations/total no of employees x 100 = turnover rate (%) for organisation		8.0

Table 9: Skills development, 1 April 2020 to 31 March 2021

The table below refers to all staff (including people with disabilities) who are in receipt of SAMRC study support and training.

OCCUPATIONAL LEVELS	MALE				FEMALE				TOTAL
	AFRICAN	COLOURED	INDIAN	WHITE	AFRICAN	COLOURED	INDIAN	WHITE	
	Top management	1	0	0	0	0	0	0	
Senior management	0	1	0	7	0	2	1	3	14
Professionally qualified and experienced specialists and mid-management	5	9	0	0	17	3	6	6	46
Skilled technical and academically qualified workers, junior management, supervisors, foremen, and superintendents	17	5	6		44	14	13	1	100
Semi-skilled and discretionary decision making	12	0	0	0	25	2	0	0	39
Unskilled and defined decision making	7	0	0	0	0	0	0	0	7
Total	42	15	6	7	86	21	20	10	207

PERFORMANCE REWARDS

In recognition of performance relating to 2019/20, the organisation granted performance bonuses to its personnel as follows:

Table 10: Performance Bonuses by Occupational Category, 1 April 2020 to 31 March 2021

PUBLIC SECTOR SALARY LEVELS	SAMRC EQUIVALENT OCCUPATIONAL CATEGORY	BENEFICIARY PROFILE			EXPENDITURE		
		NUMBER OF BENEFICIARIES	NUMBER OF POSTS FILLED	% OF TOTAL STAFF WITHIN SALARY BANDS	TOTAL (R)	AVERAGE PER EMPLOYEE (R)	TOTAL BONUS EXPENDITURES A % OF THE TOTAL PERSONNEL EXPENDITURE IN THE BAND
Lower Skilled (levels 1-2)	Unskilled and defined decision making (Paterson A)	18	40	45.0	57,082.44	3,171.24	0.02
Skilled (Levels 3-5)	Semi-skilled & Discretionary decision making (Paterson B)	61	108	56.5	203,611.00	3,337.88	0.06
Highly Skilled Production (Levels 6-8)	Skilled technical and academically qualified (Paterson C)	177	257	68.9	1,282,463.45	7,245.55	0.40
Highly skilled supervision (Levels 9-12)	Professionally qualified & specialists (Paterson D)	132	164	80.5	2,021,679.58	15,315.75	0.60
Senior Management Band E&F	Senior Management and Top Management (Paterson E & F)	53	55	96.4	1,647,313.00	31,081.37	0.50
Total		441	624	70.7	5,212,149.47	11,818.93	1.60

FOREIGN NATIONAL WORKERS

The tables below summarise the employment of foreign nationals in the organisation by salary bands and major occupation. The tables also summarise changes in the total number of foreign nationals in each salary band and by each major occupation.

Table 11: Foreign nationals by Occupational Category as at 31 March 2021

PUBLIC SECTOR SALARY LEVELS	SAMRC EQUIVALENT OCCUPATIONAL CATEGORY	NUMBER	% OF TOTAL NO OF EMPLOYEES (624)
Lower skilled (Levels 1-2)	Unskilled and defined decision making (Paterson A)	0	0.0
Skilled (Levels 3-5)	Semi-skilled & discretionary decision making (Paterson B)	1	0.2
Highly skilled production (Levels 6-8)	Skilled technical & academically qualified (Paterson C)	2	0.3
Highly skilled supervision (Levels 9-12)	Professionally qualified & specialists (Paterson D)	15	2.4
Senior Management (Levels 13-16)	Senior and Top Management (Paterson E & F)	6	0.9
Total		24	3.8

Table 12: Foreign nationals by job title as at 31 March 2021

JOB TITLE	NUMBER	% OF TOTAL NO OF EMPLOYEES (624)
Unit Director	3	0.4
Chief Specialist Scientist	1	0.2
Senior Specialist Scientist	0	0.0
Specialist Scientist	7	1.1
Senior Scientist	7	1.1
Senior Data Manager	1	0.2
Senior Data Scientist	0	0.0
Research Manager	1	0.2
Chief Research Technologist	0	0.0
Division Manager	1	0.2
Senior Research Technician	0	0.0
Research Technologist	1	0.2
Project Leader	1	0.2
Pharmacist	1	0.2
Driver	0	0.0
Total	24	3.8

LEAVE UTILIZATION: 1 APRIL 2020 TO 31 MARCH 2021

Table 13 below provides an indication of the use of sick leave while Table 14 depicts disability leave granted. In both cases, the cost of the leave is also provided.

Table 13: Sick leave, 1 April 2020 to 31 March 2021

PUBLIC SECTOR SALARY LEVEL	SAMRC EQUIVALENT OCCUPATIONAL CATEGORY	TOTAL SICK LEAVE DAYS TAKEN	NO OF SICK LEAVE DAYS TAKEN REQUIRING A MEDICAL CERTIFICATE >2 DAYS	% DAYS WITH MEDICAL CERTIFICATION	NUMBER OF EMPLOYEES USING SICK LEAVE	NO OF POSTS FILLED	% OF TOTAL EMPLOYEES USING SICK LEAVE	AVERAGE DAYS SICK LEAVE PER EMPLOYEE	VALUE (R)
Lower skilled (Levels 1-2)	Unskilled and defined decision making (Paterson A)	158	108	68.4	28	40	70.0	5.6	18,765.00
Skilled (Level 3-5)	Semi-skilled & Discretionary decision making (Paterson B)	334	141	42.2	87	108	80.6	3.8	242,476.00
Highly skilled production (Levels 6-8)	Skilled technical & academically qualified (Paterson C)	734	324	44.1	212	257	82.5	3.5	1,089,929.00
Highly skilled supervision (Levels 9-12)	Professionally qualified & specialists (Paterson D)	385	234	60.8	105	164	64.0	3.7	1,202,789.00
Senior Management	Senior and Top Management (Paterson E & F)	81	43	53.1	12	55	21.8	6.8	271,273.00
Total		1692	850	50.2	444	624	71.2	3.8	2,825,232.00

Table 14: Special sick leave (temporary), 1 April 2020 to 31 March 2021

PUBLIC SECTOR SALARY LEVEL	SAMRC EQUIVALENT OCCUPATIONAL CATEGORY	TOTAL DAYS TAKEN	% DAYS WITH MEDICAL CERTIFICATION	NUMBER OF EMPLOYEES USING DISABILITY LEAVE	NO OF POSTS FILLED	% OF TOTAL EMPLOYEE FOR THIS BAND USING DISABILITY LEAVE	AVERAGE SPECIAL SICK LEAVE DAYS TAKEN PER EMPLOYEE (TOTAL DAYS TAKEN/NO EMPLOYEES USING SICK LEAVE)	VALUE (R)
Lower skilled (Levels 1-2)	Unskilled and defined decision making (Paterson A)	0	0.0	0	40	0.0	0.0	0.00
Skilled (Levels 3-5)	Semi-skilled & discretionary decision making (Paterson B)	0	0.0	0	108	0.0	0.0	0.00
Highly skilled production (Levels 6-8)	Skilled technical & academically qualified (Paterson C)	13	100.0	1	257	0.4	13.0	12,772.00
Highly skilled supervision (Levels 9-12)	Professionally qualified & specialists (Paterson D)	65	100.0	1	164	0.6	65.0	283,261.00
Senior Management	Senior and Top Management (Paterson E & F)	10	100.0	1	55	1.8	10.0	76,370.00
Total		88	100.0	3	624	0.5	29.3	372,403.00

Note: Special sick leave refers to additional sick leave awarded for major incidents or illness in addition to normal sick leave allocation

Table 15 below summarises the utilisation of annual leave.

Table 15 Annual Leave, 1 April 2020 to 31 March 2021

PUBLIC SECTOR SALARY LEVEL	SAMRC EQUIVALENT OCCUPATIONAL CATEGORY	NO OF POSTS FILLED	TOTAL DAYS TAKEN	AVERAGE ANNUAL LEAVE DAYS TAKEN PER EMPLOYEE
Lower skilled (Levels 1-2)	Unskilled and defined decision making (Paterson A)	40	562	14.1
Skilled (Levels 3-5)	Semi-skilled & discretionary decision making (Paterson B)	108	1122	10.4
Highly skilled production (Levels 6-8)	Skilled technical & academically qualified (Paterson C)	257	3333	13.0
Highly skilled supervision (Levels 9-12)	Professionally qualified & specialists (Paterson D)	164	2541	15.5
Senior Management	Senior and Top Management (Paterson E & F)	55	803	14.6
Total		624	8361	13.4

Table 16: Forfeited leave, 1 April 2020 to 31 March 2021

PUBLIC SECTOR SALARY LEVELS	SAMRC EQUIVALENT OCCUPATIONAL CATEGORY	NO OF EMPLOYEES WHO FORFEITED LEAVE	TOTAL DAYS OF LEAVE FORFEITED	AVERAGE NUMBER OF DAYS FORFEITED PER EMPLOYEE
Lower skilled (Level 1-2)	Unskilled and defined decision making (Paterson A)	0	0	0
Skilled (Levels 3-5)	Semi-skilled & discretionary decision making (Paterson B)	0	0	0
Highly skilled production (Levels 6-8)	Skilled technical & academically qualified (Paterson C)	0	0	0
Highly skilled supervision (Levels 9-12)	Professionally qualified & specialists (Paterson D)	0	0	0
Senior Management	Senior and Top Management (Paterson E & F)	0	0	0
Total		0	0	0

Note: Due to the lockdown period, it was approved not to implement forfeiting of leave by the end of 2020.

Table 17: Leave pay outs, 1 April 2020 to 31 March 2021

REASON	NUMBER OF EMPLOYEES	TOTAL AMOUNT (R)
Terminations (all exits)	67	1,697,593.68
Encashment in service approved by Board	455	7,404,547.30
Total		9,102,140.98

EMPLOYEE WELLNESS PROGRAMME: HEALTH PROMOTION

Table 18: Details of Health Promotion and HIV and AIDS Programmes (part of SAMRC Employee Wellness Program)

- The HR Executive Director takes responsibility for the SAMRC Employee Wellness Programme in order to implement the provisions contained in Part VI E of Chapter 1 of the Public Service Regulations, 2001.
- HR has 3 staff dedicated members, in collaboration with the appointed service provider, to promote the health and well-being of the SAMRC employees. The budget is R450 000 per annum.
- HR has introduced an Employee Wellness Programme to employees with an Employee Assistance Programme, with the key elements including a 24/7/365 Call Centre, face to face counselling, trauma debriefing, HIV and chronic disease management, life management and work-related issues, wellness days, employee orientation and awareness programmes and management assistance and orientation.
- There is a committee as contemplated in Part VI E.5 (e) of Chapter 1 of the Public Service Regulations, 2001, consisting of the HR Executive, Divisional Manager, Wellness Officer, the appointed service provider (Alexander Forbes) and a representative from the corporate supported medical scheme.
- HR reviews its employment policies on a 2 to 3-year cycle basis, to ensure that these do not unfairly discriminate against employees on the basis of their HIV status. The relevant policies are Performance Management Policy, Recruitment Policy, Transformation Strategy and Employee Relations Policy.
- HR has not formally introduced measures to protect HIV-positive employees or those perceived to be HIV-positive from discrimination. However, it is part of the SAMRC general code of conduct to honour the Constitution, EE and LRA Acts and other legislation, including reference to non-discriminatory practices and conduct. The SAMRC subscribes to the principles of no unfair discrimination.
- HR encourages employees of the SAMRC to undergo voluntary counselling and testing (VCT) during the wellness days initiatives. The individual information remains confidential. Due to lockdown, wellness days were not arranged and VCT not offered.
- The service provider provides HR a regular report with statistics, observations and trends to monitor & evaluate the impact of its employee wellness programme. This is furthermore supported by promotion of the programme through information sessions and training.

LABOUR RELATIONS

Table 19: Disciplinary action considered by a formal disciplinary hearing, 1 April 2020 to 31 March 2021

	MALE				FEMALE				FOREIGN NATIONAL		TOTAL
	AFRICAN	COLOURED	INDIAN	WHITE	AFRICAN	COLOURED	INDIAN	WHITE	MALE	FEMALE	
Disciplinary action	2	0	0	0	1	0	0	0	0	0	3

The following table summarises the outcome of both formal and informal disciplinary processes conducted within the organisation for the year under review.

Table 20: Misconduct and disciplinary hearings finalised, 1 April 2020 to 31 March 2021

OUTCOME OF DISCIPLINARY HEARINGS	NUMBER
Verbal warning	0
Written warning	1
Final written warning	4
Suspended without pay	0
Fine	0
Demotion	0
Dismissal	0
Not guilty	0
Case withdrawn	0
Total	5

Table 21: Types of misconduct addressed at disciplinary hearings

TYPE OF MISCONDUCT	NUMBER OF EMPLOYEES
Absence without permission	2
Late coming	1
Negligence	1
Insubordination	1
Total	5

Table 22: Grievances lodged, 1 April 2020 to 31 March 2021

	NUMBER
Number of grievances resolved	0
Number of grievances not resolved	0
Total number of grievances lodged	0

Table 23: Disputes pending before the CCMA, 1 April 2020 to 31 March 2021

	NUMBER
Number of disputes in progress	1
Number of disputes settled	0

Table 24: Strike actions, 1 April 2020 to 31 March 2021

Total number of employees working days lost	None
Total cost (R) of working days lost	
Amount (R) recovered as a result of no work no pay	

Table 25: Precautionary suspensions, 1 April 2020 to 31 March 2021

Number of people suspended	1
Average number of days suspended	26
Cost (R) of suspensions	R14,518.40

SKILLS DEVELOPMENT

This section highlights the strides made by the organisation to improve the development of skills.

Table 26: Training needs identified, 1 April 2020 to 31 March 2021 (WSP)

OCCUPATIONAL CATEGORY	GENDER	TRAINING NEEDS IDENTIFIED AT START OF REPORTING PERIOD				
		NUMBER OF EMPLOYEES AS AT 1 APRIL 2020	LEARNERSHIPS	SKILLS PROGRAMMES & OTHER SHORT COURSES	OTHER FORMS OF TRAINING	TOTAL
Legislators, senior officials, and managers	Female	28	0	1	0	1
	Male	29	0	0	0	0
Professionals	Female	136	0	19	25	44
	Male	40	0	1	1	2
Technicians and associate professionals	Female	181	0	39	152	191
	Male	72	0	10	6	16
Clerks	Female	57	0	1	41	42
	Male	48	0	24	14	38
Service and sales workers	Female	0	0	0	0	0
	Male	0	0	0	0	0
Skilled agriculture and fishery workers	Female	0	0	0	0	0
	Male	0	0	0	0	0
Craft and related trades workers	Female	0	0	0	0	0
	Male	0	0	0	0	0
Plant and machine operators and assemblers	Female	0	0	0	0	0
	Male	0	0	0	0	0
Elementary occupations	Female	26	0	0	0	0
	Male	11	0	0	0	0
Sub Total	Female	428	0	60	218	278
	Male	200	0	35	21	56
Total		628	0	95	239	334

NA=not applicable

Table 27: Training provided, 1 April 2020 to 31 March 2021 (ATR)

OCCUPATIONAL CATEGORY	GENDER	NUMBER OF EMPLOYEES AS AT 1 APRIL 2020	TRAINING PROVIDED WITHIN THE REPORTING PERIOD			TOTAL
			LEARNERSHIPS	SKILLS PROGRAMMES & OTHER SHORT COURSES	OTHER FORMS OF TRAINING	
Legislators, senior officials and managers	Female	28	0	6	2	8
	Male	29	0	1	2	3
Professionals	Female	136	0	31	65	96
	Male	40	0	10	8	18
Technicians and associate professionals	Female	181	0	39	193	232
	Male	72	0	25	50	75
Clerks	Female	57	0	19	132	151
	Male	48	0	9	30	39
Service and sales workers	Female	0	0	0	0	0
	Male	0	0	0	0	0
Skilled agriculture and fishery workers	Female	0	0	0	0	0
	Male	0	0	0	0	0
Craft and related trades workers	Female	0	0	0	0	0
	Male	0	0	0	0	0
Plant and machine operators and assemblers	Female	0	0	0	0	0
	Male	0	0	0	0	0
Elementary occupations	Female	26	0	0	0	0
	Male	11	0	0	0	0
Sub Total	Female	428	0	95	392	487
	Male	200	0	45	90	135
Total		628	0	140	482	622

NA=not applicable

INJURY ON DUTY

The following table provides basic information on injury on duty.

Table 28: Injury on duty, 1 April 2020 to 31 March 2021

NATURE OF INJURY ON DUTY	NUMBER
Required basic medical attention only	2
Temporary total disablement	2
Permanent disablement	0
Fatal	0
Total	4

PART E

AUDITED FINANCIAL STATEMENTS

INDEX

The reports and statements set out below comprise the audited annual financial statements presented to parliament:

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NATURE OF BUSINESS AND PRINCIPAL ACTIVITIES

The South African Medical Research Council (SAMRC) is a section 3A public entity, it is accountable to Parliament for its performance and budget. The mandate of the SAMRC, in terms of the MRC Act 58, 1991 (as amended), is to improve the health and quality of life of South Africans. This needs to be realised through research, capacity development and technology transfer. SAMRC focuses on the top ten causes of death and disability associated risk factors. SAMRC acquires the most accurate healthcare information and provides policy makers with tools to enhance the quality of life for the people in South Africa. The address of the SAMRC's principal place of business is Francie Van Zijl Drive, Parowvalley, Cape Town.

REPORT OF THE CHIEF EXECUTIVE OFFICER & PRESIDENT

GENERAL FINANCIAL REVIEW

(All figures R'000, prior year in parenthesis.)

Revenue for the year showed an increase of 7.1% to R1169 593 (R1092 305). This consists of an increase in government grants of 24% to R743 168 (R 597 101) offset to some extent by a decrease in contract income of 13.9% to R426 425 (R495 204).

Operating expenses reflected an increase of 2.3% to R1 128 037 (R1 103 131) mainly driven by an increase in collaborative research costs of 16.4% to R532 719 (R457 540).

This has resulted in an operating surplus R57 330 for the year compared to an operating surplus of R12 246 in 2019/20. A decrease in investment income of 39.8% to R19 638 (R32 630) due to a decline in interest rates and a decrease in the average balance of investments during the year under review resulted in a net surplus for the year of R79 218 compared to a net surplus of R43 042 in 2019/2020.

The organisation remains financially strong with accumulated reserves of R420 749 (R341 530).

Total assets have increased by 36.6% to R922 077 (R674 862) due mainly to an increase in cash and cash equivalents of R230 576 from National Government as well as local and international funders to fund COVID-19 research.

Deferred income has increased by R107 987 to R306 353 due to additional funds received for research activities not yet performed while payables from exchange transactions increased by R65 033 to R175 450 due to contractual liabilities recognised on research contracts.

The SAMRC generated a positive operating cashflow of R284 646 compared to a negative operating cash flow of R59 139 in the prior period due to an increase in grant receipts and lower payments to suppliers.

Net cash flows from investing activities were negative due mainly to capital expenditure of R49 318 (R30 857).

The net impact of the above is an increase of R230 576 in cash and cash equivalents compared to a decrease of R92 905 in the prior year.

SPENDING TRENDS

Employee related costs have decreased by 4.1% to R386 210 (R402 747). Basic salary costs have decreased by 2.5% to R 325 706 (R333 933). No salary increases were implemented in 2020/21 in line with National Treasury instructions.

Leave payments have increased by 173% to R9 752 (R3 566) while temporary staff costs have decreased by 22.8% to R17 240 (R22 331)

Employee related costs include a bonus provision of R5 025 (R5 137). Initiatives to manage the employer liabilities in relation to the Defined Benefit Pension fund and Post-Retirement Medical Aid have yielded further results with a further reduction in these liabilities of R7 975 (R2 134) for the year.

The net surplus for the year of R79 218 compared to a final budget surplus of R51 755. Revenue was R4 230 over budget due mainly to the recoupment of research payments made. Personnel costs were R17 824 under budget due to lower research activities as well as a decrease in the liability for the defined benefit pension fund. Tight control of costs resulted in repairs and maintenance, travel and subsistence, consulting costs, IT costs and laboratory costs showing significant savings on budget.

REQUESTS FOR ROLL OVER OF FUNDS

The organisation remains financially strong with accumulated reserves of R420 749 (R341 530). The necessary approvals have been requested for the rollover of funds received from Government but not yet spent.

SUPPLY CHAIN MANAGEMENT

There were no unsolicited bid proposals received during the year. The existing Materiality Framework was approved by the Minister.

AUDIT REPORT MATTERS

There were no matters to report.

EVENTS AFTER THE REPORTING DATE

No significant events were identified after the reporting date that may have an impact on the financial statements.

ECONOMIC VIABILITY

Funding allocations of R851 714 for 2021/22 have been approved by government. This together with accumulated reserves of R420 749 and the increase anticipated in the value of grants received will ensure that the SAMRC will continue to operate as a going concern.

REPORT OF THE AUDITOR-GENERAL TO PARLIAMENT ON THE SOUTH AFRICAN MEDICAL RESEARCH COUNCIL

REPORT ON THE AUDIT OF THE FINANCIAL STATEMENTS

Opinion

- I have audited the financial statements of the South African Medical Research Council set out on pages 247 to 314, which comprise the statement of financial position as at 31 March 2021, statement of financial performance, statement of changes in net assets, cash flow statement and statement of comparison of budget and actual amounts for the year then ended, as well as notes to the financial statements, including a summary of significant accounting policies.
- In my opinion, the financial statements present fairly, in all material respects, the financial position of the South African Medical Research Council as at 31 March 2021, and its financial performance and cash flows for the year then ended in accordance with the Standards of Generally Recognised Accounting Practice (Standards of GRAP) and the requirements of the Public Finance Management Act 1 of 1999 (PFMA).

Basis for opinion

- I conducted my audit in accordance with the International Standards on Auditing (ISAs). My responsibilities under those standards are further described in the auditor-general's responsibilities for the audit of the financial statements section of my report.
- I am independent of the public entity in accordance with the International Ethics Standards Board for Accountants' *International code of ethics for professional accountants (including International Independence Standards)* (IESBA code) as well as other ethical requirements that are relevant to my audit in South Africa. I have fulfilled my other ethical responsibilities in accordance with these requirements and the IESBA code.
- I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my opinion.

Emphasis of matter

- I draw attention to the matter below. My opinion is not modified in respect of this matter.

Sisonke phase 3B implementation study

- I draw attention to note 33 to the financial statements, which deals with commitments. The public entity has disclosed grant commitments to various research institutions. The amount arose as a result of funding agreements entered into with researchers to enable them to carry out the Sisonke study protocol as part of the response to the national disaster brought on by the covid-19 pandemic. The amount of the commitment was R117 075 039 as disclosed in note 33.

Other matter

- I draw attention to the matter below. My opinion is not modified in respect of this matter.

Unaudited supplementary schedules

- The supplementary information set out on page 315 does not form part of the financial statements and is presented as additional information. I have not audited this schedule and, accordingly, I do not express an opinion thereon.

Responsibilities of the accounting authority for the financial statements

- The board, which constitutes the accounting authority, is responsible for the preparation and fair presentation of the financial statements in accordance with the Standards of GRAP and the requirements of the PFMA, and for such internal control as the accounting authority determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

REPORT OF THE AUDITOR-GENERAL TO PARLIAMENT ON THE SOUTH AFRICAN MEDICAL RESEARCH COUNCIL (CONTINUED)

- In preparing the financial statements, the accounting authority is responsible for assessing the public entity's ability to continue as a going concern, disclosing, as applicable, matters relating to going concern and using the going concern basis of accounting unless the appropriate governance structure either intends to liquidate the public entity or to cease operations, or has no realistic alternative but to do so.

Auditor-general's responsibilities for the audit of the financial statements

- My objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes my opinion. Reasonable assurance is a high level of assurance but is not a guarantee that an audit conducted in accordance with the ISAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.
- A further description of my responsibilities for the audit of the financial statements is included in the annexure to this auditor's report.

REPORT ON THE AUDIT OF THE ANNUAL PERFORMANCE REPORT

Introduction and scope

- In accordance with the Public Audit Act 25 of 2004 (PAA) and the general notice issued in terms thereof, I have a responsibility to report on the usefulness and reliability of the reported performance information against predetermined objectives for selected programmes presented in the annual performance report. I performed procedures to identify material findings but not to gather evidence to express assurance.

- My procedures address the usefulness and reliability of the reported performance information, which must be based on the public entity's approved performance planning documents. I have not evaluated the completeness and appropriateness of the performance indicators included in the planning documents. My procedures do not examine whether the actions taken by the public entity enabled service delivery. My procedures do not extend to any disclosures or assertions relating to the extent of achievements in the current year or planned performance strategies and information in respect of future periods that may be included as part of the reported performance information. Accordingly, my findings do not extend to these matters.
- I evaluated the usefulness and reliability of the reported performance information in accordance with the criteria developed from the performance management and reporting framework, as defined in the general notice, for the following selected programmes presented in the public entity's annual performance report for the year ended 31 March 2021:

PROGRAMMES	PAGES IN THE ANNUAL REPORT
Programme 2 – core research	26 – 27
Programme 3 – innovation and technology	28 – 29

- I performed procedures to determine whether the reported performance information was properly presented and whether performance was consistent with the approved performance planning documents. I performed further procedures to determine whether the indicators and related targets were measurable and relevant, and assessed the reliability of the reported performance information to determine whether it was valid, accurate and complete.

REPORT OF THE AUDITOR-GENERAL TO PARLIAMENT ON THE SOUTH AFRICAN MEDICAL RESEARCH COUNCIL (CONTINUED)

18. I did not identify any material findings on the usefulness and reliability of the reported performance information for these programmes:

- Programme 2 – core research
- Programme 3 – innovation and technology

REPORT ON THE AUDIT OF COMPLIANCE WITH LEGISLATION

Introduction and scope

19. In accordance with the PAA and the general notice issued in terms thereof, I have a responsibility to report material findings on the public entity's compliance with specific matters in key legislation. I performed procedures to identify findings but not to gather evidence to express assurance.

20. I did not identify any material findings on compliance with the specific matters in key legislation set out in the general notice issued in terms of the PAA.

OTHER INFORMATION

21. The accounting authority is responsible for the other information. The other information does not include the financial statements, the auditor's report and those selected programmes presented in the annual performance report that have been specifically reported in this auditor's report.

22. My opinion on the financial statements and findings on the reported performance information and compliance with legislation do not cover the other information and I do not express an audit opinion or any form of assurance conclusion on it.

23. In connection with my audit, my responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial statements and the selected programmes presented in the annual performance report, or my knowledge obtained in the audit, or otherwise appears to be materially misstated.

24. I have nothing to report in this regard.

INTERNAL CONTROL DEFICIENCIES

25. I considered internal control relevant to my audit of the financial statements, reported performance information and compliance with applicable legislation; however, my objective was not to express any form of assurance on it.

26. I did not identify any significant deficiencies in internal control.

Auditor General

Cape Town
31 August 2021



ANNEXURE – AUDITOR GENERAL'S RESPONSIBILITY FOR THE AUDIT

1. As part of an audit in accordance with the ISAs, I exercise professional judgement and maintain professional scepticism throughout my audit of the financial statements and the procedures performed on reported performance information for selected programmes and on the public entity's compliance with respect to the selected subject matters.

FINANCIAL STATEMENTS

2. In addition to my responsibility for the audit of the financial statements as described in this auditor's report, I also:

- identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error; design and perform audit procedures responsive to those risks; and obtain audit evidence that is sufficient and appropriate to provide a basis for my opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations or the override of internal control
- obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the public entity's internal control
- evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the board, which constitutes the accounting authority

- conclude on the appropriateness of the accounting officer's use of the going concern basis of accounting in the preparation of the financial statements. I also conclude, based on the audit evidence obtained, whether a material uncertainty exists relating to events or conditions that may cast significant doubt on the ability of the public entity to continue as a going concern. If I conclude that a material uncertainty exists, I am required to draw attention in my auditor's report to the related disclosures in the financial statements about the material uncertainty or, if such disclosures are inadequate, to modify my opinion on the financial statements. My conclusions are based on the information available to me at the date of this auditor's report. However, future events or conditions may cause a public entity to cease operating as a going concern
- evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and determine whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

COMMUNICATION WITH THOSE CHARGED WITH GOVERNANCE

3. I communicate with the accounting authority regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that I identify during my audit.
4. I also provide the accounting authority with a statement that I have complied with relevant ethical requirements regarding independence, and to communicate with them all relationships and other matters that may reasonably be thought to bear on my independence and, where applicable, actions taken to eliminate threats or safeguards applied.

ACCOUNTING AUTHORITY'S RESPONSIBILITIES AND APPROVAL

The Accounting Authority is required by the Public Finance Management Act (Act 1 of 1999), to maintain adequate accounting records and is responsible for the content and integrity of the annual financial statements and related financial information included in this report. It is the responsibility of the Accounting Authority to ensure that the annual financial statements fairly present the state of affairs of the entity as at the end of the financial year and the results of its operations and cash flows for the period then ended. The external auditors are engaged to express an independent opinion on the annual financial statements and were given unrestricted access to all financial records and related data.

The annual financial statements have been prepared in accordance with Standards of Generally Recognised Accounting Practice (GRAP) including any interpretations, guidelines and directives issued by the Accounting Standards Board.

The annual financial statements are based upon appropriate accounting policies consistently applied and supported by reasonable and prudent judgements and estimates. On a quarterly basis the Board approved revised estimates in response to additional income received and progress with research projects.

The Accounting Authority acknowledges that it is ultimately responsible for the system of internal financial control established by the entity and places considerable importance on maintaining a strong control environment. To enable the Accounting Authority to meet these responsibilities, the Accounting Authority sets standards for internal control aimed at reducing the risk of error or in a cost effective manner. The standards include the proper delegation of responsibilities within a clearly defined framework, effective accounting procedures and adequate segregation of duties to ensure an acceptable level of risk. These controls are monitored throughout the entity and all employees are required to maintain the highest ethical standards in ensuring the entity's business is conducted in a manner that in all reasonable circumstances is above reproach. The focus of risk management in the entity is on identifying, assessing, managing and monitoring

all known forms of risk across the entity. While operating risk cannot be fully eliminated, the entity endeavours to minimise it by ensuring that appropriate infrastructure, controls, systems and ethical behaviour are applied and managed within predetermined procedures and constraints.

The Accounting Authority is of the opinion, based on the information and explanations given by management, that the system of internal control provides reasonable assurance that the financial records may be relied on for the preparation of the annual financial statements. However, any system of internal financial control can provide only reasonable, and not absolute, assurance against material misstatement.

The Accounting Authority has reviewed the entity's cash flow forecast for the year to March 31, 2022 and, in the light of this review and the current financial position, is satisfied that the entity has or has access to adequate resources to continue in operational existence for the foreseeable future.

Although the Accounting Authority is primarily responsible for the financial affairs of the entity, it is supported by the entity's external auditors.

The external auditors are responsible for independently reviewing and reporting on the entity's annual financial statements. The annual financial statements have been examined by the entity's external auditors and their report is presented on page 240.

The annual financial statements set out on page 247 to 315, which have been prepared on the going concern basis, were approved by the Accounting Authority on August 2021 and were signed on its behalf by:



Professor J Mahlangu
Chairperson of the Board

AUDIT COMMITTEE REPORT

We are pleased to present our report for the financial year ended March 31, 2021.

AUDIT COMMITTEE MEMBERS AND ATTENDANCE

The audit committee consists of the members listed hereunder and should meet at least 4 times per annum as per its approved terms of reference. During the current year 6 meetings were held. The audited annual financial statements were reviewed and discussed at a meeting held on 25 May 2021.

NAME OF MEMBER	NUMBER OF MEETINGS ATTENDED
Professor B Shaw (Chairperson)	6
Doctor M Madikizela	6
Professor T Mavundla	6
Professor L Skaal	6
Ms. J Williams	6
Mr. J Watson (independent audit committee member appointed 1 October 2020)	3

AUDIT COMMITTEE RESPONSIBILITY

The audit committee reports that it has complied with its responsibilities arising from section 55(1)(a) of the PFMA and Treasury Regulation 27.1.

The audit committee also reports that it has adopted appropriate formal terms of reference as its audit committee charter, has regulated its affairs in compliance with this charter and has discharged all its responsibilities as contained therein.

THE EFFECTIVENESS OF INTERNAL CONTROL

The system of internal controls applied by the entity over financial and risk management is effective, efficient and transparent. In line with the PFMA and the King IV Report on Corporate Governance requirements, Internal Audit provides the audit committee and management with assurance that the internal controls are appropriate and effective. This is achieved by means of the risk management process, as well as the identification of corrective actions and suggested enhancements to the controls and processes. From the various reports of the Internal Auditors, the Audit Report on the annual financial statements, and the management report of the Auditor-General South Africa, it was noted that no matters were reported that indicate any material deficiencies in the system of internal control or any deviations therefrom.

Accordingly, we can report that the system of internal control over financial reporting for the period under review was efficient and effective.

The audit committee is satisfied with the content and quality of monthly and quarterly reports prepared and issued by the Accounting Authority of the entity during the year under review.

EVALUATION OF ANNUAL FINANCIAL STATEMENTS

The audit committee has:

- reviewed and discussed the audited annual financial statements to be included in the annual report, with the Auditor-General and the Accounting Authority;
- reviewed changes in accounting policies and practices;
- reviewed the entity's compliance with legal and regulatory provisions;

The audit committee concurs with and accepts the Auditor-General of South Africa's report on the annual financial statements, and is of the opinion that the audited annual financial statements should be accepted and read together with the report of the Auditor-General of South Africa.

AUDIT COMMITTEE REPORT

INTERNAL AUDIT

The audit committee is satisfied that the internal audit function is operating effectively and that it has addressed the risks pertinent to the entity and its audits.

AUDITOR-GENERAL OF SOUTH AFRICA

The audit committee has met with the Auditor-General of South Africa to ensure that there are no unresolved issues.

Risk Management

The risk management activity has received corporate endorsement and risk management processes have been formalised and adopted. Risk management activities are reported on a quarterly basis.

Information Systems

During the year under review a new human resource system was implemented. Modules implemented during the current year were payroll and leave, additional modules will be implemented during the next financial year.



Chairperson of the Audit Committee

Date: 30 August 2021

STATEMENT OF FINANCIAL POSITION AS AT MARCH 31, 2021

	NOTE(S)	2021 31 MARCH R	2020 31 MARCH R
Assets			
Current Assets			
Financial assets at fair value	3	8,047,704	5,558,744
Receivables from exchange transactions	4	50,746,101	63,357,217
Receivables from non-exchange transactions	5	3,369,481	2,281,053
VAT receivable	6	874,940	10,689,890
Prepayments	7	11,719,980	7,726,987
Cash and cash equivalents	8	601,037,366	370,461,853
		675,795,572	460,075,744
Non-Current Assets			
Biological assets that form part of an agricultural activity	9	80,000	1,137,538
Property, plant and equipment	10	221,474,681	198,249,751
Intangible assets	11	15,279,797	14,095,993
Living Resources	12	1,418,590	–
Investments in controlled entities	13	2	2
Employee benefit asset	17	8,028,000	1,303,000
		246,281,070	214,786,284
Total Assets		922,076,642	674,862,028
Liabilities			
Current Liabilities			
Payables from exchange transactions	14	175,449,706	110,417,000
Provisions	15	8,397,476	12,299,191
Deferred income	16	306,352,589	198,366,172
		490,199,771	321,082,363
Non-Current Liabilities			
Employee benefit obligation	17	6,714,000	7,964,000
Earmarked funds	18	4,414,042	4,285,170
		11,128,042	12,249,170
Total Liabilities		501,327,813	333,331,533
Net Assets		420,748,829	341,530,495
Accumulated surplus	19	420,748,829	341,530,495

STATEMENT OF FINANCIAL PERFORMANCE

	NOTE(S)	2021 31 MARCH R	2020 31 MARCH R
Revenue	20	1,169,592,562	1,092,304,846
Other income	21	15,774,552	23,072,669
Operating expenses	23	(1,128,036,885)	(1,103,131,032)
Operating surplus	30	57,330,229	12,246,483
Investment income	22	19,638,086	32,630,015
Fair value adjustments	28	2,396,550	(1,565,659)
Finance costs	25	(146,531)	(268,853)
Surplus for the period		79,218,334	43,041,986

STATEMENT OF CHANGES IN NET ASSETS

	TOTAL NET ASSETS 31 MARCH R
Balance at 1 April, 2019	298,488,509
Changes in net assets	
Surplus for the 12 months ended	43,041,986
Total changes	43,041,986
Balance at 1 April, 2020	341,530,495
Changes in net assets	
Surplus for the 12 months ended	79,218,334
Total changes	79,218,334
Balance at 31 March, 2021	420,748,829

CASH FLOW STATEMENT

	NOTE(S)	2021 31 MARCH R	2020 31 MARCH R
Cash flows from operating activities			
Receipts			
Interest income	22	19,535,723	32,466,696
Dividends received	22	102,363	163,319
Cash receipts from grants and other income		1,310,698,176	1,033,744,631
		1,330,336,262	1,066,374,646
Payments			
Suppliers		(1,045,543,731)	(1,125,244,756)
Finance costs		(146,531)	(268,853)
		(1,045,690,262)	(1,125,513,609)
Net cash flows from operating activities	31	284,646,000	(59,138,963)
Cash flows from investing activities			
Purchase of property, plant and equipment	10	(49,318,189)	(30,856,560)
Proceeds from sale of property, plant and equipment		15,802	713,721
Proceeds from sale of financial assets	3	4,134	–
Purchase of other intangible assets	11	(4,809,655)	(3,984,900)
Living resource additions	12	(38,917)	–
Purchase of biological assets that form part of an agricultural activity	9	(114,401)	(114,401)
Proceeds from sale of biological assets that form part of an agricultural activity	9	61,867	284,133
Net cash flows from investing activities		(54,199,359)	(33,958,007)
Cash flows from financing activities			
Movement in earmarked funds	18	128,872	192,112
Net (decrease) increase in cash and cash equivalents		230,575,513	(92,904,858)
Cash and cash equivalents at the beginning of the year		370,461,853	463,366,711
Cash and cash equivalents at the end of the period	8	601,037,366	370,461,853

An amount of R306,352,589 (March 2020: R198,366,172) included in cash and cash equivalents is due to cash received from funders for research projects in progress or not yet commenced.

STATEMENT OF COMPARISON OF BUDGET AND ACTUAL AMOUNTS

BUDGET ON ACCRUAL BASIS

	APPROVED BUDGET 31 MARCH R	ADJUSTMENTS 31 MARCH R	FINAL BUDGET 31 MARCH R	ACTUAL AMOUNTS ON COMPARABLE BASIS 31 MARCH R	DIFFERENCE BETWEEN FINAL BUDGET AND ACTUAL 31 MARCH R	REFERENCE R
Statement of Financial Performance						
Revenue						
Revenue from exchange transactions						
Income from contracts, grants and services rendered	435,106,968	(10,000,000)	425,106,968	331,477,753	(93,629,215)	40.1
Rental income	5,445,000	–	5,445,000	5,342,179	(102,821)	
Other income	3,555,235	–	3,555,235	10,432,373	6,877,138	40.3
Interest received – investment	31,000,000	(7,500,000)	23,500,000	19,535,723	(3,964,277)	40.11
Dividends received	–	–	–	102,363	102,363	
Total revenue from exchange transactions	475,107,203	(17,500,000)	457,607,203	366,890,391	(90,716,812)	
Revenue from non-exchange transactions						
Government grants & subsidies	621,789,564	121,378,783	743,168,347	743,167,826	(521)	
Income from contracts and grants (non-exchange)	–	–	–	94,946,983	94,946,983	40.1
Total revenue from non-exchange transactions	621,789,564	121,378,783	743,168,347	838,114,809	94,946,462	
Total revenue	1,096,896,767	103,878,783	1,200,775,550	1,205,005,200	4,229,650	

ACCOUNTING POLICIES (CONTINUED)

Fair value estimation

The fair value of financial instruments traded in active markets (such as trading) is based on quoted market prices at the end of the reporting period. The quoted market price used for financial assets held by the entity is the current bid price.

The fair value of financial instruments that are not traded in an active market (for example, over-the counter derivatives) is determined by using valuation techniques. The entity uses a variety of methods and makes assumptions that are based on market conditions existing at the end of each reporting period. Quoted market prices or dealer quotes for similar instruments are used for financial assets. Other techniques, such as estimated discounted cash flows, are used to determine fair value for the remaining financial instruments.

The carrying value less impairment provision of trade receivables and payables are assumed to approximate their fair values. The fair value of financial liabilities for disclosure purposes is estimated by discounting the future contractual cash flows at the current market interest rate that is available to the entity for similar financial instruments.

Impairment testing

The entity reviews and tests the carrying value of current and non-current assets when events or changes in circumstances suggest that the carrying amount may not be recoverable. Assets are grouped at the lowest level for which identifiable cash flows are largely independent of cash flows of other assets and liabilities. If there are indications that impairment may have occurred, estimates are prepared of expected future cash flows for each group of assets. Expected future cash flows used to determine the value in use of tangible assets are inherently uncertain and could materially change over time. They are significantly affected by a number of factors including supply demand, together with economic factors such as research units closed as part of the revitalisation process.

Provisions

Provisions were raised and management determined an estimate based on the information available. Additional disclosure of these estimates of provisions are included in note 15 - Provisions.

Post retirement benefits

The present value of the post retirement obligation depends on a number of factors that are determined on an actuarial basis using a number of assumptions. The assumptions used in determining the net cost (income) include the discount rate. Any changes in these assumptions will impact on the carrying amount of post retirement obligations.

The entity determines the appropriate discount rate at the end of each year. This is the interest rate that should be used to determine the present value of estimated future cash outflows expected to be required to settle the pension obligations. In determining the appropriate discount rate, the entity considers the interest rates of high-quality corporate bonds that are denominated in the currency in which the benefits will be paid, and that have terms to maturity approximating the terms of the related pension liability.

Other key assumptions for pension obligations are based on current market conditions. Additional information is disclosed in Note 17.

Useful lives of property, plant and equipment and Intangible assets

Management assess the appropriateness of the useful lives of property, plant and equipment and Intangible assets at the end of each reporting period. The useful lives of motor vehicles; furniture and office equipment; computer equipment; laboratory equipment; certain components of buildings and intangible assets are determined based on the entity's replacement practices for the various assets and factors such as technological innovation.

When the estimated useful life of an asset differs from previous estimates, the change is accounted for as a change in estimate.

ACCOUNTING POLICIES (CONTINUED)

1.3 SIGNIFICANT JUDGEMENTS AND SOURCES OF ESTIMATION UNCERTAINTY (CONTINUED)

Biological assets

The fair value of biological assets is determined by the last selling price per biological animal type.

During the year under review rhesus monkeys were classified living resources as they will be held for research purposes and not for sale.

Inventory

The SAMRC recognises inventory when it is controlled by the entity; as a result of a past event; from which it is probable that future economic benefits or service potential associated with the item will flow to the entity and the cost (or fair value) of the inventory can be measured reliably. Inventory is also recognised when control of the inventory is transferred to the entity.

Inventory is also recognised as an asset when it is in the form of materials or supplies to be consumed or distributed in the rendering of service.

Where inventory is acquired at no cost it is recognised at fair value at the date of acquisition.

The study drug received for the Sisonke Trial by Janssen Vaccines & Prevention BK was not recognised an asset controlled by the entity although its distribution achieves the research mandate of the SAMRC. The cost of the study drug could not be measured reliably as the administration modality differs between the study drug and the commercial vaccine. The fair value could not be obtained as there is no active market/quoted price for the study drug. The study drug cannot be sold and is not available for sale.

The study drug received would not be recognised as inventory.

1.4 BIOLOGICAL ASSETS THAT FORM PART OF AN AGRICULTURAL ACTIVITY

The entity recognises biological assets or agricultural produce when, and only when:

- the entity controls the asset as a result of past events;
- it is probable that future economic benefits or service potential associated with the asset will flow to the entity; and
- the fair value or cost of the asset can be measured reliably.

Biological assets are measured at their fair value less costs to sell.

Agricultural produce harvested from an entity's biological assets shall be measured at its fair value less estimated costs to sell at point of harvest.

A gain or loss arising on initial recognition of biological assets at fair value less costs to sell and from a change in fair value less estimated costs to sell biological assets is included in surplus or deficit for the period in which it arises.

Where biological assets are acquired at no cost, or for a nominal cost, the cost is determined to be its fair value less costs to sell as at the date of acquisition.

Where fair value cannot be measured reliably, biological assets are measured at cost less any accumulated impairment losses.

Horses are classified as biological assets.

1.5 PROPERTY, PLANT AND EQUIPMENT

Property, plant and equipment are tangible non-current assets (including infrastructure assets) that are held for use in the production or supply of goods or services, rental to others, or for administrative purposes, and are expected to be used during more than one period. Biological assets used for research have been transferred to living resources during the year under review.

ACCOUNTING POLICIES (CONTINUED)

1.5 PROPERTY, PLANT AND EQUIPMENT (CONTINUED)

The cost of an item of property, plant and equipment is recognised as an asset when:

- it is probable that future economic benefits or service potential associated with the item will flow to the entity; and
- the cost or fair value of the item can be measured reliably.

Property, plant and equipment is initially measured at cost.

The cost of an item of property, plant and equipment is the purchase price and other costs attributable to bring the asset to the location and condition necessary for it to be capable of operating in the manner intended by management. Trade discounts and rebates are deducted on arriving at the cost. Subsequent costs of replacing part of an item of property, plant and equipment is recognised in the carrying amount of the asset if it is probable that the future economic benefits embodied within the part will flow to the entity and its costs can be measured reliably. The cost of the replaced part is derecognised. The costs of day to day servicing of property, plant and equipment are recognised in the surplus or deficit.

Where an asset is acquired through a non-exchange transaction, its cost is its fair value as at the date of acquisition.

When significant components of an item of property, plant and equipment have different useful lives, they are accounted for as separate items (major components) of property, plant and equipment.

The entity identified the following major components of buildings as generators; buildings; prefabricated buildings; borehole tanks and pumps; water meters; water pipes and air conditioners.

The entity identified the following major components of laboratory equipment as laboratory equipment and irrigation equipment.

The entity identified the following major components of furniture and office equipment as furniture and office equipment and signage.

Property, plant and equipment is carried at cost less accumulated depreciation and any impairment losses.

Property, plant and equipment are depreciated on the straight line basis over their expected useful lives to their estimated residual value.

The useful lives of items of property, plant and equipment have been assessed as follows:

ITEM	DEPRECIATION METHOD	AVERAGE USEFUL LIFE
Land (including boreholes)	Not depreciated	Indefinite
Buildings	Straight line	40 – 50 years
Vehicles and containers	Straight line	5 – 10 years
Furniture and office equipment	Straight line	3 – 15 years
Computer equipment	Straight line	5 – 10 years
Borehole tanks and pumps	Straight line	10 – 15 years
Air conditioners	Straight line	10 – 15 years
Irrigation equipment	Straight line	10 – 15 years
Signage	Straight line	10 – 15 years
Usufruct buildings	Straight line	over life of asset
Prefabricated buildings	Straight line	20 – 30 years
Water pipes	Straight line	20 – 30 years
Water meters	Straight line	10 – 15 years
2020: Other property, plant and equipment – Biological assets – Vervet monkeys	Straight line	30 years
Laboratory equipment	Straight line	5 – 30 years

ACCOUNTING POLICIES (CONTINUED)

The items listed above are grouped in land; buildings; vehicles and containers; furniture and office equipment; computer equipment; laboratory equipment and other property, plant and equipment - vervet monkeys classes.

The residual value, the useful life and depreciation method of each asset is reviewed at the end of each reporting date. If the expectations differ from previous estimates, the change is accounted for as a change in accounting estimate. The useful lives of assets are based on management's estimation. The actual useful lives of assets and residual values are assessed annually, and may vary depending on a number of factors. In re-assessing asset useful lives, factors such as technology, innovation, product life cycles and maintenance programmes are taken into account. The estimation of residual values of assets determine whether they will be sold or used to the end of their useful lives and what their condition would be like at that time. Residual value assessments consider issues such as, the remaining life of the asset and the estimated amount which the entity would currently obtain.

Each part of an item of property, plant and equipment with a cost that is significant in relation to the total cost of the item is depreciated separately.

The depreciation charge for each period is recognised in surplus or deficit unless it is included in the carrying amount of another asset.

Items of property, plant and equipment are derecognised when the asset is disposed of or when there are no further economic benefits or service potential expected from the use of the asset.

The gain or loss arising from the derecognition of an item of property, plant and equipment is included in surplus or deficit when the item is derecognised. The gain or loss arising from the derecognition of an item of property, plant and equipment is determined as the difference between the net disposal proceeds, if any, and the carrying amount of the item.

Assets which the entity sells via auction when it is obsolete or can no longer be used by the entity, are not accounted for as current assets held for sale. Proceeds from sales of these assets are recognised as profit or loss on disposal of assets. All cash flows on these assets are included in cash flows from investing activities in the cash flow statement.

Reviewing the impairment of assets is performed on an annual basis. Assets impaired as a result of restructuring are not accounted for as non-current assets held for sale as these assets will be transferred to institutions of higher learning.

The entity separately discloses expenditure to repair and maintain property, plant and equipment in the notes to the financial statements (see note 10).

1.6 INTANGIBLE ASSETS

An asset is identifiable if it either:

- is separable, i.e. is capable of being separated or divided from an entity and sold, transferred, licensed, rented or exchanged, either individually or together with a related contract, identifiable assets or liability, regardless of whether the entity intends to do so; or
- arises from contractual rights or other legal rights, regardless of whether those rights are transferable or separable from the entity or from other rights and obligations.

An intangible asset is recognised when:

- it is probable that the expected future economic benefits or service potential that are attributable to the asset will flow to the entity; and
- the cost or fair value of the asset can be measured reliably.

Intangible assets are initially recognised at cost.

Where an intangible asset is acquired through a non-exchange transaction, its initial cost at the date of acquisition is measured at its fair value as at that date.

Intangible assets are carried at cost less any accumulated amortisation and any impairment losses. For all intangible assets amortisation is provided on a straight line basis over their useful life.

ACCOUNTING POLICIES (CONTINUED)

1.6 INTANGIBLE ASSETS (CONTINUED)

The amortisation period and the amortisation method for intangible assets are reviewed at each reporting date and any change is accounted for as a change in estimate.

Amortisation is provided to write down the intangible assets, on a straight line basis, to their residual values. The estimated useful lives for current and comparative periods are as follows:

ITEM	DEPRECIATION METHOD	AVERAGE USEFUL LIFE
Computer software	Straight line	3 – 10 years

Intangible assets are derecognised:

- on disposal; or
- when no future economic benefits or service potential are expected from its use or disposal.

The gain or loss arising from the derecognition of intangible assets is included in surplus or deficit when the asset is derecognised (unless the Standard of GRAP on leases requires otherwise on a sale and leaseback).

1.7 INVESTMENTS IN CONTROLLED ENTITIES

Investments in controlled entities are carried at cost less any accumulated impairment. The financial statements of the entity is not consolidated with those of the controlled entities, as the entities have had no trading activities and they are not material.

1.8 FINANCIAL INSTRUMENTS

A financial instrument is any contract that gives rise to a financial asset of one entity and a financial liability or a residual interest of another entity.

A concessionary loan is a loan granted to or received by an entity on terms that are not market related.

Credit risk is the risk that one party to a financial instrument will cause a financial loss for the other party by failing to discharge an obligation.

Currency risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in foreign exchange rates.

Derecognition is the removal of a previously recognised financial asset or financial liability from an entity's statement of financial position.

The effective interest method is a method of calculating the amortised cost of a financial asset or a financial liability (or group of financial assets or financial liabilities) and of allocating the interest income or interest expense over the relevant period. The effective interest rate is the rate that exactly discounts estimated future cash payments or receipts through the expected life of the financial instrument or, when appropriate, a shorter period to the net carrying amount of the financial asset or financial liability. When calculating the effective interest rate, an entity shall estimate cash flows considering all contractual terms of the financial instrument (for example, prepayment, call and similar options) but shall not consider future credit losses. The calculation includes all fees and amounts paid or received between parties to the contract that are an integral part of the effective interest rate, transaction costs, and all other premiums or discounts. There is a presumption that the cash flows and the expected life of a group of similar financial instruments can be estimated reliably. However, in those rare cases when it is not possible to reliably estimate the cash flows or the expected life of a financial instrument (or group of financial instruments), the entity shall use the contractual cash flows over the full contractual term of the financial instrument (or group of financial instruments).

Fair value is the amount for which an asset could be exchanged, or a liability settled, between knowledgeable willing parties in an arm's length transaction.

ACCOUNTING POLICIES (CONTINUED)

1.8 FINANCIAL INSTRUMENTS (CONTINUED)

A financial asset is:

- cash;
- a contractual right to:
 - receive cash or another financial asset from another entity; or
 - exchange financial assets or financial liabilities with another entity under conditions that are potentially favourable to the entity.

A financial liability is any liability that is a contractual obligation to:

- deliver cash or another financial asset to another entity; or
- exchange financial assets or financial liabilities under conditions that are potentially unfavourable to the entity.

Interest rate risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market interest rates.

Liquidity risk is the risk encountered by an entity in the event of difficulty in meeting obligations associated with financial liabilities that are settled by delivering cash or another financial asset.

Loan commitment is a firm commitment to provide credit under pre-specified terms and conditions.

Market risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market prices. Market risk comprises three types of risk: currency risk, interest rate risk and other price risk.

Other price risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market prices (other than those arising from interest rate risk or currency risk), whether those changes are caused by factors specific to the individual financial instrument or its issuer, or factors affecting all similar financial instruments traded in the market.

A financial asset is past due when a counterparty has failed to make a payment when contractually due.

Transaction costs are incremental costs that are directly attributable to the acquisition, issue or disposal of a financial asset or financial liability. An incremental cost is one that would not have been incurred if the entity had not acquired, issued or disposed of the financial instrument.

Financial instruments at amortised cost are non-derivative financial assets or non-derivative financial liabilities that have fixed or determinable payments, excluding those instruments that:

- the entity designates at fair value at initial recognition; or
- are held for trading.

Financial instruments at cost are investments in residual interests that do not have a quoted market price in an active market, and whose fair value cannot be reliably measured.

Financial instruments at fair value comprise financial assets or financial liabilities that are:

- derivatives;
- combined instruments that are designated at fair value;
- instruments held for trading. A financial instrument is held for trading if:
 - it is acquired or incurred principally for the purpose of selling or repurchasing it in the near-term; or
 - on initial recognition it is part of a portfolio of identified financial instruments that are managed together and for which there is evidence of a recent actual pattern of short term profit-taking;
 - non-derivative financial assets or financial liabilities with fixed or determinable payments that are designated at fair value at initial recognition; and
 - financial instruments that do not meet the definition of financial instruments at amortised cost or financial instruments at cost.

ACCOUNTING POLICIES (CONTINUED)

1.8 FINANCIAL INSTRUMENTS (CONTINUED)

Classification

The entity has the following types of financial assets (classes and category) as reflected on the face of the statement of financial position or in the notes thereto:

CLASS	CATEGORY
Trade debtors	Financial asset measured at amortised cost
Shares	Held for trading measured at fair value
Unit trusts	Held for trading measured at fair value
Cash and cash equivalents	Financial asset measured at amortised cost
Loans and receivables	Financial asset measured at amortised cost
Employee costs in advance	Financial asset measured at amortised cost
Deposits	Financial asset measured at amortised cost

The entity has the following types of financial liabilities (classes and category) as reflected on the face of the statement of financial position or in the notes thereto:

CLASS	CATEGORY
Trade payables	Financial liabilities measured at amortised cost

Initial recognition

The entity recognises a financial asset or a financial liability in its statement of financial position when the entity becomes a party to the contractual provisions of the instrument.

The entity recognises financial assets using trade date accounting.

Initial measurement of financial assets and financial liabilities

The entity measures a financial asset and financial liability initially at its fair value plus, in the case of a financial asset or a financial liability not subsequently measured at fair value, transaction costs that are directly attributable to the acquisition or issue of the financial asset or financial liability.

Subsequent measurement of financial assets and financial liabilities

The entity measures all financial assets and financial liabilities after initial recognition using the following categories:

- Financial instruments at fair value.
- Financial instruments at amortised cost.

All financial assets measured at amortised cost, or cost, are subject to an impairment review. The factors taken into account when considering impairment are solvency and whether the account holder is a slow payer.

Impairment and uncollectibility of financial assets

The entity assesses at the end of each reporting period whether there is any objective evidence that a financial asset or group of financial assets is impaired.

Financial assets are measured at amortised cost:

If there is objective evidence that an impairment loss on financial assets measured at amortised cost has been incurred, the amount of the loss is measured as the difference between the asset's carrying amount and the present value of estimated future cash flows (excluding future credit losses that have not been incurred) discounted at the financial asset's original effective interest rate. The carrying amount of the asset is reduced through the use of an allowance account. The amount of the loss is recognised in surplus or deficit.

ACCOUNTING POLICIES (CONTINUED)

1.8 FINANCIAL INSTRUMENTS (CONTINUED)

If, in a subsequent period, the amount of the impairment loss decreases and the decrease can be related objectively to an event occurring after the impairment was recognised, the previously recognised impairment loss is reversed by adjusting an allowance account. The reversal does not result in a carrying amount of the financial asset that exceeds what the amortised cost would have been had the impairment not been recognised at the date the impairment is reversed. The amount of the reversal is recognised in surplus or deficit.

If there is objective evidence that an impairment loss has been incurred on an investment in a residual interest that is not measured at fair value because its fair value cannot be measured reliably, the amount of the impairment loss is measured as the difference between the carrying amount of the financial asset and the present value of estimated future cash flows discounted at the current market rate of return for a similar financial asset. Such impairment losses are not reversed.

Presentation

Interest relating to a financial instrument is recognised as revenue in surplus or deficit.

Dividends or similar distributions relating to a financial instrument or a component that is a financial liability is recognised as revenue or expense in surplus or deficit.

Losses and gains relating to a financial instrument or a component that is a financial liability is recognised as revenue or expense in surplus or deficit.

1.9 STATUTORY RECEIVABLES

Identification

Statutory receivables are receivables that arise from legislation, supporting regulations, or similar means, and require settlement by another entity in cash or another financial asset.

Carrying amount is the amount at which an asset is recognised in the statement of financial position.

The cost method is the method used to account for statutory receivables that requires such receivables to be measured at their transaction amount, plus any accrued interest or other charges (where applicable) and, less any accumulated impairment losses and any amounts derecognised.

The transaction amount (for purposes of this Standard) for a statutory receivable means the amount specified in, or calculated, levied or charged in accordance with, legislation, supporting regulations, or similar means.

Recognition

The entity recognises statutory receivables as follows:

- if the transaction is an exchange transaction, using the policy on Revenue from exchange transactions;
- if the transaction is a non-exchange transaction, using the policy on Revenue from non-exchange transactions (Taxes and transfers); or
- if the transaction is not within the scope of the policies listed in the above or another Standard of GRAP, the receivable is recognised when the definition of an asset is met and, when it is probable that the future economic benefits or service potential associated with the asset will flow to the entity and the transaction amount can be measured reliably.

Initial measurement

The entity initially measures statutory receivables at their transaction amount.

ACCOUNTING POLICIES (CONTINUED)

1.9 STATUTORY RECEIVABLES IDENTIFICATION (CONTINUED)

Subsequent measurement

The entity measures statutory receivables after initial recognition using the cost method. Under the cost method, the initial measurement of the receivable is changed subsequent to initial recognition to reflect any:

- interest or other charges that may have accrued on the receivable (where applicable);
- impairment losses; and
- amounts derecognised.

Derecognition

The entity derecognises a statutory receivable, or a part thereof, when:

- the rights to the cash flows from the receivable are settled, expire or are waived;
- the entity transfers to another party substantially all of the risks and rewards of ownership of the receivable; or
- the entity, despite having retained some significant risks and rewards of ownership of the receivable, has transferred control of the receivable to another party and the other party has the practical ability to sell the receivable in its entirety to an unrelated third party, and is able to exercise that ability unilaterally and without needing to impose additional restrictions on the transfer. In this case, the entity:
 - derecognise the receivable; and
 - recognise separately any rights and obligations created or retained in the transfer.

The carrying amounts of any statutory receivables transferred are allocated between the rights or obligations retained and those transferred on the basis of their relative fair values at the transfer date. The entity considers whether any newly created rights and obligations are within the scope of the Standard of GRAP on Financial Instruments or another Standard of GRAP. Any difference between the consideration received and the amounts derecognised and, those amounts recognised, are recognised in surplus or deficit in the period of the transfer

1.10 TAXES

The SAMRC is exempt from income tax in terms of section 10 (1) (cA) (i) of the Income Tax Act (Act No. 58 of 1962).

1.11 LEASES

Operating leases – lessor

Operating lease revenue is recognised as revenue on a straight-line basis over the lease term.

Initial direct costs incurred in negotiating and arranging operating leases are added to the carrying amount of the leased asset and recognised as an expense over the lease term on the same basis as the lease revenue.

Income for leases is disclosed under revenue in the statement of financial performance.

Operating leases – lessee

Operating lease payments are recognised as an expense on a straight-line basis over the lease term. The difference between the amounts recognised as an expense and the contractual payments are recognised as a prepayment or liability.

1.12 IMPAIRMENT OF CASH-GENERATING ASSETS

Cash-generating assets are assets managed with the objective of generating a commercial return. An asset generates a commercial return when it is deployed in a manner consistent with that adopted by a profit-oriented entity.

Impairment is a loss in the future economic benefits or service potential of an asset, over and above the systematic recognition of the loss of the asset's future economic benefits or service potential through depreciation (amortisation).

Carrying amount is the amount at which an asset is recognised in the statement of financial position after deducting any accumulated depreciation and accumulated impairment losses thereon.

ACCOUNTING POLICIES (CONTINUED)

1.12 IMPAIRMENT OF CASH-GENERATING ASSETS (CONTINUED)

A cash-generating unit is the smallest identifiable group of assets managed with the objective of generating a commercial return that generates cash inflows from continuing use that are largely independent of the cash inflows from other assets or groups of assets.

Costs of disposal are incremental costs directly attributable to the disposal of an asset, excluding finance costs and income tax expense.

Depreciation (Amortisation) is the systematic allocation of the depreciable amount of an asset over its useful life.

Fair value less costs to sell is the amount obtainable from the sale of an asset in an arm's length transaction between knowledgeable, willing parties, less the costs of disposal.

Recoverable amount of an asset or a cash-generating unit is the higher of its fair value less costs to sell and its value in use.

Useful life is either:

- the period of time over which an asset is expected to be used by the entity; or
- the number of production or similar units expected to be obtained from the asset by the entity.

1.13 IMPAIRMENT OF NON-CASH-GENERATING ASSETS

Cash-generating assets are assets managed with the objective of generating a commercial return. When an asset is deployed in a manner consistent with that adopted by a profit-oriented entity, it generates a commercial return.

Non-cash-generating assets are assets other than cash-generating assets.

Impairment is a loss in the future economic benefits or service potential of an asset, over and above the systematic recognition of the loss of the asset's future economic benefits or service potential through depreciation (amortisation).

Carrying amount is the amount at which an asset is recognised in the statement of financial position after deducting any accumulated depreciation and accumulated impairment losses thereon.

Depreciation (Amortisation) is the systematic allocation of the depreciable amount of an asset over its useful life.

Fair value less costs to sell is the amount obtainable from the sale of an asset in an arm's length transaction between knowledgeable, willing parties, less the costs of disposal.

Recoverable service amount is the higher of a non-cash-generating asset's fair value less costs to sell and its value in use.

Useful life is either:

- the period of time over which an asset is expected to be used by the entity; or
- the number of production or similar units expected to be obtained from the asset by the entity.

Criteria developed by the annual financial statements to distinguish non-cash-generating assets from cash-generating assets are as follows:

Assets used for administration and in daily operation of the entity is classified as non-cash-generating assets.

Where a substantial part of the asset is hired out, the asset is classified as cash generating assets.

ACCOUNTING POLICIES (CONTINUED)

1.13 IMPAIRMENT OF NON-CASH-GENERATING ASSETS (CONTINUED)

Identification

When the carrying amount of a non-cash-generating asset exceeds its recoverable service amount, it is impaired.

The entity assesses at each reporting date whether there is any indication that a non-cash-generating asset may be impaired. If any such indication exists, the entity estimates the recoverable service amount of the asset.

This impairment test is performed at the same time every year. If an intangible asset was initially recognised during the current reporting period, that intangible asset was tested for impairment before the end of the current reporting period.

Value in use

Value in use of non-cash-generating assets is the present value of the non-cash-generating assets remaining service potential. The present value of the remaining service potential of non-cash-generating assets is determined using the following approach:

Restoration cost approach

Restoration cost is the cost of restoring the service potential of an asset to its pre-impaired level. The present value of the remaining service potential of the asset is determined by subtracting the estimated restoration cost of the asset from the current cost of replacing the remaining service potential of the asset before impairment. The latter cost is determined as the depreciated reproduction or replacement cost of the asset, whichever is lower.

Recognition and measurement

If the recoverable service amount of a non-cash-generating asset is less than its carrying amount, the carrying amount of the asset is reduced to its recoverable service amount. This reduction is an impairment loss.

An impairment loss is recognised immediately in surplus or deficit.

When the amount estimated for an impairment loss is greater than the carrying amount of the non-cash-generating asset to which it relates, the entity recognises a liability only to the extent that is a requirement in the Standards of GRAP.

After the recognition of an impairment loss, the depreciation (amortisation) charge for the non-cash-generating asset is adjusted in future periods to allocate the non-cash-generating asset's revised carrying amount, less its residual value (if any), on a systematic basis over its remaining useful life.

Reversal of an impairment loss

The entity assesses at each reporting date whether there is any indication that an impairment loss recognised in prior periods for a non-cash-generating asset may no longer exist or may have decreased. If any such indication exists, the entity estimates the recoverable service amount of that asset.

An impairment loss recognised in prior periods for a non-cash-generating asset is reversed if there has been a change in the estimates used to determine the asset's recoverable service amount since the last impairment loss was recognised. The carrying amount of the asset is increased to its recoverable service amount. The increase is a reversal of an impairment loss. The increased carrying amount of an asset attributable to a reversal of an impairment loss does not exceed the carrying amount that would have been determined (net of depreciation or amortisation) had no impairment loss been recognised for the asset in prior periods.

A reversal of an impairment loss for a non-cash-generating asset is recognised immediately in surplus or deficit.

After a reversal of an impairment loss is recognised, the depreciation (amortisation) charge for the non-cash-generating asset is adjusted in future periods to allocate the non-cash-generating asset's revised carrying amount, less its residual value (if any), on a systematic basis over its remaining useful life.

ACCOUNTING POLICIES (CONTINUED)

1.14 EMPLOYEE BENEFITS

Employee benefits are all forms of consideration given by SAMRC in exchange for service rendered by employees. An annual valuation of the MRC Pension Fund and Post Retirement Medical Aid is performed.

A qualifying insurance policy is an insurance policy issued by an insurer that is not a related party (as defined in the Standard of GRAP on Related Party Disclosures) of the reporting entity, if the proceeds of the policy can be used only to pay or fund employee benefits under a defined benefit plan and are not available to the reporting entity's own creditors (even in liquidation) and cannot be paid to the reporting entity, unless either:

- the proceeds represent surplus assets that are not needed for the policy to meet all the related employee benefit obligations; or
- the proceeds are returned to the reporting entity to reimburse it for employee benefits already paid.

Termination benefits are employee benefits payable as a result of either:

- an entity's decision to terminate an employee's employment before the normal retirement date; or
- an employee's decision to accept voluntary redundancy in exchange for those benefits.

Short-term employee benefits

Short-term employee benefits are employee benefits (other than termination benefits) that are due to be settled within twelve months after the end of the period in which the employees render the related service.

When an employee has rendered service to the entity during a reporting period, the entity recognises the undiscounted amount of short-term employee benefits expected to be paid in exchange for that service:

- as a liability (accrued expense), after deducting any amount already paid. If the amount already paid exceeds the undiscounted amount of the benefits, the entity recognises that excess as an asset (prepaid expense) to the extent that the prepayment will lead to, for example, a reduction in future payments or a cash refund.

The expected cost of compensated absences is recognised as an expense as the employees render services that increase their entitlement or, in the case of non-accumulating absences, when the absence occurs. The entity measures the expected cost of accumulating compensated absences as the additional amount that the entity expects to pay as a result of the unused entitlement that has accumulated at the reporting date.

The entity recognises the expected cost of bonus, incentive and performance related payments when the entity has a present legal or constructive obligation to make such payments as a result of past events and a reliable estimate of the obligation can be made. A present obligation exists when the entity has no realistic alternative but to make the payments.

Post-employment benefits

Post-employment benefits are employee benefits (other than termination benefits) which are payable after the completion of employment.

SAMRC offers its employees post-employee benefits to the SAMRC Pension Fund.

Post-employment benefits: Defined contribution plans

Defined contribution plans are post-employment benefit plans under which an entity pays fixed contributions into a separate entity (a fund) and will have no legal or constructive obligation to pay further contributions if the fund does not hold sufficient assets to pay all employee benefits relating to employee service in the current and prior periods.

When an employee has rendered service to the entity during a reporting period, the entity recognises the contribution payable to a defined contribution plan in exchange for that service:

- as a liability (accrued expense), after deducting any contribution already paid. If the contribution already paid exceeds the contribution due for service before the reporting date, an entity recognise that excess as an asset (prepaid expense) to the extent that the prepayment will lead to, for example, a reduction in future payments or a cash refund; and
- as an expense, unless another Standard requires or permits the inclusion of the contribution in the cost of an asset.

ACCOUNTING POLICIES (CONTINUED)

1.14 EMPLOYEE BENEFITS (CONTINUED)

Where contributions to a defined contribution plan do not fall due wholly within twelve months after the end of the reporting period in which the employees render the related service, they are discounted. The rate used to discount reflects the time value of money. The currency and term of the financial instrument selected to reflect the time value of money is consistent with the currency and estimated term of the obligation.

Post-employment benefits: Defined benefit plans

Defined benefit plans are post-employment benefit plans other than defined contribution plans.

Actuarial gains and losses comprise experience adjustments (the effects of differences between the previous actuarial assumptions and what has actually occurred) and the effects of changes in actuarial assumptions. In measuring its defined benefit liability the entity recognise actuarial gains and losses in surplus or deficit in the reporting period in which they occur.

Assets held by a long-term employee benefit fund are assets (other than non-transferable financial instruments issued by the reporting entity) that are held by an entity (a fund) that is legally separate from the reporting entity and exists solely to pay or fund employee benefits and are available to be used only to pay or fund employee benefits, are not available to the reporting entity's own creditors (even in liquidation), and cannot be returned to the reporting entity, unless either:

- the remaining assets of the fund are sufficient to meet all the related employee benefit obligations of the plan or the reporting entity; or
- the assets are returned to the reporting entity to reimburse it for employee benefits already paid.

Current service cost is the increase in the present value of the defined benefit obligation resulting from employee service in the current period.

Interest cost is the increase during a period in the present value of a defined benefit obligation which arises because the benefits are one period closer to settlement.

Past service cost is the change in the present value of the defined benefit obligation for employee service in prior periods, resulting in the current period from the introduction of, or changes to, post-employment benefits or other long-term employee benefits. Past service cost may be either positive (when benefits are introduced or changed so that the present value of the defined benefit obligation increases) or negative (when existing benefits are changed so that the present value of the defined benefit obligation decreases). In measuring its defined benefit liability the entity recognise past service cost as an expense in the reporting period in which the plan is amended.

Plan assets comprise assets held by a long-term employee benefit fund and qualifying insurance policies.

The present value of a defined benefit obligation is the present value, without deducting any plan assets, of expected future payments required to settle the obligation resulting from employee service in the current and prior periods.

The return on plan assets is interest, dividends or similar distributions and other revenue derived from the plan assets, together with realised and unrealised gains or losses on the plan assets, less any costs of administering the plan (other than those included in the actuarial assumptions used to measure the defined benefit obligation) and less any tax payable by the plan itself.

The entity account not only for its legal obligation under the formal terms of a defined benefit plan, but also for any constructive obligation that arises from the entity's informal practices. Informal practices give rise to a constructive obligation where the entity has no realistic alternative but to pay employee benefits. An example of a constructive obligation is where a change in the entity's informal practices would cause unacceptable damage to its relationship with employees.

ACCOUNTING POLICIES (CONTINUED)

1.14 EMPLOYEE BENEFITS (CONTINUED)

The amount recognised as a defined benefit liability is the net total of the following amounts:

- the present value of the defined benefit obligation at the reporting date;
- minus the fair value at the reporting date of plan assets (if any) out of which the obligations are to be settled directly;
- plus any liability that may arise as a result of a minimum funding requirement.

The amount determined as a defined benefit liability may be negative (an asset). The entity measures the resulting asset at the lower of:

- the amount determined above; and
- the present value of any economic benefits available in the form of refunds from the plan or reductions in future contributions to the plan. The present value of these economic benefits is determined using a discount rate which reflects the time value of money.

Any adjustments arising from the limit above is recognised in surplus or deficit.

The entity determines the present value of defined benefit obligations and the fair value of any plan assets with sufficient regularity such that the amounts recognised in the annual financial statements do not differ materially from the amounts that would be determined at the reporting date.

The entity recognises the net total of the following amounts in surplus or deficit, except to the extent that another Standard requires or permits their inclusion in the cost of an asset:

- current service cost;
- interest cost;
- the expected return on any plan assets and on any reimbursement rights;
- actuarial gains and losses;
- past service cost;
- the effect of any curtailments or settlements; and
- the effect of applying the limit on a defined benefit asset (negative defined benefit liability).

The entity uses the Projected Unit Credit Method to determine the present value of its defined benefit obligations and the related current service cost and, where applicable, past service cost. The Projected Unit Credit Method (sometimes known as the accrued benefit method pro-rated on service or as the benefit/years of service method) sees each period of service as giving rise to an additional unit of benefit entitlement and measures each unit separately to build up the final obligation.

Actuarial valuations for GRAP 25 purposes are conducted on an annual basis by independent actuaries separately for each plan. The results of the valuation are updated for any material transactions and other material changes in circumstances (including changes in market prices and interest rates) up to the reporting date.

The entity recognises gains or losses on the curtailment or settlement of a defined benefit plan when the curtailment or settlement occurs. The gain or loss on a curtailment or settlement comprises:

- any resulting change in the present value of the defined benefit obligation; and
- any resulting change in the fair value of the plan assets.

Before determining the effect of a curtailment or settlement, the entity re-measure the obligation (and the related plan assets, if any) using current actuarial assumptions (including current market interest rates and other current market prices).

When it is virtually certain that another party will reimburse some or all of the expenditure required to settle a defined benefit obligation, the right to reimbursement is recognised as a separate asset. The asset is measured at fair value. In all other respects, the asset is treated in the same way as plan assets. In surplus or deficit, the expense relating to a defined benefit plan is not presented as the net of the amount recognised for a reimbursement.

ACCOUNTING POLICIES (CONTINUED)

1.14 EMPLOYEE BENEFITS (CONTINUED)

The entity offsets an asset relating to one plan against a liability relating to another plan when the entity has a legally enforceable right to use a surplus in one plan to settle obligations under the other plan and intends either to settle the obligations on a net basis, or to realise the surplus in one plan and settle its obligation under the other plan simultaneously.

Actuarial assumptions

Actuarial assumptions are unbiased and mutually compatible.

Financial assumptions are based on market expectations, at the reporting date, for the period over which the obligations are to be settled.

The rate used to discount post-employment benefit obligations (both funded and unfunded) reflect the time value of money. The currency and term of the financial instrument selected to reflect the time value of money is consistent with the currency and estimated term of the post-employment benefit obligations.

Post-employment benefit obligations are measured on a basis that reflects:

- estimated future salary increases;
- the benefits set out in the terms of the plan (or resulting from any constructive obligation that goes beyond those terms) at the reporting date; and
- estimated future changes in the level of any state benefits that affect the benefits payable under a defined benefit plan, if, and only if, either:
 - those changes were enacted before the reporting date; or
 - past history, or other reliable evidence, indicates that those state benefits will change in some predictable manner, for example, in line with future changes in general price levels or general salary levels.

Assumptions about medical costs take account of estimated future changes in the cost of medical services, resulting from both inflation and specific changes in medical costs.

Post retirement medical aid obligations

The SAMRC provides post-retirement health care benefits, to some of its employees and their legitimate spouses. The major portion of the liability is funded by an investment policy.

The entitlement to post-retirement health care benefits is based on the employee remaining in service up to retirement age and the completion of a minimum service period. The expected costs of these benefits are accrued over the period of employment. Independent qualified actuaries carry out valuations of these obligations.

The amount recognised as a liability for other long-term employee benefits is the net total of the following amounts:

- the present value of the defined benefit obligation at the reporting date;
- minus the fair value at the reporting date of plan assets (if any) out of which the obligations are to be settled directly.

The entity shall recognise the net total of the following amounts as expense or revenue, except to the extent that another Standard requires or permits their inclusion in the cost of an asset:

- current service cost;
- interest cost;
- the expected return on any plan assets and on any reimbursement right recognised as an asset;
- actuarial gains and losses, which shall all be recognised immediately;
- past service cost, which shall all be recognised immediately; and
- the effect of any curtailments or settlements.

ACCOUNTING POLICIES (CONTINUED)

1.14 EMPLOYEE BENEFITS (CONTINUED)

Termination benefits

The entity recognises termination benefits as a liability and an expense when the entity is demonstrably committed to either:

- terminate the employment of an employee or group of employees before the normal retirement date; or
- provide termination benefits as a result of an offer made in order to encourage voluntary redundancy.

The entity is demonstrably committed to a termination when the entity has a detailed formal plan for the termination and is without realistic possibility of withdrawal. The detailed plan includes [as a minimum]:

- the location, function, and approximate number of employees whose services are to be terminated;
- the termination benefits for each job classification or function; and
- the time at which the plan will be implemented.

Termination benefits are payable whenever an employee's employment is terminated before normal retirement date or whenever an employee accepts voluntary redundancy in exchange for these benefits. The SAMRC recognises termination benefits as an expense when it is demonstrably committed to either terminate the employment of current employees according to a detailed formal plan without the possibility of withdrawal or to provide termination benefits as a result of an offer made to encourage voluntary redundancy. Benefits falling due more than 12 months after reporting date are discounted to present value.

Pension Plan

Contributions to a pension plan in respect of service in a particular period are included in the total cost of employment and are charged to the statement of financial performance in the year in which they relate as part of the cost of employment. The amount recognised in the surplus or deficit for the period under defined benefit plans represents the movement in the present value of the defined benefit obligation and the fair value of the plan assets, after adjusting for contributions paid to the fund, as well as any unrecognised past service costs. Actuarial gains or losses are recognised in the surplus or deficit in the period in which it occurs.

1.15 PROVISIONS AND CONTINGENCIES

Provisions are recognised when:

- the entity has a present obligation as a result of a past event;
- it is probable that an outflow of resources embodying economic benefits or service potential will be required to settle the obligation; and
- a reliable estimate can be made of the obligation.

The amount of a provision is the best estimate of the expenditure expected to be required to settle the present obligation at the reporting date.

Provisions are measured at the present value of the expenditures expected to be made to settle the obligation using the pre-tax rate that reflects the current market assessments of the time value of money and the risks specific to the obligation. The increase in the provision due to the passage of time is recognised as finance charges.

Where some or all of the expenditure required to settle a provision is expected to be reimbursed by another party, the reimbursement is recognised when, and only when, it is virtually certain that reimbursement will be received if the entity settles the obligation. The reimbursement is treated as a separate asset. The amount recognised for the reimbursement does not exceed the amount of the provision.

Provisions are reviewed at each reporting date and adjusted to reflect the current best estimate. Provisions are reversed if it is no longer probable that an outflow of resources embodying economic benefits or service potential will be required, to settle the obligation.

ACCOUNTING POLICIES (CONTINUED)

1.15 PROVISIONS AND CONTINGENCIES (CONTINUED)

A provision is used only for expenditures for which the provision was originally recognised. Provisions are not recognised for future operating deficits

A constructive obligation to restructure arises only when an entity:

- has a detailed formal plan for the restructuring, identifying at least:
 - the activity/operating unit or part of an activity/operating unit concerned;
 - the principal locations affected;
 - the location, function, and approximate number of employees who will be compensated for services being terminated;
 - the expenditures that will be undertaken; and
 - when the plan will be implemented; and
- has raised a valid expectation in those affected that it will carry out the restructuring by starting to implement that plan or announcing its main features to those affected by it.

Contingent assets and contingent liabilities are not recognised. Contingencies are disclosed in note 44.

1.16 COMMITMENTS

Items are classified as commitments when an entity has committed itself to future transactions that will normally result in the outflow of cash.

Commitments for which disclosure is necessary to achieve a fair presentation is disclosed in a note to the financial statements, if both the following criteria are met:

- Contracts should be non-cancelable or only cancelable at significant cost (for example, contracts for computer or building maintenance services); and
- Contracts should relate to something other than the routine, steady, state business of the entity – therefore salary commitments relating to employment contracts commitments are excluded.

1.17 REVENUE FROM EXCHANGE TRANSACTIONS

Revenue is the gross inflow of economic benefits or service potential during the reporting period when those inflows result in an increase in net assets, other than increases relating to contributions from owners.

An exchange transaction is one in which the entity receives assets or services, or has liabilities extinguished, and directly gives approximately equal value (primarily in the form of goods, services or use of assets) to the other party in exchange.

Fair value is the amount for which an asset could be exchanged, or a liability settled, between knowledgeable, willing parties in an arm's length transaction.

Measurement

Revenue is measured at the fair value of the consideration received or receivable.

Sale of goods

Revenue from the sale of goods is recognised when all the following conditions have been satisfied:

- the entity has transferred to the purchaser the significant risks and rewards of ownership of the goods;
- the entity retains neither continuing managerial involvement to the degree usually associated with ownership nor effective control over the goods sold;
- the amount of revenue can be measured reliably;
- it is probable that the economic benefits or service potential associated with the transaction will flow to the entity; and
- the costs incurred or to be incurred in respect of the transaction can be measured reliably.

Revenue derived from the sale of animal blood; dietary assessment kits and nutritional text books and sale of biological assets are classified as sale of goods.

ACCOUNTING POLICIES (CONTINUED)

1.17 REVENUE FROM EXCHANGE TRANSACTIONS (CONTINUED)

Rendering of services

When the outcome of a transaction involving the rendering of services can be estimated reliably, revenue associated with the transaction is recognised by reference to the stage of completion of the transaction at the reporting date. The outcome of a transaction can be estimated reliably when all the following conditions are satisfied:

- the amount of revenue can be measured reliably;
- it is probable that the economic benefits or service potential associated with the transaction will flow to the entity;
- the stage of completion of the transaction at the reporting date can be measured reliably; and
- the costs incurred for the transaction and the costs to complete the transaction can be measured reliably.

When services are performed by an indeterminate number of acts over a specified time frame, revenue is recognised on a straight line basis over the specified time frame unless there is evidence that some other method better represents the stage of completion. When a specific act is much more significant than any other acts, the recognition of revenue is postponed until the significant act is executed.

When the outcome of the transaction involving the rendering of services cannot be estimated reliably, revenue is recognised only to the extent of the expenses recognised that are recoverable.

Consulting and research service revenue is recognised by reference to the stage of completion of the transaction at the reporting date. Stage of completion is determined by the proportion that costs incurred to date bear to the total estimated costs of the transaction.

Interest, royalties and dividends

Revenue arising from the use by others of entity assets yielding interest, royalties and dividends or similar distributions is recognised when:

- It is probable that the economic benefits or service potential associated with the transaction will flow to the entity, and
- The amount of the revenue can be measured reliably.

Interest is recognised, in surplus or deficit, using the effective interest rate method.

Royalties are recognised as they are earned in accordance with the substance of the relevant agreements.

Dividends or their equivalent distributions are recognised, in surplus or deficit, when the entity's right to receive payment has been established.

Service fees included in the price of the product are recognised as revenue over the period during which the service is performed.

1.18 REVENUE FROM NON-EXCHANGE TRANSACTIONS

Revenue comprises gross inflows of economic benefits or service potential received and receivable by an entity, which represents an increase in net assets, other than increases relating to contributions from owners.

Conditions on transferred assets are stipulations that specify that the future economic benefits or service potential embodied in the asset is required to be consumed by the recipient as specified or future economic benefits or service potential must be returned to the transferor.

Control of an asset arises when the entity can use or otherwise benefit from the asset in pursuit of its objectives and can exclude or otherwise regulate the access of others to that benefit.

Exchange transactions are transactions in which one entity receives assets or services, or has liabilities extinguished, and directly gives approximately equal value (primarily in the form of cash, goods, services, or use of assets) to another entity in exchange.

ACCOUNTING POLICIES (CONTINUED)

1.18 REVENUE FROM NON-EXCHANGE TRANSACTIONS (CONTINUED)

Non-exchange transactions are transactions that are not exchange transactions. In a non-exchange transaction, an entity either receives value from another entity without directly giving approximately equal value in exchange, or gives value to another entity without directly receiving approximately equal value in exchange.

Stipulations on transferred assets are terms in laws or regulation, or a binding arrangement, imposed upon the use of a transferred asset by entities external to the reporting entity.

Recognition

An inflow of resources from a non-exchange transaction recognised as an asset is recognised as revenue, except to the extent that a liability is also recognised in respect of the same inflow.

As the entity satisfies a present obligation recognised as a liability in respect of an inflow of resources from a non-exchange transaction recognised as an asset, it reduces the carrying amount of the liability recognised and recognises an amount of revenue equal to that reduction.

Measurement

Revenue from a non-exchange transaction is measured at the amount of the increase in net assets recognised by the entity.

When, as a result of a non-exchange transaction, the entity recognises an asset, it also recognises revenue equivalent to the amount of the asset measured at its fair value as at the date of acquisition, unless it is also required to recognise a liability. Where a liability is required to be recognised it will be measured as the best estimate of the amount required to settle the obligation at the reporting date, and the amount of the increase in net assets, if any, recognised as revenue. When a liability is subsequently reduced, because the taxable event occurs or a condition is satisfied, the amount of the reduction in the liability is recognised as revenue.

Gifts and donations, including goods in-kind

Gifts and donations, including goods in-kind, are recognised as assets and revenue when it is probable that the future economic benefits or service potential will flow to the entity and the fair value of the assets can be measured reliably.

Services in-kind

The entity recognise services in-kind that are significant to its operations and/or service delivery objectives as assets and recognise the related revenue when it is probable that the future economic benefits or service potential will flow to the entity and the fair value of the assets can be measured reliably.

Where services in-kind are not significant to the entity's operations and/or service delivery objectives and/or do not satisfy the criteria for recognition, the entity discloses the nature and type of services in-kind received during the reporting period.

1.19 REVENUE RECOGNITION FOR EXCHANGE AND NON-EXCHANGE TRANSACTIONS

Revenue represents the parliamentary grant from government as well as external income.

Parliamentary grant (Revenue from non-exchange transactions)

Government grants are recognised when it is probable that the future economic benefit will flow to the SAMRC and these benefits can be measured reliably. The grant is recognised to the extent that there are no further obligations arising from the receipt of the grant. Government grants are assistance by government in the form of transfer of resources in return for compliance with conditions related to operating activities. Grants that compensate the SAMRC for expenses incurred are recognised in surplus or deficit in the same periods in which the expense is recognised.

Revenue other than grants, donations, project revenue and council activities (Revenue from exchange transactions)

Revenue is recognised on the accrual basis. Revenue is recognised when significant risks and rewards of ownership have been transferred.

ACCOUNTING POLICIES (CONTINUED)

1.19 REVENUE RECOGNITION FOR EXCHANGE AND NON-EXCHANGE TRANSACTIONS (CONTINUED)

Research revenue

Revenue is recognised only to the extent of research costs incurred and is probable that it will be recoverable. Advance income received in respect of which no work has been done, is treated as deferred income until such time the expenditure is incurred or the conditions of the grant/contract are met.

Rental income

Rental income from tenants is recognised in the statement of financial performance on a straight line basis over the term of the lease. Lease incentives granted are recognised as an integral part of the total rental income, over the term of the lease.

Deferred income

Deferred income is recognised as revenue to the extent that expenses are incurred and that conditions of the grant are met.

1.20 BORROWING COSTS

Borrowing costs are interest and other expenses incurred by an entity in connection with the borrowing of funds.

Borrowing costs are recognised as an expense in the period in which they are incurred.

1.21 TRANSLATION OF FOREIGN CURRENCIES

Foreign currency transactions

A foreign currency transaction is recorded, on initial recognition in Rand's, by applying to the foreign currency amount the spot exchange rate between the functional currency and the foreign currency at the date of the transaction.

At each reporting date:

- foreign currency monetary items are translated using the closing rate;
- non-monetary items that are measured in terms of historical cost in a foreign currency are translated using the exchange rate at the date of the transaction; and
- non-monetary items that are measured at fair value in a foreign currency are translated using the exchange rates at the date when the fair value was determined.

Exchange differences arising on the settlement of monetary items or on translating monetary items at rates different from those at which they were translated on initial recognition during the period or in previous annual financial statements are recognised in surplus or deficit in the period in which they arise.

When a gain or loss on a non-monetary item is recognised directly in net assets, any exchange component of that gain or loss is recognised directly in net assets. When a gain or loss on a non-monetary item is recognised in surplus or deficit, any exchange component of that gain or loss is recognised in surplus or deficit.

Cash flows arising from transactions in a foreign currency are recorded in Rands by applying to the foreign currency amount the exchange rate between the Rand and the foreign currency at the date of the cash flow.

1.22 VAT

The SAMRC accounts for VAT on the invoice basis.

The net amount of VAT recoverable, or payable to SARS is reflected on the Statement of Financial Position.

ACCOUNTING POLICIES (CONTINUED)

1.23 COMPARATIVE FIGURES

Where necessary, comparative figures have been reclassified to conform to changes in presentation in the current year.

1.24 FRUITLESS AND WASTEFUL EXPENDITURE

Fruitless and wasteful expenditure means expenditure which was made in vain and would have been avoided had reasonable care been exercised.

National Treasury instruction note no.3 of 2019/2020 which was issued in terms of sections 76(2)(e) to 76(4)(a) of the PFMA (effective from 1 November 2019).

All expenditure relating to fruitless and wasteful expenditure is recognised as an expense in the statement of financial performance in the year that the expenditure was incurred. The expenditure is classified in accordance with the nature of the expense, and where recovered, it is subsequently accounted for as revenue in the statement of financial performance. The entity records the details of all alleged fruitless and wasteful expenditure in the register; investigates the incidents; where appropriate raise a debt. Fruitless and wasteful expenditure is reported monthly to National Treasury and quarterly to the Board.

1.25 IRREGULAR EXPENDITURE

Irregular expenditure as defined in section 1 of the PFMA is expenditure other than unauthorised expenditure, incurred in contravention of or that is not in accordance with a requirement of any applicable legislation, including -

- (a) this Act; or
- (b) the State Tender Board Act, 1968 (Act No. 86 of 1968), or any regulations made in terms of the Act; or
- (c) any provincial legislation providing for procurement procedures in that provincial government.

National Treasury practice note no. 4 of 2008/2009 and instruction note no. 2 of 2019/2020 which was issued in terms of sections 76(1) to 76(4) of the PFMA requires the following:

Irregular expenditure that was incurred and identified during the current financial year and which was condoned before year end and/or before finalisation of the financial statements is recorded appropriately in the irregular expenditure register. In such an instance, no further action is required with the exception of updating the note to the financial statements.

Irregular expenditure that was incurred and identified during the current financial year and for which condonement is being awaited at year end must be recorded in the irregular expenditure register. No further action is required with the exception of updating the note to the financial statements.

Where irregular expenditure was incurred in the previous financial year and is only condoned in the following financial year, the register and the disclosure note to the financial statements will be updated with the amount condoned.

Irregular expenditure written off by the Board is submitted to National Treasury for condonation.

Irregular expenditure that was incurred and identified during the current financial year and which was not condoned by the National Treasury or the relevant authority must be recorded appropriately in the irregular expenditure register. If liability for the irregular expenditure can be attributed to a person, a debt account must be created if such a person is liable in law. Immediate steps will be taken to recover the amount from the person concerned. If recovery is not possible, the accounting authority may write off the amount as debt impairment and disclose such in the relevant note to the financial statements. The irregular expenditure register will be updated accordingly.

ACCOUNTING POLICIES (CONTINUED)

1.26 BUDGET INFORMATION

General purpose financial reporting by entity shall provide information on whether resources were obtained and used in accordance with the legally adopted budget.

The approved budget is prepared on an accrual basis and presented by functional classification linked to performance outcome objectives.

The approved budget covers the fiscal period from 01/04/2020 to 31/03/2021.

The annual financial statements and the budget are on the same basis of accounting therefore a comparison with the budgeted amounts for the reporting period have been included in the Statement of comparison of budget and actual amounts.

Comparative information is not required.

1.27 RELATED PARTIES

The entity operates in a sector currently dominated by entities directly or indirectly owned by the South African Government. As a consequence of the constitutional independence of the three spheres of government in South Africa, only entities within the national sphere of government and are in the same economic entity (having the same executive authority) are considered to be related parties.

Management are those persons responsible for planning, directing and controlling the activities of the entity, including those charged with the governance of the entity in accordance with legislation, in instances where they are required to perform such functions.

Close members of the family of a persons considered to be those family members who may be expected to influence, or be influenced by, that management in their dealings with the entity.

Transactions with related parties are disclosed.

Where those charged with governance are employed by an entity receiving funding or doing business with SAMRC which do not meet the definition of a related party in terms of GRAP 20 these relationships are separately disclosed in note 49.

1.28 LIVING AND NON-LIVING RESOURCES

Living resources are those resources that undergo biological transformation.

Non-living resources are those resources, other than living resources, that occur naturally and have not been extracted. Agricultural activity is the management by an entity of the biological transformation and harvest of biological assets for:

- (a) sale;
- (b) distribution at no charge or for a nominal charge; or
- (c) conversion into agriculture produce or into additional biological assets for sale or distribution at no charge or for a nominal charge.

Biological transformation (for purposes of this Standard) comprises the processes of growth, degeneration, production, and procreation that cause qualitative or quantitative changes in a living resource.

Carrying amount is the amount at which an asset is recognised after deducting any accumulated depreciation and accumulated impairment losses.

Cost is the amount of cash or cash equivalents paid or the fair value of the other consideration given to acquire an asset at the time of its acquisition or development and, where applicable, the amount attributed to the asset when initially recognised in accordance with the specific requirements of other Standards of GRAP.

Depreciation is the systematic allocation of the depreciable amount of an asset over its useful life. Depreciable amount is the cost of an asset, or other amount substituted for cost, less its residual value.

ACCOUNTING POLICIES (CONTINUED)

1.28 LIVING AND NON-LIVING RESOURCES (CONTINUED)

Fair value is the amount for which an asset could be exchanged, or a liability settled, between knowledgeable, willing parties in an arm's length transaction.

Group of resources means a grouping of living or non-living resources of a similar nature or function in an entity's operations that is shown as a single item for the purpose of disclosure in the annual financial statements.

The residual value of an asset is the estimated amount that an entity would currently obtain from disposal of the asset, after deducting the estimated costs of disposal, if the asset was already of the age and in the condition expected at the end of its useful life.

Useful life is the period over which an asset is expected to be available for use by an entity, or the number of production or similar units expected to be obtained from the asset by an entity.

Recognition

A living resource is recognised as an asset if it is probable that future economic benefits or service potential associated with the asset will flow to the entity, and the cost or fair value of the asset can be measured reliably.

Where the entity holds a living resource that meets the definition of an asset, but which does not meet the recognition criteria, relevant information are disclosed in the notes to the annual financial statements. When the information about the cost or fair value of the living resource becomes available, the entity recognise, from that date, the living resource and apply the measurement principles.

Measurement at recognition

A living resource that qualifies for recognition as an asset is measured at its cost.

Where a living resource is acquired through a non-exchange transaction, its cost is measured at its fair value as at the date of acquisition.

The cost of a living resource comprises its purchase price, including import duties and non-refundable purchase taxes, and any costs directly attributable to bringing the living resource to the location and condition necessary for it to be capable of operating in the manner intended by management.

Measurement after recognition

Depreciation

Living resources are depreciated and the depreciation charge for each period is recognised in surplus or deficit unless it is included in the carrying amount of another asset, where appropriate.

The depreciable amount of a living resource is allocated on a systematic basis over its useful life.

The entity assesses at each reporting date whether there is any indication that the entity's expectations about the residual value and the useful life of a living resource have changed since the preceding reporting date. If any such indication exists, the entity revises the expected useful life and/or residual value accordingly. The change(s) is accounted for as a change in an accounting estimate.

In assessing whether there is any indication that the expected useful life of the living resource has changed, the entity considers the following indications:

ACCOUNTING POLICIES (CONTINUED)

1.28 LIVING AND NON-LIVING RESOURCES (CONTINUED)

(a) The use of the living resource has changed, because of the following:

- The entity has changed the manner in which The living resource is used.
- The entity has made a decision to dispose of the living resource in a future reporting period(s) such that this decision changes the expected period over which the living resource will be used.
- Legislation, government policy or similar means have been amended or implemented during the reporting period that have, or will, change the use of the living resource.
- The living resource was idle or retired from use during the reporting period.

(b) The living resource is approaching the end of its previously expected useful life.

(c) There is evidence that the condition of the living resource improved or declined based on assessments undertaken during the reporting period.

(d) The living resource is assessed as being impaired.

In assessing whether there is any indication that the expected residual value of the living resource has changed, the entity considers whether there has been any change in the expected timing of disposal of the living resource, as well as any relevant indicators as noted above.

The depreciation method used reflects the pattern in which the future economic benefits or service potential of the living resource is expected to be consumed by the entity.

The depreciation method applied to a living resource is reviewed at least at each reporting date and, if there has been a significant change in the expected pattern of consumption of the future economic benefits or service potential embodied in the living resource, the method is changed to reflect the changed pattern. Such a change is accounted for as a change in an accounting estimate.

The useful lives of items of property, plant and equipment have been assessed as follows:

ITEM	DEPRECIATION METHOD	AVERAGE USEFUL LIFE
Rhesus monkeys	Straight-line	25 years
Vervet monkeys	Straight-line	30 years

Impairment

The entity assesses at each reporting date whether there is an indication that the living resource may be impaired. If any such indication exists, the entity estimates the recoverable amount or the recoverable service amount of the living resource.

Transfers

Transfers from living resources are made when the particular asset no longer meets the definition of a living resource and/or is no longer within the scope of this accounting policy.

Transfers to living resources are made when the asset meets the definition of a living resource.

Derecognition

The carrying amount of a living resource is derecognised on disposal, or when no future economic benefits or service potential are expected from its use or disposal.

The gain or loss arising from the derecognition of a living resource is included in surplus or deficit when the item is derecognised.

1.29 EARMARKED FUNDS

The Earmarked funds are donations; bequests from deceased estates or cash received for a limited period to be used for visiting eminent scientists; cancer research or tuberculosis research. The monies received have been allocated to a separate account. The monies are ring-fenced from the cash balance of the SAMRC.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

2. NEW STANDARDS AND INTERPRETATIONS

2.1 STANDARDS AND INTERPRETATIONS EFFECTIVE AND ADOPTED IN THE CURRENT YEAR

In the current year, the entity has adopted the following standards and interpretations that are effective for the current financial year and that are relevant to its operations:

STANDARD/INTERPRETATION	EFFECTIVE DATE: YEARS BEGINNING ON OR AFTER	EXPECTED IMPACT
GRAP 34 Separate Financial Statements	1 April, 2020	No impact
GRAP 110 (as amended 2016)	1 April, 2020	The adoption of this not had a material impact on the results of the entity, but has resulted in more disclosure.
GRAP 35 Consolidated Financial Statements	1 April, 2020	No impact
GRAP 36 Investments in Associates and Joint Ventures	1 April, 2020	No impact
GRAP 37 Joint Arrangements	1 April, 2020	No impact
GRAP 38 Disclosure of interests in Other entities	1 April, 2020	No impact

2.2 STANDARDS AND INTERPRETATIONS NOT YET EFFECTIVE OR RELEVANT

The following standards and interpretations have been published and are mandatory for the entity's accounting periods beginning on or after April 1, 2021 or later periods but are not relevant to its operations:

STANDARD/INTERPRETATION	EFFECTIVE DATE	EXPECTED IMPACT
Guideline The Application of Materiality to Financial Statements	Undetermined	Impact is currently being assessed

NOTES TO THE ANNUAL FINANCIAL STATEMENTS (CONTINUED)

3. FINANCIAL ASSETS AT FAIR VALUE

Designated at fair value

Class 1 Listed shares
Sanlam demutualisation shares No. of shares 12715 (2020: 12715); Old Mutual demutualisation shares No. of shares 3682 (2020: 3682); Quilter shares No. of shares 1079 (2020: 1226) and Nedbank Ltd shares No. of shares 103 (2020: 103)

Class 2 Unit trusts
SIM General Equity Fund R – 17271,86 units (2020: 17029,97 units) and SIM Balanced Fund R – 30202,72 (2020: 29647,82)

Current assets

Designated at fair value

Financial assets at fair value

Fair value hierarchy of financial assets at fair value

For financial assets recognised at fair value, disclosure is required of a fair value hierarchy which reflects the significance of the inputs used to make the measurements. The fair value hierarchy has the following levels:

Level 1 represents those assets which are measured using unadjusted quoted prices in active markets for identical assets. Quoted selling price per share at 31 March 2021 (31 March 2020) is used.

Level 2 applies inputs other than quoted prices that are observable for the assets either directly (i.e. as prices) or indirectly (i.e. derived from prices). The valuation certificate received from Sanlam indicating the unit balance and price per unit and market value.

Level 3 applies inputs which are not based on observable market data.

Level 1

Class 1 Listed shares

Class 2 Unit trusts

	2021 31 MARCH R	2020 31 MARCH R
Class 1 Listed shares	852,840	733,264
Class 2 Unit trusts	7,194,864	4,825,480
	8,047,704	5,558,744
Designated at fair value	8,047,704	5,558,744

Class 1 Listed shares	852,840	733,264
Class 2 Unit trusts	7,194,864	4,825,480
	8,047,704	5,558,744

The entity has not reclassified any financial assets from cost or amortised cost to fair value, or from fair value to cost or amortised cost during the current or prior period.

The number of Quilter shares was reduced by 147 shares due to the odd lot buy back of Quilter Inc. shares on 18 May 2020.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS (CONTINUED)

3. FINANCIAL ASSETS AT FAIR VALUE (CONTINUED)

Reconciliation of financial assets at fair value through surplus or deficit measured in level 1

Reconciliation of financial assets at fair value through surplus or deficit measured in level 1 – March 2021

	OPENING BALANCE	GAINS OR LOSSES IN SURPLUS OR DEFICIT	PURCHASES	SALES	CLOSING BALANCE
Class 1 Listed shares	733,264	123,710	–	(4,134)	852,840
Class 2 Unit trusts	4,825,480	2,272,841	96,543	–	7,194,864
	5,558,744	2,396,551	96,543	(4,134)	8,047,704

Reconciliation of financial assets at fair value through surplus or deficit measured in level 1 – March 2020

	OPENING BALANCE	GAINS OR LOSSES IN SURPLUS OR DEFICIT	PURCHASES	CLOSING BALANCE
Class 1 Listed shares	1,078,434	(345,170)	–	733,264
Class 2 Unit trusts	5,889,917	(1,220,489)	156,052	4,825,480
	6,968,351	(1,565,659)	156,052	5,558,744

4. RECEIVABLES FROM EXCHANGE TRANSACTIONS

	2021 31 MARCH R	2020 31 MARCH R
Trade and research grant debtors	46,199,141	59,106,563
Employee costs in advance	221,997	3,952
Deposits	1,480,478	1,380,478
South African Revenue Services	2,824,561	2,824,561
Staff Loans	19,924	41,663
	50,746,101	63,357,217

The decrease in receivables from exchange transactions is attributed to lower accrued income for funder/grantor debtors.

The South African Revenue Services (SARS) amount refers to output vat that was disallowed in the September 2016 vat period that was re-assessed in November and December 2017. The output vat is claimable and SAMRC has lodged several disputes with SARS.

The staff loans bear interest at 7.50%

Credit quality of trade debtors

The credit quality of research grant debtors that are neither past nor due nor impaired can be assessed by reference to external credit ratings (if available) or to historical information about counterparty default rates.

Trade and other receivables

Trade and research grant receivables which are less than one month past due are not considered to be impaired. At March 31, 2021: R441,439 (2020: R610,051) were past due but not impaired.

The ageing of amounts past due but not impaired is as follows:

1 month past due	430,517	122,571
2 months past due	1,062	7,198
3 months past due	9,860	480,282

NOTES TO THE ANNUAL FINANCIAL STATEMENTS (CONTINUED)

4. RECEIVABLES FROM EXCHANGE TRANSACTIONS (CONTINUED)

Trade and other receivables impaired

The amount of the provision was R128,592 as of March 31, 2021 (2020: R76,483). All debtor balances are reviewed for impairment. Impairment considerations include solvency of debtor and recoverability of amount owed. Employee costs in advance are not considered for impairment as these amounts are recovered/processed within 30 days.

Aged as follows:

1 month but less than 2 months past due	412	5,471
2 months but less than 3 months past due	412	5,391
More than 3 months past due	127,768	65,621

The carrying amount of trade debtors are denominated in the following currencies:

Rand	41,208,641	47,187,019
US Dollar	4,357,890	10,749,895
Pound sterling	141,079	1,169,649
Euro	491,531	–
	46,199,141	59,106,563

Reconciliation of provision for impairment of trade and other receivables

Opening balance	76,483	34,198
Provision for impairment	128,592	76,483
Unused amounts reversed	(76,483)	(34,198)
	128,592	76,483

5. RECEIVABLES FROM NON-EXCHANGE TRANSACTIONS

Trade debtors

At March 31, 2021 there were funder/grantor non-exchange debtors and accrued income.

Receivables from non-exchange transactions past due but not impaired

Other receivables from non-exchange transactions which are less than one month past due are not considered to be impaired. At March 31, 2021, RNil - (2020: R249,199) were past due but not impaired.

1 month past due	–	249,199
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Receivables from non-exchange transactions impaired

The amount of the provision was RNil as at March 31, 2021 (2020: RNil), the current amounts owing are considered fully recoverable.

The carrying amount of other receivables from non-exchange transactions are denominated in the following currencies

Rand	3,369,481	1,789,887
GBP	–	491,166
	3,369,481	2,281,053

6. VAT RECEIVABLE

VAT	874,940	10,689,890
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7. PREPAYMENTS

Prepayments - other relate to expenditure paid in advance for subscriptions, membership fees; annual computer licenses; computer software updates and maintenance; computer warranties; insurance; conference registrations; airtickets and accommodation..

Subsistence and travel advances	340,857	696,276
Prepayments – other	11,379,123	7,030,711
	11,719,980	7,726,987

NOTES TO THE ANNUAL FINANCIAL STATEMENTS (CONTINUED)

8. CASH AND CASH EQUIVALENTS

Cash and cash equivalents consist of:

Cash on hand	18,637	42,685
Bank balances	601,018,729	370,419,168
	601,037,366	370,461,853

Analysis of bank balances

ABSA and Standard Bank	3,506,173	2,717,710
ABSA funder accounts	2,225,252	4,030,066
First National Bank	190,895	53,171
Cash at the Reserve Bank	595,096,409	356,838,231
First National Bank funder accounts	–	6,779,990
	601,018,729	370,419,168

The cash at the Reserve Bank includes funds for the Botha Trust; Bruhns Trust; Melville Douglas Trust; Q&S Abdool Karim Trust; FJ Kleynhans Trust; MF Ramashala Trust and Motor vehicle reserve fund.

The Motor vehicle reserve fund was established to provide self-insurance of motor vehicles with a low market value.

Motor vehicle reserve fund

Balance at beginning of year	4,090,952	3,827,582
Allocation for the year	268,970	263,370
	4,359,922	4,090,952

9. BIOLOGICAL ASSETS THAT FORM PART OF AN AGRICULTURAL ACTIVITY

	MARCH 2021		MARCH 2020	
	COST/ VALUATION	CARRYING VALUE	COST/ VALUATION	CARRYING VALUE
Bearer mature biological assets	80,000	80,000	1,137,538	1,137,538

Reconciliation of biological assets that form part of an agricultural activity – March 2021

	OPENING BALANCE	ADDITIONS	DECREASES DUE TO HARVEST /SALES	TRANSFERS	OTHER CHANGES, MOVEMENTS	TOTAL
Bearer mature biological assets	1,137,538	114,401	(61,867)	(1,100,539)	(9,533)	80,000

Reconciliation of biological assets that form part of an agricultural activity – March 2020

	OPENING BALANCE	ADDITIONS	DECREASES DUE TO SALES/ DISPOSALS	TOTAL
Bearer mature biological assets	1,307,270	114,401	(284,133)	1,137,538

During the year under review the rhesus monkeys were transferred to living resources as they will be held for breeding and internal research. The monkeys will no longer be available for sale to other research entities.

SAMRC holds horses as biological assets, horse blood is sold to laboratories when required. All activities are monitored and controlled to ensure humane treatment of animals. The last selling price per biological animal type is used to determine fair value.

The last selling price per biological animal type is used to determine fair value.

Fair value less costs to sell of biological assets during the period	80,000	1,137,538
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NOTES TO THE ANNUAL FINANCIAL STATEMENTS (CONTINUED)

10. PROPERTY, PLANT AND EQUIPMENT

	2021 31 MARCH R			2020 31 MARCH R		
	COST/ VALUATION	ACCUMULATED DEPRECIATION AND IMPAIRMENT	CARRYING VALUE	COST/ VALUATION	ACCUMULATED DEPRECIATION AND IMPAIRMENT	CARRYING VALUE
Land	1,769,181	–	1,769,181	1,769,181	–	1,769,181
Buildings	151,460,308	(44,056,227)	107,404,081	129,669,739	(40,371,636)	89,298,103
Vehicles and containers	19,368,044	(13,106,313)	6,261,731	20,323,345	(12,626,938)	7,696,407
Furniture and office equipment	44,140,018	(23,063,145)	21,076,873	43,134,549	(23,180,944)	19,953,605
Computer equipment	77,294,991	(42,072,596)	35,222,395	70,108,681	(35,194,981)	34,913,700
Laboratory equipment	81,478,465	(31,738,045)	49,740,420	70,204,114	(26,383,646)	43,820,468
Other property, plant and equipment – vervet monkeys	–	–	–	1,497,608	(699,321)	798,287
Total	375,511,007	(154,036,326)	221,474,681	336,707,217	(138,457,466)	198,249,751

Reconciliation of property, plant and equipment – March 2021

	OPENING BALANCE	ADDITIONS	DISPOSALS	TRANSFERS	OTHER CHANGES, MOVEMENTS	DEPRECIATION	IMPAIRMENT LOSS	IMPAIRMENT REVERSAL	TOTAL
Land	1,769,181	–	–	–	–	–	–	–	1,769,181
Buildings	89,298,103	21,921,946	(47,075)	–	–	(3,616,126)	(152,767)	–	107,404,081
Vehicles and containers	7,696,407	–	(152,915)	–	–	(1,055,577)	(226,184)	–	6,261,731
Furniture and office equipment	19,953,605	3,904,095	(495,006)	–	27	(2,012,931)	(272,917)	–	21,076,873
Computer equipment	34,913,700	10,352,804	(448,013)	–	(27)	(9,499,448)	(96,621)	–	35,222,395
Laboratory equipment	43,820,468	13,139,344	(563,027)	–	–	(5,285,214)	(1,399,340)	28,189	49,740,420
Other property, plant and equipment – vervet monkeys	798,287	–	–	(798,287)	–	–	–	–	–
	198,249,751	49,318,189	(1,706,036)	(798,287)	–	(21,469,296)	(2,147,829)	28,189	221,474,681

Reconciliation of property, plant and equipment – March 2020

	OPENING BALANCE	ADDITIONS	DISPOSALS	TRANSFERS	DEPRECIATION	TOTAL
Land	1,872,502	–	(103,321)	–	–	1,769,181
Buildings	79,817,469	11,710,355	(1,021,830)	1,798,621	(3,006,512)	89,298,103
Vehicles and containers	5,815,257	622,198	(332,667)	(41,712)	1,633,331	7,696,407
Furniture and office equipment	18,601,024	3,971,996	(127,579)	(1,556,147)	(935,689)	19,953,605
Computer equipment	32,580,558	9,743,916	(211,190)	(146,010)	(7,053,574)	34,913,700
Laboratory equipment	44,169,965	4,483,791	(63,816)	(54,752)	(4,714,720)	43,820,468
Other property, plant and equipment – vervet monkeys	860,799	324,304	(172,013)	–	(214,803)	798,287
	183,717,574	30,856,560	(2,032,416)	–	(14,291,967)	198,249,751

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

10. PROPERTY, PLANT AND EQUIPMENT (CONTINUED)

Other information

Impaired assets March 2021

Property, plant and equipment – Laboratory equipment	1,399,340
Property, plant and equipment – Computer equipment	96,621
Property, plant and equipment – Furniture and office equipment	272,917
Property, plant and equipment – Buildings	152,767
Property, plant and equipment – Vehicles	226,184
	2,147,829

Impaired assets March 2020

Property, plant and equipment – Laboratory equipment	28,189
	28,189

During the period under review various intra-mural units and platforms identified items of property, plant and equipment that would be used for future research projects, these items were impaired. The items are stored at a research site or at the unit/ platform.

All items of property, plant and equipment are owned by the entity.

There are no restrictions on the title of Property, plant and equipment.

Details of properties

Property, plant and equipment in the process of being constructed or developed

Cumulative expenditure recognised in the carrying value of property, plant and equipment

Buildings	7,819,814	1,673,260
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Reconciliation of Work-in-Progress March 2021

	INCLUDED WITHIN INFRASTRUCTURE	TOTAL
Opening balance	1,673,260	1,673,260
Additions/capital expenditure	10,469,464	10,469,464
Other movements [costs capitalised]	(4,322,910)	(4,322,910)
	7,819,814	7,819,814

	2021 31 MARCH R	2020 31 MARCH R
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SAMRC INTRAMURAL UNITS

ONCOLOGY

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

10. PROPERTY, PLANT AND EQUIPMENT (CONTINUED)

Reconciliation of Work-in-Progress March 2020

	INCLUDED WITHIN INFRASTRUCTURE	TOTAL
Opening balance	9,972,487	9,972,487
Additions/capital expenditure	3,407,499	3,407,499
Other movements [costs capitalised]	(11,706,726)	(11,706,726)
	1,673,260	1,673,260

Expenditure incurred to repair and maintain property, plant and equipment

Expenditure incurred to repair and maintain property, plant and equipment included in Statement of Financial Performance

Contracted services and maintenance costs	10,732,923	12,043,518
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11. INTANGIBLE ASSETS

	2021 31 MARCH R			2020 31 MARCH R		
	COST/ VALUATION	ACCUMULATED AMORTISATION AND IMPAIRMENT	CARRYING VALUE	COST/ VALUATION	ACCUMULATED AMORTISATION AND IMPAIRMENT	CARRYING VALUE
Computer software	29,776,970	(14,497,173)	15,279,797	29,505,609	(15,409,616)	14,095,993

Reconciliation of intangible assets – March 2021

	OPENING BALANCE	ADDITIONS	DISPOSALS	AMORTISATION	IMPAIRMENT REVERSAL	TOTAL
Computer software	14,095,993	4,809,655	(1,076,819)	(3,603,222)	1,054,190	15,279,797

Reconciliation of intangible assets – March 2020

	OPENING BALANCE	ADDITIONS	DISPOSALS	AMORTISATION	TOTAL
Computer software	12,674,035	3,984,900	(1)	(2,562,941)	14,095,993

There are no restrictions on the title of intangible assets.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS (CONTINUED)

12. LIVING RESOURCES

	2021 31 MARCH R			2020 31 MARCH R		
	COST/ VALUATION	ACCUMULATED AMORTISATION AND IMPAIRMENT	CARRYING VALUE	COST/ VALUATION	ACCUMULATED AMORTISATION AND IMPAIRMENT	CARRYING VALUE
Rhesus monkeys	1,100,539	(399,726)	700,813	-	-	-
Vervet monkeys	1,334,390	(616,613)	717,777	-	-	-
Total	2,434,929	(1,016,339)	1,418,590	-	-	-

Reconciliation of living resources March 2021

	OPENING BALANCE	ADDITIONS	DISPOSALS	TRANSFERS RECEIVED	DEPRECIATION	TOTAL
Rhesus monkeys	-	-	-	1,100,539	(399,726)	700,813
Vervet monkeys	-	38,917	(73,449)	798,287	(45,978)	717,777
Total	-	38,917	(73,449)	1,898,826	(445,704)	1,418,590

SAMRC holds rhesus monkeys and vervet monkeys for research purposes. During the year under review the rhesus monkeys were transferred from biological assets as these monkeys will only be held for entity research and will not be available for sale. Vervet monkeys were transferred from property, plant and equipment during the year under review. All research activities are monitored and controlled to ensure the humane treatment of animals.

The last selling price per animal type was used to determine the fair value as there is not an active market for these animals.

13. INVESTMENTS IN CONTROLLED ENTITIES

NAME OF COMPANY	HELD BY	% HOLDING 2021	% HOLDING 2020	CARRYING AMOUNT MARCH 2021 R	CARRYING AMOUNT MARCH 2020 R
Medres (Pty) Ltd	SAMRC	100.00 %	100.00 %	1	1
Jirehsa Medical (Pty) Ltd	Medres (Pty) Ltd	42.00 %	42.00 %	1	1
				2	2

The carrying amounts of controlled entities are shown net of impairment losses.

The financial statements of Medres (Pty) Ltd and Jirehsa Medical (Pty) Ltd have not been consolidated with those of the SAMRC, as they are not considered material in the context of SAMRC.

Controlled entities with less than 50% voting powers held

Although the entity holds less than 50% of the voting powers in Jirehsa Medical (Pty) Ltd the investment is considered a controlled entity because SAMRC has the power to govern the financial and operating policies of Jirehsa Medical (Pty) Ltd.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS (CONTINUED)

14. PAYABLES FROM EXCHANGE TRANSACTIONS

	2021 31 MARCH R	2020 31 MARCH R
Trade payables	71,182,624	73,029,747
Leave accrual	26,404,111	25,646,681
Accruals	77,775,460	11,661,014
Interest due to funders	87,511	79,558
	175,449,706	110,417,000

The increase in payables from exchange transactions is attributed to amounts due in respect of grants awarded.

The carrying amount of trade payables are denominated in the following currencies:

	2021 31 MARCH R	2020 31 MARCH R
Rand	68,756,549	71,239,898
US Dollar	2,426,075	-
Pound Sterling	-	1,789,849
	71,182,624	73,029,747

Leave accrual

	2021 31 MARCH R	2020 31 MARCH R
Balance at the beginning of the year	25,646,681	24,407,689
Leave payouts	(9,259,369)	(3,218,847)
Movement recognised in surplus or deficit	10,016,799	4,457,839
	26,404,111	25,646,681

NOTES TO THE ANNUAL FINANCIAL STATEMENTS (CONTINUED)

15. PROVISIONS

Reconciliation of provisions – March 2021

	OPENING BALANCE	ADDITIONS	UTILISED DURING THE YEAR	REVERSED DURING THE YEAR	TOTAL
Provision for bonus dispute	929,019	–	–	–	929,019
Provision for collaborative research	4,306,852	100,000	(4,079,352)	–	327,500
Provision for performance bonus	5,234,805	5,048,064	(5,212,149)	(22,656)	5,048,064
Other provisions	1,828,515	1,429,396	(595,385)	(569,633)	2,092,893
	12,299,191	6,577,460	(9,886,886)	(592,289)	8,397,476

Reconciliation of provisions – March 2020

	OPENING BALANCE	ADDITIONS	UTILISED DURING THE YEAR	REVERSED DURING THE YEAR	TOTAL
Provision for bonus dispute	929,019	–	–	–	929,019
Provision for collaborative research	6,664,048	4,259,352	(5,532,894)	(1,083,654)	4,306,852
Provision for performance bonus	4,918,964	5,234,805	(4,820,679)	(98,285)	5,234,805
Other provisions	6,530,283	1,165,018	(5,866,786)	–	1,828,515
	19,042,314	10,659,175	(16,220,359)	(1,181,939)	12,299,191

Collaborative research costs

The provision relates to collaborative research grants that have been awarded during the period under review, the grants will be settled in the next twelve months once the contractual payment terms have been met. During the period under review, payments were made to CSIR; UCT and NHLS. One self initiated research grant for R100,000 was provided for, as the institution has not responded to the request to submit an invoice or the institution has not submitted its audit report for the previous financial year.

Provision for bonus dispute

The bonus dispute provision relates to the estimated legal costs that needs to be paid to NEHAWU.

Other provisions

The other provisions relate to research units that closed during the rationalisation process; an estimate for the Department of Labour assessment for the claim for occupational injury on duty assessment for 2021; repayment of unspent grant funds to National Institute of Health and retention payable on building works (March 2020: The other provisions relate to research units that closed during the rationalisation process; the Department of Labour assessment for the claim for occupational injury on duty assessment for 2020 (COIDA) and repayment of grant/contract funds the Centers for Disease Control and Prevention; GlaxoSmithKline Biologicals SA and WHO).

Provision for performance bonus

The performance bonus cycle was changed after discussions and agreement with the union. The Board approved the change in bonus cycle which will result in payments being made after the financial year end. The amount reflected is the 2020/2021 provision for performance bonuses.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS (CONTINUED)

16. DEFERRED INCOME

The increase in deferred income can be attributed to the following contract funds received in advance: Department of Science and Technology; Solidarity Response Fund NPC; The Elma Philathrope; Michelle & Susan Dell Foundation; Global Fund and MRC UK.

	2021 31 MARCH R	2020 31 MARCH R
Deferred income	306,352,589	198,366,172

Summary of deferred income

Research grants received in advance	306,165,694	197,996,416
Other funds received in advance	186,895	369,756
	306,352,589	198,366,172

17. EMPLOYEE BENEFIT OBLIGATIONS

Post retirement medical aid obligation

Pension fund - Defined benefit (asset)

	6,714,000	7,964,000
	(8,028,000)	(1,303,000)
Net (asset) obligation	(1,314,000)	6,661,000

Post retirement benefits

Post retirement medical aid plan

SAMRC took a compulsory insurance policy in order to fund post retirement medical obligations of its ex-employees. Given the nature of the policy, it is appropriate to treat this as a plan asset. Certain assets have been allocated specifically for the purpose of covering the post retirement medical aid defined benefit liability. The defined benefit medical liability has been recognised and accounted for under the requirements of GRAP 25 - Employee Benefits. The assets have been accounted for in terms of the requirements of the accounting standards to which they relate and not in terms of GRAP 25 because the plan is not registered. The relevant assets are included in the statement of financial position..

Pension funds

SAMRC personnel are members of the following pension funds

- State Pension Fund (Associated institutions - AIPF) (Act No. 51 of 1963)
- State Pension fund for temporary employees (Act No. 75 of 1979)
- SAMRC Pension fund (since January 1994)

(a) The first two funds were established by Law and are regulated by the respective Acts.

(b) The last-named fund is regulated by the Pension Fund Act and is managed by an independent Board of Trustees. The SAMRC Pension fund was actuarially valued at 1 April 2020. Next statutory valuation for the fund is 1 April 2023.

(c) The first two funds offer defined benefits to staff. With regard to the SAMRC Pension fund, some members are on a defined benefit scheme, while the remainder are on a defined contribution scheme.

The SAMRC Pension Fund and the Post retirement Medical Aid Plan is valued annually in compliance with GRAP 25.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS (CONTINUED)

17. EMPLOYEE BENEFIT OBLIGATIONS (CONTINUED)

Post retirement medical aid plan

The amounts recognised in the statement of financial position are as follows:

Carrying value

	2021 31 MARCH R	2020 31 MARCH R
Present value of the defined benefit obligation-wholly unfunded	(1,168,000)	(1,208,000)
Present value of the defined benefit obligation-partly or wholly funded	(20,320,000)	(21,314,000)
Fair value of plan assets	14,774,000	14,558,000
Net liability	(6,714,000)	(7,964,000)

Changes in the present value of the defined benefit obligation are as follows:

Opening balance	22,522,000	25,984,000
Interest costs	2,416,000	2,186,000
Benefits paid	(2,515,000)	(2,636,000)
Actuarial (gain)	(935,000)	(3,012,000)
Closing balance	21,488,000	22,522,000

Net expense recognised in the statement of financial performance

Interest cost	2,416,000	2,186,000
Expected return on plan assets	(1,516,000)	(1,430,000)
Contribution paid	–	(1,423,000)
Recognised actuarial (gain) loss	(2,150,000)	159,000
Total included in employee related cost	(1,250,000)	(508,000)

Calculation of actuarial gains and losses

Actuarial (gains) losses – Obligation	(935,000)	(3,012,000)
Actuarial (gains) losses – Plan assets	(1,215,000)	3,171,000
	(2,150,000)	159,000

NOTES TO THE ANNUAL FINANCIAL STATEMENTS (CONTINUED)

17. EMPLOYEE BENEFIT OBLIGATIONS (CONTINUED)

Changes in the fair value of plan assets are as follows:

	2021 31 MARCH R	2020 31 MARCH R
Opening balance	14,558,000	17,512,000
Actuarial gain (losses)	1,215,000	(3,171,000)
Expected return on plan assets	1,516,000	1,430,000
Contributions by employer	–	1,423,000
Benefits paid	(2,515,000)	(2,636,000)
Closing balance	14,774,000	14,558,000

The entity expects to contribute RNil to its defined benefit plan in the following financial year.

The entity will investigate the options available to eliminate the net liability as far as possible

Key assumptions used

Assumptions used at the reporting date:

Discount rates used	9.70 %	11.40 %
General increases to medical aid subsidy	7.40 %	8.60 %
Expected rate of return on assets	9.70 %	11.40 %
Proportion of continuing membership at retirement	100.00 %	100.00 %
Proportion of retiring members who are married	80.00 %	80.00 %
Retirement age for staff who joined prior to 1 May 1998	65	65
Retirement age for staff who joined after 1 May 1998	65	65

The expected rate of return on plan assets is based on market expectations, at the beginning of the period, for returns over the entire life of the related obligation.

The discount rate has been determined by reference to market yields at the balance sheet date of South African long-term bonds.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS (CONTINUED)

17. EMPLOYEE BENEFIT OBLIGATIONS (CONTINUED)

Other assumptions

Assumed healthcare cost trends rates have a significant effect on the amounts recognised in surplus or deficit. A one percentage point change in assumed healthcare cost trends rates would have the following effects:

	IMPACT ON LIABILITY RM	% INCREASE/ DECREASE
March 2021		
Assumptions as above	21,488	
Discount rate – increases by 1% p.a.	20,061	(7)
Discount rate – decreases by 1% p.a.	23,122	8
Medical inflation – increases by 1% p.a.	23,026	7
Medical inflation – decreases by 1% p.a.	20,124	(6)
March 2020		
Assumptions as above	22,522	
Discount rate – increases by 1% p.a.	21,074	(6)
Discount rate – decreases by 1% p.a.	24,172	7
Medical inflation – increases by 1% p.a.	24,072	7
Medical inflation – decreases by 1% p.a.	20,598	(9)

Amounts for the current period and previous four years are as follows:

	2021 R	2020 R	2019 R	2018 R	2017 R
Defined benefit obligation – partially or wholly unfunded	20,320,000	21,314,000	24,753,000	26,667,000	22,177,000
Defined benefit obligation wholly unfunded	1,168,000	1,208,000	1,231,000	1,326,000	1,194,000
Plan assets	14,774,000	14,558,000	17,512,000	17,581,000	16,206,000
(Deficit) in the plan	(6,714,000)	(7,964,000)	(8,472,000)	(10,412,000)	(7,165,000)

NOTES TO THE ANNUAL FINANCIAL STATEMENTS (CONTINUED)

17. EMPLOYEE BENEFIT OBLIGATIONS (CONTINUED)

Pension funds

Defined benefit obligation – Wholly funded

Present value of obligation	(85,789,000)	(84,536,000)
Fair value of plan assets	93,817,000	85,839,000

Net Asset (Liability)

	8,028,000	1,303,000
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Changes in the present value of the defined benefit obligation are as follows:

Opening defined benefit obligation	84,536,000	98,927,000
Benefits paid	(10,522,000)	(16,071,000)
Service cost	2,503,000	3,136,000
Interest cost	9,781,000	9,108,000
Actuarial (gain)	(1,978,000)	(11,415,000)
Member contributions	1,133,000	1,205,000
Re-insurance premiums	(211,000)	(180,000)
Expenses	(163,000)	(174,000)
Re-insurance proceeds	710,000	–

Closed defined benefit obligation closing balance

	85,789,000	84,536,000
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Changes in the fair value of plan assets are as follows:

Opening fair value of plan assets after limitation	85,839,000	98,604,000
Contributions – Employer	3,255,000	3,464,000
Contributions – Plan participants	1,133,000	1,205,000
Benefits paid	(10,522,000)	(16,071,000)
Expected return on plan assets	9,787,000	8,902,000
Actuarial gains (losses)	3,989,000	(9,911,000)
Re-insurance premiums	(211,000)	(180,000)
Expenses	(163,000)	(174,000)
Re-insurance proceeds	710,000	–

Closing fair value of plan assets

	93,817,000	85,839,000
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Calculation of actuarial gains and losses

Actuarial (gains) – Obligation	(1,978,000)	(11,415,000)
Actuarial (gains) losses – Plan assets	(3,989,000)	9,911,000

	(5,967,000)	(1,504,000)
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Staff costs includes the following in respect of the defined benefit pension plan:

Current service cost	2,503,000	3,136,000
Interest cost	9,781,000	9,108,000
Expected return on plan assets	(9,787,000)	(8,902,000)
Net actuarial gains (losses) recognised in current year	(5,967,000)	(1,504,000)
Contributions paid	(3,255,000)	(3,464,000)

	(6,725,000)	(1,626,000)
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The principal actuarial assumptions used in determining the pension plan per annum were:

General inflation rate	6.50%	6.10%
Discount rate	11.20%	11.80%
Interest income on assets	11.20%	11.80%
Salary inflation – percentage plus merit increase	7.50%	7.10%

The entity expects to contribute R4,388,000 to its defined benefit plan in the following financial year.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS (CONTINUED)

17. EMPLOYEE BENEFIT OBLIGATIONS (CONTINUED)

	2021 R	2020 R	2019 R	2018 R	2017 R
Defined benefit obligation	85,789,000	84,536,000	98,927,000	111,435,000	105,379,000
Plan assets	93,817,000	85,839,000	98,604,000	99,663,000	100,508,000
Surplus (deficit) in the plan	8,028,000	1,303,000	(323,000)	(11,772,000)	(4,871,000)

18. EARMARKED FUNDS

	2021 31 MARCH R	2020 31 MARCH R
Botha trust	151,636	151,636
Bruhns trust	1,332,296	1,308,446
Melville Douglas trust	13,325	13,325
Q&S Abdool Karim trust	2,805,343	2,700,321
FJ Kleynhans trust	111,442	111,442
	4,414,042	4,285,170

The Earmarked funds are donations; bequests from deceased estates or cash received for a limited period to be used for visiting eminent scientists; cancer research or tuberculosis research.

The Earmarked funds are held at the Reserve Bank.

The Bruhns and Q & S Abdool Karim trust funds earned interest.

19. ACCUMULATED SURPLUS

Accumulated surplus	420,748,829	341,530,495
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The policy of the SAMRC is to maintain a reserve of R50 million to provide for any unforeseen health emergencies. The accumulated surplus at the end of the reporting period is required to fund capital projects and other commitments as well as the maintenance of current funding levels of research projects over the MTEF period. The surplus will also be used to attract equivalent leverage funding from international funders.

National Treasury approved an emergency allocation of R150 million including vat in terms of section 16 of the Public Finance Management Act, 1999 (Act No of 1999). The funds are earmarked for the Sisonke research project on effectiveness of vaccine and resistance against mutant strains, with particular emphasis on the initial 500,000 Johnson & Johnson doses. The research project is expected to be completed in the 2021/2022 financial year. The unused portion of this transfer payment is included in accumulated surplus.

20. REVENUE

Income from contracts, grants and services rendered (exchange)	331,477,753	423,552,011
Rental income	5,342,179	5,393,995
Other income	10,432,373	12,693,257
Interest received - investment	19,535,723	32,466,696
Dividends received	102,363	163,319
Fair value adjustments	2,396,550	-
Gain on foreign exchange	-	4,985,417
Government grants & subsidies	743,167,826	597,100,870
Income from contracts, and grants (non-exchange)	94,946,983	71,651,965
	1,207,401,750	1,148,007,530

NOTES TO THE ANNUAL FINANCIAL STATEMENTS (CONTINUED)

20. REVENUE (CONTINUED)

The amount included in revenue arising from exchanges of goods or services are as follows:

	2021 31 MARCH R	2020 31 MARCH R
Income from contracts, grants and services rendered (exchange)	331,477,753	423,552,011
Rental income	5,342,179	5,393,995
Gain on foreign exchange	-	4,985,417
Fair value adjustments	2,396,550	-
Other income	10,432,373	12,693,257
Interest received – investment	19,535,723	32,466,696
Dividends received	102,363	163,319
	369,286,941	479,254,695

The amount included in revenue arising from non-exchange transactions is as follows:

Baseline grant	743,167,826	597,100,870
Income from contracts and grants (non-exchange)	94,946,983	71,651,965
	838,114,809	668,752,835

Included in the baseline grant is the amount of R130,434,800 received for the Sisonke research project.

Revenue

Income from contract, grants and services rendered – exchange	331,477,753	423,552,011
Income from contract, grants and services rendered – non-exchange	94,946,983	71,651,965
Government grants	743,167,826	597,100,870
	1,169,592,562	1,092,304,846

21. OTHER INCOME

Rental income	5,342,179	5,393,995
Gain on foreign exchange	-	4,985,417
Other income	10,432,373	12,693,257
	15,774,552	23,072,669

22. INVESTMENT INCOME

Dividend revenue

Listed financial assets – Local	102,363	163,319
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Interest revenue

Unit trusts	28,154	24,469
Bank	140,123	410,776
Interest charged on trade and other receivables	9,268	11,375
Corporation for public deposits	19,358,178	32,020,076
	19,535,723	32,466,696
	19,638,086	32,630,015

NOTES TO THE ANNUAL FINANCIAL STATEMENTS (CONTINUED)

23. OPERATING EXPENSES

	2021 31 MARCH R	2020 31 MARCH R
Depreciation and amortisation	25,518,222	16,854,908
Debt impairment	62,432	36,521
Employee costs	386,209,756	402,746,555
Loss on disposals	2,840,501	1,318,697
Impairment loss on property, plant and equipment	1,065,450	–
General expenses	688,672,942	661,781,489
Lease rentals on operating lease	6,408,947	6,161,303
Loss on foreign exchange	5,186,925	–
Repairs and maintenance	12,071,710	14,231,559
	1,128,036,885	1,103,131,032

24. EMPLOYEE RELATED COSTS

	2021 31 MARCH R	2020 31 MARCH R
Basic	325,705,922	225,980,181
Other non pensionable allowances	–	107,952,772
Bonus	5,025,409	5,136,520
UIF	1,204,404	1,284,485
Leave payments	9,752,002	3,566,487
Adjustments from the application of GRAP 25	(7,975,000)	(2,134,000)
Other salary related costs	6,725,367	8,811,462
Defined pension benefit plan expense – current service cost	3,383,775	3,614,982
Overtime payments	1,356,817	849,525
Temporary staff	17,239,524	22,331,360
Defined pension contribution plan expense	23,791,536	23,929,995
Post retirement medical aid contribution	–	1,422,786
	386,209,756	402,746,555

Included in other salary related costs is the increase in the leave liability of R10M after leave payments which is due to low leave usage during the period under review.

The bonus amount includes the 2020/2021 provision for performance bonus of R 5,048,064 and an unutilised amount of R22,655 relating to the 2019/2020 that was reversed.

Basic salary includes other non pensionable allowances for the period under review.

Staff exercised the option to encash a maximum of ten days leave, the encashment of leave is included in the leave payment amount.

25. FINANCE COSTS

Other interest paid	146,531	268,853
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SAMRC had to refund interest due to its funders for monies received in advance (March 2021: R15,632; March 2020: R13,323), to the earmarked funds (March 2021: R128,872; March 2020: R252,112). Interest paid to suppliers for late payments of account is not classified as fruitless and wasteful expenditure if the invoice is received late from the supplier (March 2021: R2,027; March 2020: R1,020). During June 2019 SARS issued an assessment for PAYE and levied interest and penalties amounting to R2,398, the matter was investigated. The short payment was due to a payroll processing error.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS (CONTINUED)

26. DEBT IMPAIRMENT

	2021 31 MARCH R	2020 31 MARCH R
Debt impairment	16,851	–
Provision for debt impairment	45,581	36,521
	62,432	36,521

The debt impairment reflected above include the current periods provision for bad debt of R128,592 (including VAT of R14,242) and reversal of the previous year's provision (March 2020 provision for bad debts of R76,483 (including VAT of R7,714)).

27. GENERAL EXPENSES

	2021 31 MARCH R	2020 31 MARCH R
Advertising	1,958,278	2,364,918
Auditors remuneration	1,561,883	2,786,644
Bank charges	406,287	620,705
Cleaning consumables	2,925,080	3,244,983
Computer expenses	28,179,544	24,139,990
Consulting and professional fees	7,851,435	7,974,091
Insurance	2,442,448	2,462,173
Personal Protective Equipment	3,645,676	–
Magazines, books and periodicals	6,739,977	5,111,888
Postage and courier	7,924,026	707,923
Printing, stationery and publication costs	7,683,060	8,610,262
Security	9,206,231	8,366,532
Subscriptions and membership fees	632,759	850,244
Telephone and fax	1,727,872	2,341,611
Training	2,198,977	4,207,072
Travel, subsistence and conference attendance	12,259,248	46,863,307
Utilities	13,712,484	15,417,673
Laboratory operating cost	39,357,287	53,346,659
Skills Development levies	1,832,902	3,024,648
Collaborative research	532,719,210	457,539,975
Other expenses	3,708,278	11,800,191
	688,672,942	661,781,489

Travel, subsistence and conference attendance

	2021 31 MARCH R	2020 31 MARCH R
Local travel	335,325	7,082,100
Overseas travel	284,092	9,829,203
Accommodation - local and overseas	677,347	8,137,019
Subsistence and travel expenditure	3,612,933	6,855,533
Conference expenditure	2,537,491	8,433,678
Participant incentives	4,812,060	6,525,774
	12,259,248	46,863,307

Other expenses

	2021 31 MARCH R	2020 31 MARCH R
Canteen costs	336,871	2,165,225
Personnel teas	427,835	947,465
Hire of premises and equipment	2,178,089	7,305,619
Licences	67,283	97,153
Staff recruitment costs	150,042	355,249
Employee wellness costs	316,612	514,203
Pot and plant rental	171,999	209,100
Uniforms	59,547	206,177
	3,708,278	11,800,191

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

27. GENERAL EXPENSES (CONTINUED)

Collaborative research costs include amounts that were paid to research institutions which relates to tranche payments of contractual agreements signed with institutions who will conduct research on behalf of the SAMRC as part of the entity's mandate. No goods or services are received for these payments as they relate to start-up costs for research, the 2020/2021 amount is R180,083,151 (2019/2020 amount is R147,464,531).

Collaborative costs increased mainly due to the increase in COVID research during the year under review.

28. FAIR VALUE ADJUSTMENTS

	2021 31 MARCH R	2020 31 MARCH R
Other financial assets		
• Other financial assets at fair value	2,396,550	(1,565,659)

29. AUDITORS' REMUNERATION

Fees	1,561,883	2,786,644
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30. OPERATING SURPLUS (DEFICIT)

Operating surplus for the year is stated after accounting for the following:

Operating lease charges

Premises		
• Contractual amounts	6,408,947	6,161,303
Loss on sale of property, plant and equipment	2,840,501	1,318,697
Impairment loss/reversal of impairments on intangible assets and property, plant and equipment	1,065,450	–
Loss (Gains) on exchange differences	5,186,925	(4,985,417)
Amortisation on intangible assets	3,603,222	2,562,941
Depreciation on property, plant and equipment	21,469,296	14,291,967
Depreciation on living resources	445,704	–
Employee costs	386,209,756	402,746,555
General expenses	688,672,942	661,781,489

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

31. CASH GENERATED FROM (USED IN) OPERATIONS

	2021 31 MARCH R	2020 31 MARCH R
Surplus	79,218,334	43,041,986
Adjustments for:		
Depreciation and amortisation	25,518,222	16,854,908
Loss on sale of assets	2,840,501	1,318,697
Loss (Gain) on foreign exchange	5,186,925	(4,985,417)
Fair value adjustments	(2,396,550)	1,565,659
Impairment loss/ reversal of impairments on intangible assets and property, plant and equipment	1,065,450	–
Debt impairment	62,432	36,521
Movements in retirement benefit assets and liabilities	(7,975,000)	(2,134,000)
Movements in provisions	(3,901,715)	(6,743,123)
Capitalisation of financial assets	(96,543)	(156,052)
Non cash adjustment on biological assets	9,533	–
Changes in working capital:		
Receivables from exchange transactions	7,361,759	30,674,508
Receivables from non-exchange transactions	(1,088,428)	(2,281,053)
Prepayments	(3,992,993)	398,366
Payables from exchange transactions	65,032,706	(31,254,153)
VAT	9,814,950	(5,079,056)
Deferred income	107,986,417	(100,396,754)
	284,646,000	(59,138,963)

32. FINANCIAL INSTRUMENTS DISCLOSURE

Categories of financial instruments

March 2021

Financial assets

	AT FAIR VALUE	AT AMORTISED COST	AT COST	TOTAL
Receivables from exchange transactions	–	50,746,101	–	50,746,101
Receivables from non-exchange transactions	–	3,369,481	–	3,369,481
Cash and cash equivalents	–	601,037,366	–	601,037,366
Investment in controlled entities	–	–	2	2
Financial assets	8,047,704	–	–	8,047,704
	8,047,704	655,152,948	2	663,200,654

Financial liabilities

	AT AMORTISED COST	TOTAL
Payables from exchange transactions	175,449,706	175,449,706

NOTES TO THE ANNUAL FINANCIAL STATEMENTS (CONTINUED)

32. FINANCIAL INSTRUMENTS DISCLOSURE (CONTINUED)

March 2020

Financial assets

	AT FAIR VALUE	AT AMORTISED COST	AT COST	TOTAL
Receivables from exchange transactions	–	63,357,217	–	63,357,217
Receivables from non-exchange transactions	–	2,281,053	–	2,281,053
Cash and cash equivalents	–	370,461,853	–	370,461,853
Investment in controlled entities	–	–	2	2
Financial assets	5,558,744	–	–	5,558,744
	5,558,744	436,100,123	2	441,658,869

Financial liabilities

	AT AMORTISED COST	TOTAL
Payables from exchange transactions	110,417,000	110,417,000

33. COMMITMENTS

Authorised commitments

Already contracted for but not provided for

- Property, plant and equipment
- Goods and services
- Research grants
- Operating leases
- Sisonke grants

	2021 31 MARCH R	2020 31 MARCH R
	5,131,168	4,151,834
	10,665,018	7,554,547
	2,152,585	16,732,837
	895,898	2,638,986
	117,075,039	–
	135,919,708	31,078,204
	135,919,708	31,078,204

Already contracted for but not provided for

This committed expenditure relates to property, plant and equipment, goods and services and research grants and will be financed by retained surpluses, existing cash resources, funds internally generated, etc.

Operating leases – as lessee (expense)

Minimum lease payments due

– within one year	895,898	1,927,096
– in second to fifth year inclusive	–	711,890
	895,898	2,638,986

NOTES TO THE ANNUAL FINANCIAL STATEMENTS (CONTINUED)

33. COMMITMENTS (CONTINUED)

Operating lease payments represent rentals payable by the entity for certain of its office properties. Leases are negotiated for an average term of three years. No contingent rent is payable.

Operating leases – as lessor (income)

Minimum lease payments due

	2021 31 MARCH R	2020 31 MARCH R
– within one year	3,746,148	3,560,039
– in second to fifth year inclusive	5,471,249	4,534,373
– later than five years	3,092,495	729,822
	12,309,892	8,824,234

Certain of the entity's buildings generate rental income. Lease agreements have terms from 12 months to 9 years and eleven months.

34. RELATED PARTIES

Executive authority	Dept. of Health (DOH)
Entities in the same economic entity	National Health Laboratory Services (NHLS) South African Health Products Regulatory Authority (SAHPRA)
Controlled entities	Medres (Pty) Ltd Refer to note 13 Jirehsa Medical (Pty) Ltd Refer to note 13
Members of key management	Prof G Gray (President appointed 1 April 2014). Mr. N Buick (Chief Financial Officer appointed 16 July 2012). The official is a director of the controlled entity Medres (Pty) Ltd. Dr. R Gordon (Ex officio Executive Management Committee member from 1 April 2013 – 31 December 2020). Prof. R Jewkes (Executive scientist research strategy in the office of the president appointed 1 June 2017). Prof. MJ Mphahlele (Vice President appointed 1 October 2014). Mr. B Spies (Executive Director Human Capacity Development appointed 1 August 2016 till October 2020). Dr. M Mdhuli (Chief research operations officer appointed 1 September 2017). Mr. M Popo (Legal Counsel).
Board member:	Prof. M Sathekge, term ended 31 October 2019 Prof. J Mahlangu (Chairperson from 1 November 2019) Dr. Z Kwitshana, term ended 31 October 2019 Prof. R Carolissen, term started 1 November 2019 Prof. C Dandara, term started 1 November 2019 Dr T Tucker, term started 1 November 2019 Prof. Q Abdool Karim, term ended 31 October 2019 Prof. L Skaal Prof. T Sodi Prof E Seekoe, term started 1 November 2019 Prof. M Cotton, term ended 31 October 2019 Prof. S Velaphi Prof. L Zungu Prof. T Mavundla Prof. B Shaw Dr. R Chikwamba, term ended 31 October 2019 Dr. M Madikizela, term started 1 November 2019 Prof. E Mukwevho, term started 1 November 2019

NOTES TO THE ANNUAL FINANCIAL STATEMENTS (CONTINUED)

34. RELATED PARTIES (CONTINUED)

	2021 31 MARCH R	2020 31 MARCH R
Loan accounts – Owing (to) by related parties		
Medres (Pty) Ltd (The loan is not considered to be recoverable and has been written off.)	219,585	218,285
Amounts included in Trade receivable (Trade Payable) regarding related parties National		
Health Laboratory Services (NHLS)	115,608	65,172
National Health Laboratory Services (NHLS)	–	(138,040)
South African Health Products Regulatory Authority	–	(21,855)
Deferred Income (grants received in advance in advance)		
Dept. of Health (DOH)	1,926,607	4,118,335
Revenue – grants received and services rendered to related parties		
Dept. of Health (DOH, revenue from non- exchange)	743,167,826	597,100,870
Dept. of Health (DOH) Contracts, revenue from exchange	558,261	1,936,977
National Health Laboratory Services	1,589,492	2,239,998
	745,315,579	601,277,845
Expenditure such as grants awarded, extra-mural unit grants and collaborative research grants incurred with related party suppliers		
National Health Laboratory Services	819,969	138,040
South African Health Products Regulatory Authority (SAHPRA)	102,940	75,973
	922,909	214,013
Executive authority information		
Minister: Dr. Z. Mkhize		
No subsistence, travel and other related re-imbusement costs have been paid.		
Director General: Ms. Precious Matsoso		
No subsistence, travel and other related re-imbusement costs have been paid.		
Executive Directors leave balances		
Mr. N Buick	241,689	108,557
Dr. R Gordon	–	115,514
Prof. G Gray	380,490	193,421
Mr. M Popo	39,404	53,461
Prof. M Mphahlele	247,718	306,283
Prof. R Jewkes	232,665	148,459
Dr. M Mdhluhi	277,893	236,498
Mr. B Spies	–	236,627

1,419,859 1,398,820

NOTES TO THE ANNUAL FINANCIAL STATEMENTS (CONTINUED)

35. MEMBER'S EMOLUMENTS

Executive March 2021

	EMOLUMENTS	VEHICLE & PARKING & CELLPHONE ALLOWANCE	ACCOMMODATION AND ENTERTAINMENT	LOCAL AIR TRAVEL AND PARKING	TOTAL
Professor J Mahlangu	128,733	15,584	–	–	144,317
Professor R Carolissen	81,189	3,684	–	–	84,873
Professor C Dandara	62,856	3,684	–	–	66,540
Advocate D Khosa	109,998	3,684	–	–	113,682
Professor M Madikizela	91,665	3,684	–	–	95,349
Professor T Mavundla	89,046	3,684	–	–	92,730
Professor E Mukwevho	62,856	3,684	–	–	66,540
Professor W Rae	62,856	3,684	–	–	66,540
Professor E Seekoe	79,059	3,684	–	–	82,743
Professor B Shaw	121,452	3,684	–	–	125,136
Professor L Skaal	89,046	3,684	–	–	92,730
Professor T Sodi	155,988	3,684	1,387	15,498	176,557
Doctor T Tucker	99,522	3,684	–	–	103,206
Professor S Velaphi	62,856	3,684	–	–	66,540
Ms J Williams	89,046	3,684	–	–	92,730
Professor L Zungu	83,808	3,684	–	–	87,492
	1,469,976	70,844	1,387	15,498	1,557,705

March 2020

	EMOLUMENTS	VEHICLE & PARKING & CELLPHONE ALLOWANCE	ACCOMMODATION AND ENTERTAINMENT	LOCAL AIR TRAVEL AND PARKING	TOTAL
**Professor J Mahlangu	65,964	7,581	4,245	18,611	96,401
* Professor M Sathekge	102,054	7,049	1,371	18,477	128,951
* Professor Q Abdool Karim	–	–	1,361	–	1,361
* Professor E Bukusi	39,285	2,149	3,029	141,312	185,775
*** Professor R Carolissen	23,571	2,077	–	9,194	34,842
* Doctor R Chikwamba	–	–	–	19,205	19,205
* Professor M Cotton	31,428	2,149	–	–	33,577
*** Professor C Dandara	15,714	1,616	–	9,851	27,181
* Doctor P Hanekom	84,153	–	–	16,984	101,137
* Advocate N Kadwa	62,856	2,149	–	49,116	114,121
* ** Advocate D Khoza	23,571	1,788	3,579	9,034	37,972
* Doctor Z Kwitshana	75,519	2,149	4,089	61,457	143,214

NOTES TO THE ANNUAL FINANCIAL STATEMENTS (CONTINUED)

March 2020

	EMOLUMENTS	VEHICLE & PARKING & CELLPHONE ALLOWANCE	ACCOMMODATION AND ENTERTAINMENT	LOCAL AIR TRAVEL AND PARKING	TOTAL
*** Professor M Madikizela	26,190	2,040	3,202	11,631	43,063
*** Professor T Mavundla	26,190	2,149	1,849	18,633	48,821
*** Professor E Mukwevho	21,072	3,810	1,790	7,213	33,885
** Professor W Rae	57,618	3,684	12,512	101,944	175,758
** Professor B Shaw	122,805	3,857	6,523	70,615	203,800
*** Professor E Seekoe	15,714	1,535	3,657	7,599	28,505
** Professor L Skaal	75,951	6,290	8,616	41,970	132,827
** Professor T Sodi	96,759	9,582	10,074	50,861	167,276
*** Doctor T Tucker	23,571	1,535	–	–	25,106
** Professor S Velaphi	60,237	4,171	3,135	21,131	88,674
*** Ms J Williams	26,190	2,069	–	8,660	36,919
** Professor L Zungu	57,618	3,937	1,239	26,809	89,603
	1,134,030	73,366	70,271	720,307	1,997,974

* Old Board member

** Old and current Board member

*** New Board member

EXECUTIVE DIRECTORS EMOLUMENTS

March 2021

	PACKAGE TOTAL INCL. LEAVE PAYOUT; ALLOWANCES AND LUMP SUMS	BONUS	COMPANY CONTRIBUTIONS	TOTAL
G Gray (President)	2,797,016	53,502	214,350	3,064,868
N Buick (CFO)	2,622,589	53,502	268,845	2,944,936
** R Gordon (Executive Director)	1,458,122	53,502	110,191	1,621,815
R Jewkes (Executive Scientist Research Strategy)	1,863,979	53,502	214,972	2,132,453
MJ Mphahlele (Vice President)	2,381,573	53,502	176,478	2,611,553
*B Spies (Executive Director)	882,963	53,502	117,253	1,053,718
M Mdhuli (CROO)	1,922,740	53,502	206,464	2,182,706
M Popo (Executive Director)	1,682,107	53,502	129,338	1,864,947
	15,611,089	428,016	1,437,891	17,476,996

* B Spies deceased 19 October 2020.

** R Gordon term ended 31 December 2020.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS (CONTINUED)

35. MEMBER'S EMOLUMENTS (CONTINUED)

EXECUTIVE DIRECTORS EMOLUMENTS (CONTINUED)

March 2020

	PACKAGE TOTAL INCL. LEAVE PAYOUT; ALLOWANCES AND LUMP SUMS	BONUS	S & T	COMPANY CONTRIBUTIONS	TOTAL
G Gray (President)	2,795,676	57,216	33,679	198,182	3,084,753
N Buick (CFO)	2,621,250	57,216	14,804	253,659	2,946,929
R Gordon (Executive Director)	1,942,974	57,216	22,099	137,926	2,160,215
MJ Mphahlele (Vice President)	2,383,977	57,216	34,367	162,219	2,637,779
B Spies (Executive Director)	1,512,630	57,216	2,250	195,704	1,767,800
R Jewkes (Executive Scientist Research Strategy)	1,928,993	57,216	37,353	204,193	2,227,755
M Mdhuli (CROO)	1,874,778	57,216	29,664	188,159	2,149,817
M Popo (Executive Director)	1,526,755	–	–	107,794	1,634,549
	16,587,033	400,512	174,216	1,447,836	18,609,597

36. FRUITLESS AND WASTEFUL EXPENDITURE

	2021 31 MARCH R	2020 31 MARCH R
Fruitless and wasteful expenditure - opening balance	4	92
Fruitless and wasteful expenditure current year	2,027	873
Recovered and approved for write-off	(924)	(961)
	1,107	4

Expenditure relates to interest on late payment of electricity; Government Printing Works; Telkom accounts and late renewal of motor vehicle licences.

The Board approved that interest on late payment of motor vehicle licences are not recoverable from staff in light of the prevailing circumstances at the licencing departments (R1,072).

Interest charged due to negligence on the part of the staff members and traffic fines paid is recovered from the employees. An amount of R330 for interest was recovered from staff during the period under review. The balance outstanding will be recovered from the responsible staff members. An amount of R28 charged by Telkom is being disputed as the account was paid by the due date.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS (CONTINUED)

37. IRREGULAR EXPENDITURE

Add: Irregular Expenditure – current period

Less: Amounts written off

	2021 31 MARCH R	2020 31 MARCH R
	–	5,632
	–	(5,632)
	–	–
Analysis of expenditure awaiting condonation per age classification		
Details of irregular expenditure – current year		
Non compliance with Supply Chain Management Practices	–	5,632
National Treasury – TR 16A 6.1; SCM Practice note 8 of 2007/08: Paragraph 3.2 and NT SCM Instruction No. 7 of 2017/2018: Paragraph 4	–	–
National Treasury – TR 16A 6.1; SCM Practice note 8 of 2007/08: Paragraph 3.3 and NT SCM Instruction No. 7 of 2017/2018 Paragraph 4	–	–
Preferential Procurement Regulation 2017, Regulation 8(2) and 8(5)	–	–
National Treasury – TR 3 of 2016/2017; Paragraph 8.5	–	–
	–	5,632

Details of irregular expenditure condoned

At its meeting in October 2019 the Board condoned expenditure within its authority, totaling R5,632.

38. DEVIATION FROM SUPPLY CHAIN MANAGEMENT REGULATIONS

Paragraph 12(1)(d)(i) of Government gazette No. 27636 issued on 30 May 2005 states that a supply chain management policy must provide for the procurement of goods and services by way of a competitive bidding process.

Paragraph 36 of the same gazette states that the accounting officer may dispense with the official procurement process in certain circumstances, provided that he records the reasons for any deviations and reports them to the next meeting of ARIC and the Board and includes a note to the annual financial statements.

All deviations were documented and will be submitted to the Accounting Authority or its delegate in terms of the Delegation of Authority Framework. Deviations were motivated in advance and subsequently approved.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS (CONTINUED)

39. PUBLIC FINANCE MANAGEMENT ACT (PFMA)

Section 55 (2)

No material losses through criminal conduct were incurred during the period ended 31 March 2021. Irregular and fruitless and wasteful expenditure incurred has been disclosed in notes 36 and 37.

Section 54 (2)

In terms of the PFMA and Treasury Regulation 28.3 the entity has developed and agreed to a framework of acceptable levels of materiality and significance.

40. BUDGET DIFFERENCES

Material differences between budget and actual amounts

- | | |
|-------|--|
| 40.1 | The lower than anticipated revenue from exchange transactions were offset by the higher than anticipated revenue from non-exchange transactions. |
| 40.2 | Employee related costs were lower than anticipated due to the decrease in research contract activities. |
| 40.3 | Other income is higher than budgeted mainly due to the recoupment of a research payment made to the University of Alabama. |
| 40.4 | Repairs and maintenance; external research support, consulting and internal audit costs; audit fees; lease rentals and information technology costs were lower than anticipated due to cost savings initiatives. Laboratory costs were lower than anticipated due to lower research activities |
| 40.5 | Travel, subsistence and vehicle fleet costs were under budget, due to the travel limitation during the COVID 19 pandemic. |
| 40.6 | The budget did not include impairment loss/ reversal of impairments and loss on disposal of assets . |
| 40.7 | Collaborative research costs were higher than anticipated mainly due to the funding of COVID research projects. |
| 40.8 | Infra-structural, communication and statutory costs were higher than anticipated due to higher than anticipated electricity costs and expenditure on the infrastructure . |
| 40.9 | The strengthening of the Rand had an unfavourable impact on the foreign grant and contract funds received. |
| 40.10 | The opening of the economy during the period under review had a favourable impact on the financial assets fair value of 31 March 2020, resulting in a unforeseen fair value adjustment. |
| 40.11 | Interest received was lower than anticipated due to a decline in the average balance of cash and cash equivalents. |

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

41. RISK MANAGEMENT

Liquidity risk

The entity's risk to liquidity is a result of the funds available to cover future commitments. The entity manages liquidity risk through an ongoing review of future commitments and credit facilities. Trade and other payables are due within 12 months and equal their carrying balances as the impact of discounting is not significant.

SAMRC's primary source of income is government grants and contractual income, funds receivable is estimated when preparing the MTEF. Budgets are prepared for each contract and spend is monitored on an ongoing basis to ensure the liquidity of the entity.

Credit risk

This is the risk that one party to a financial instrument will cause a financial loss for the other party by failing to discharge an obligation. Management has a debtors policy in place, and this makes provision for credit evaluation for customers requiring credit above R1 million. Investments are allowed only in liquid securities and only with the SARB and the four major banks with high credit standing.

Contract work constitutes a significant portion of the SAMRC's income, and the major exposure is delays in finalising contracts, and disputes in terms of whether or not the outputs have been produced. A certain number of contracts are stated and paid on a reimbursive basis, and this poses a risk if the funder is not satisfied with the outputs.

The SAMRC operates internationally and is exposed to foreign exchange risk arising from various currency exposures, primarily with respect to the US dollar; GBP and the Euro. SAMRC receives substantial funding from the UK; USA and Europe, as a result its statement of financial position can be affected by movements in the US dollar; GBP and Euro. Foreign exchange risk arises from future commercial transactions, recognised assets and liabilities and net investments.

Due to uncertainties in respect of when cash will be received from overseas, SAMRC does not hedge foreign exchange fluctuations.

Approximately 9% of SAMRC's Trade Debtors (R4,990,500) are exposed to currency compared to 20% last year (R12,410,710),

SAMRC's project office does a scenario calculation looking at how much would be lost if there was an unfavourable currency change. On the basis of this outcome, it will be decided whether or not to proceed with a particular project.

Market risk

Interest rate risk

In respect of income-earning financial assets interest-bearing financial liabilities, the table below indicates their average effective interest rates at the reporting date and the periods in which they mature.

Cash flow interest rate risk

FINANCIAL INSTRUMENT	CURRENT INTEREST RATE	DUE IN LESS THAN A YEAR	DUE IN ONE TO TWO YEARS	DUE IN TWO TO THREE YEARS	DUE IN THREE TO FOUR YEARS	DUE AFTER FIVE YEARS
Trade and other receivables – normal credit terms	7.00 %	49,568,622	–	–	–	–
Cash in current banking institutions	– %	601,037,366	–	–	–	–
Trade and other payables – extended credit terms	7.00 %	175,449,706	–	–	–	–

Foreign exchange risk

The entity does not hedge foreign exchange fluctuations.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

	2021 31 MARCH R	2020 31 MARCH R
Exchange rates on 31 March 2021 (31 March 2020) used for conversion of foreign items were:		
USD – ABSA buying	14.7665	17.5498
USD – ABSA selling	14.7870	17.9503
USD – FNB Buying	–	17.6000
USD – FNB selling	–	18.1572
GBP – ABSA buying	20.3532	21.7803
GBP – ABSA selling	–	22.3642
GBP – FNB buying	–	21.6982
GBP – FNB selling	–	22.5594
Euro – ABSA buying	17.3178	–

The entity reviews its foreign currency exposure, including commitments on an ongoing basis. The entity has CFC accounts for specific foreign income grants whose payments are mainly made in foreign currency. The risk for currency fluctuations is eliminated by maintaining the CFC accounts for these grants.

42. SERVICES-IN-KIND

During the year under review the SAMRC's Environment & Health Research Unit utilised office space at the University of Johannesburg; Health Systems Research Unit utilised space at a clinic in Gugulethu and the Alcohol, Tobacco and Other Drug Research Unit utilised space at various district hospitals at no cost. The deemed fair rental value of the space is computed at R134,272 (2020: R205,413).

In addition a staff member was seconded from Wits Health Consortium to the SAMRC to provide secretarial support to the President. The estimated annual value of this service is R386,316 (2020: R386,316).

43. IN-KIND DONATIONS AND ASSISTANCE

SAMRC received personal protective equipment from Fred Hutchinson for use at funded clinical trial research sites. SAMRC was the named importer on the shipment documentation and Fred Hutchinson representatives arranged for the distribution to research sites in South Africa and other African countries. The value of the personal protective equipment received by SAMRC is estimated to be less than R1,000,000.

SAMRC received the study drug for the Sisonke trial from Janssen Vaccine and Prevention BK. The study drug is not available for sale and as such no fair value could be obtained. The SAMRC paid the transportation cost for the first shipment of the study drug, subsequent transport costs were covered by Johnson and Johnson and other Sisonke stakeholders. The transport costs could not be determined as the study drug was received in various consignment quantities over five subsequent shipments.

44. CONTINGENCIES

Contingent liabilities

There is a high court claim by an ex-employee which is being disputed by the SAMRC. The Board has agreed to a mediation process. The parties are in the process of appointing a mediator. At this stage of the process it is unknown if the mediation process will be successful and if a settlement can be reached.

The SAMRC will be applying to National Treasury to retain the accumulated surplus funds of R420,748,829. If approved the accumulated surplus funds will not have to be paid to National Treasury.

Contingent assets

In October 2017 and November 2017 the South African Revenue Services (SARS) re-assessed the September 2016 vat period. Output vat amounting to R2,824,561 was disallowed and interest and penalties were levied amounting to R370,726 and R294,150 respectively. The amount of R3,492,222 was deducted from a refund due to SAMRC. SAMRC has lodged a dispute with SARS for the disallowed output vat and the interest and penalties. The output vat is valid and this amount has been included in the current assets. SAMRC anticipates to recover the interest and penalties amounting R 664,876 from SARS.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

	2021 31 MARCH R	2020 31 MARCH R
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45. GOING CONCERN

The annual financial statements have been prepared on the basis of accounting policies applicable to a going concern. This basis presumes that funds will be available to finance future operations and that the realisation of assets and settlement of liabilities, contingent obligations and commitments will occur in the ordinary course of business.

46. STATUTORY RECEIVABLES

The entity had the following statutory receivables where the Framework for the Preparation and Presentation of Financial Statements have been applied, for the initial recognition:

Vat receivable	874,940	10,689,890
South African Revenue Services		
Output vat disallowed September 2016 vat period (refer note 4)	2,824,561	2,824,561
	3,699,501	13,514,451

Transaction(s) arising from statute

Value Added Tax Act 89 of 1991.

Determination of transaction amount

The net amount of VAT recoverable from SARS is reflected in the Statement of Financial Position as Vat Receivable.

The amount included in receivables from exchange transactions relates to the output vat which was disallowed in the September 2016 vat period that was re-assessed in November and December 2017. The vat output is claimable, several disputes have been lodge with SARS in order to resolve this matter.

Interest or other charges levied/charged

The Value Added Tax Act determines the rates and interest is charged

Basis used to assess and test whether a statutory receivable is impaired

No, impairment, the balance is expected to be fully recoverable.

47. BBBEE PERFORMANCE

Information on compliance with the B-BBEE Act is included in the annual report under the section titled B-BBEE Compliance Performance Information.

48. IMPAIRMENT OF ASSETS

Impairments

Intangible assets and property, plant and equipment
Impairment of property, plant and equipment was identified at the year-end by management. Internal indicators such as the research sites/laboratories not being active were key factors in deciding to impair the property, plant and equipment. Impairment reversals for software and laboratory equipment were processed during the year under review.

1,065,450	-
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NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

49. ADDITIONAL NOTABLE RELATIONSHIPS

Other government departments	Dept. of Science & Technology Dept. of Social Development
Members of key management	Prof G Gray (President appointed 1 April 2014). Suppliers and Debtors : Wits Health Consortium – the official is a researcher at the Perinatal HIV Research Unit; National Research Foundation (NRF)- the official is a board member from 1 October 2018 and received research funding for being NRF rated; the official is a director of Hutchinson Centre Research Institute of SA; the official is a director of HPCRISA; University of Cape Town – the official is an Audit committee member. The official is a board member of GARDP Foundation. Mr. N Buick (Chief Financial Officer appointed 16 July 2012. Supplier and Debtor: University of Western Cape – Audit Committee member till 30 June 2020) The official is a director of the controlled entity Medres (Pty) Ltd Dr. R Gordon (Ex officio Executive Management Committee member from 1 April 2013 – 31 December 2020. Prof. R Jewkes (Executive scientist research strategy in the office of the president appointed 1 June 2017) Prof. MJ Mphahlele (Vice President appointed 1 October 2014 and extra mural unit director at Sefako Makgatho Health Sciences University (SAMRC supplier); Medical science committee member at the Health Professions Council of South Africa (SAMRC supplier) and SA deputy representative in the General Assembly of the European and Developing Countries Clinical Trials Partnership (EDCTP) (SAMRC debtor and supplier). Mr. B Spies (Executive Director Human Capacity Development appointed 1 August 2016 till October 2020) Dr. M Mdhuli (Chief research operations officer appointed 1 September 2017). Mr. M Popo (Legal Counsel)
Board members	Board members are employed by Universities who contract with SA Medical Research Council for grant income or collaborative research Prof. M Sathekge, term ended 31 October 2019 (University of Pretoria – grant recipient and debtor, director of College of Medicine SA a supplier) Prof. J Mahlangu (University of Witwatersrand and NHLS – grant recipient and debtor) Dr. Z Kwitshana, term ended 31 October 2019 (University KwaZulu Natal – supplier and debtor from 1 July 2019; Mangosuthu University of Technology grant recipient and debtor 1 April 2016 to 30 June 2019) Prof. R Carolissen, term started 1 November 2019 (University of Stellenbosch – grant recipient and debtor) Prof. C Dandara and Dr T Tucker, term started 1 November 2019 (University of Cape Town – grant recipient and debtor) Prof. Q Abdool Karim, term ended 31 October 2019 (CAPRISA – extramural unit, grant recipient and debtor; donor to SAMRC for the the Q&S Abdool Karim fund) Prof. L Skaal and Prof. T Sodi (University of Limpopo – grant recipient and debtor) Prof E Seekoe, term started 1 November 2019 (University of Fort Hare – grant recipient) Prof. M Cotton, term ended 31 October 2019 (University of Stellenbosch – grant recipient and debtor) Prof, S Velaphi (University of Witwatersrand – grant recipient and debtor) Prof. L Zungu and Prof. T Mavundla (University of South Africa – supplier and debtor) Prof. B Shaw (University of Zululand from 1 April 2018 – supplier and debtor) Dr. R Chikwamba, term ended 31 October 2019 (CSIR – supplier and debtor) Dr. M Madikizela, Term started 1 November 2019 (University of Pretoria – grant recipient and debtor) Prof. E Mukweho, term started 1 November 2019 (North West University – grant recipient and debtor)
Employee: Mr P Charls	Tertiary Education and Research Network of South Africa (TENET) (SAMRC internet service provider, the staff member is a co-opted director on the TENET Board effective 30 April 2015)
Employee: Dr N Abrahams	Sonke Gender Justice Network (service provider, staff member is a director till November 2019)
Employee: Prof. MA Dhansay	National Science and Technology Forum (SAMRC supplier, the staff member is a director)

NOTES TO THE ANNUAL FINANCIAL STATEMENTS (CONTINUED)

49. ADDITIONAL NOTABLE RELATIONSHIPS (CONTINUED)

Employee: Ms N Naicker	Public Health Association of South Africa (PHASA) (SAMRC supplier and debtor, the staff member is a director)
Employee: Dr R Maharaj	Lubombo Spatial Development Initiative 2 (SAMRC debtor, the staff member is a director)
Employee: Dr M Mulder	Medres (Pty) Ltd and Jirehsa Medical (Pty) Ltd – the staff member is a director of the controlled entities

Notable relationship balances

	2021 31 MARCH R	2020 31 MARCH R
Amounts included in Trade receivable (Trade Payable) for notable parties		
Dept. of Science and Technology	272,846	–
European and Developing Countries Clinical Trials Partnership (EDCTP)	717	392,220
Health Professions Council of South Africa	(3,220)	(6,210)
Lubombo Spatial Development Initiative 2	–	393,819
National Research Foundation	(400,000)	–
University of Cape Town	1,653,494	–
University of Cape Town	(25,552,831)	(20,027,316)
University of Fort Hare	(155,250)	–
University of Limpopo	(75,000)	–
University of North West	(558,340)	–
University of Pretoria	–	37,052
University of Pretoria	(329,000)	(3,220,497)
UNISA	(859,488)	(198,520)
UNISA	109,789	–
University of Stellenbosch	476,987	184,103
University of Stellenbosch	(3,946,465)	(2,143,530)
University of Western Cape	–	148,541
University of Western Cape	–	(199,400)
University of Witwatersrand	–	16,003
University of Witwatersrand	(7,169,271)	(1,582,216)
Wits Health Consortium	657,751	–
Wits Health Consortium	(27,194,286)	(14,366,311)
University of Zululand	(402,500)	(7,378)
Deferred Income (grants received in advance)		
Dept. of Science and Technology (DST)	56,867,265	62,319,748
European and Developing Countries Clinical Trials Partnership (EDCTP)	17,214,461	–
Sefako Makgatho University	90,000	–
University of Cape Town	585,045	–
National Research Foundation (NRF)	3,547,395	–
University of Witwatersrand	299,463	–

NOTES TO THE ANNUAL FINANCIAL STATEMENTS (CONTINUED)

Commitments

Sefako Makgatho University	1,000,000	–
University of Cape Town	6,395,590	–
UNISA	–	557,542
University of Stellenbosch	3,197,795	–
Wits Health Consortium	37,750,155	–
University of Witwatersrand	1,352,585	–

Revenue – grants received and services rendered to notable parties

Dept. of Science and Technology (DST)	146,597,362	100,049,996
Dept. of Social Development	73,908	528,986
European and Developing Countries Clinical Trials Partnership (EDCTP)	11,484,640	11,976,968
GARDP Foundation	–	1,807,477
Lubombo Spatial Development Initiative	849,626	393,819
National Research Foundation	5,295,641	5,887,998
North West University	–	718,005
Sefako Makgatho Health Sciences University	90,000	509,469
Sonke Gender Justice	–	21,739
University of Cape Town	1,704,507	649,272
University of Fort Hare	250,944	–
University of KwaZulu Natal	–	14,957
University of Pretoria	–	32,219
University of Stellenbosch	837,388	1,105,510
UNISA	109,789	21,739
University of Western Cape	–	1,145,951
University of Witwatersrand	280,912	328,006
Wits Health Consortium	983,752	2,730,094
	168,558,469	127,922,205

NOTES TO THE ANNUAL FINANCIAL STATEMENTS (CONTINUED)

49. ADDITIONAL NOTABLE RELATIONSHIPS (CONTINUED)

	2021 31 MARCH R	2020 31 MARCH R
Expenditure such as grants awarded, extra-mural unit grants and collaborative research grants incurred with notable parties		
CAPRISA	–	10,543,955
Council for Scientific and Industrial Research (CSIR)	–	1,460,704
European and Developing Countries Clinical Trials Partnership (EDCTP)	1,304,348	1,304,348
Health Professions Council of South Africa	4,830	48,225
Mangosuthu University of Technology	–	200,000
National Research Foundation	1,740,000	1,165,217
North West University	3,519,441	591,359
Public Health Association of South Africa (PHASA)	–	101,650
Sefako Makgatho Health Sciences University	2,828,008	4,850,139
Sonke Gender Justice Network	–	594,891
Tertiary Education and Research Network of South Africa (TENET)	1,161,002	1,113,108
University of KwaZulu Natal	–	4,433,438
University of Limpopo	13,002,943	8,485,826
University of Pretoria	20,292,498	15,890,552
University of Cape Town	73,781,131	101,396,061
University of Fort Hare	3,470,243	350,000
UNISA	3,700,340	392,138
University of Stellenbosch	26,712,616	35,327,871
University of Western Cape	3,103,223	9,902,461
University of Witwatersrand	24,685,858	27,679,325
University of Zululand	1,490,000	827,161
Wits Health Consortium	91,452,676	72,380,825
	272,249,157	299,039,254

DETAILED INCOME STATEMENT

	NOTE(S)	2021 31 MARCH R	2020 31 MARCH R
Revenue			
Revenue from exchange transactions			
Income from contracts, grants and services rendered		331,477,753	423,552,011
Rental income		5,342,179	5,393,995
Other income		10,432,373	12,693,257
Interest received - investment	22	19,535,723	32,466,696
Gain on foreign exchange		–	4,985,417
Fair value adjustments	28	2,396,550	–
Dividends received	22	102,363	163,319
Total revenue from exchange transactions		369,286,941	479,254,695
Revenue from non-exchange transactions			
Transfer revenue			
Baseline grant		743,167,826	597,100,870
Income from contracts and grants (non-exchange)		94,946,983	71,651,965
Total revenue from non-exchange transactions		838,114,809	668,752,835
Total revenue	20	1,207,401,750	1,148,007,530
Expenditure			
Employee related costs	24	(386,209,756)	(402,746,555)
Depreciation and amortisation		(25,518,222)	(16,854,908)
Impairment loss/ Reversal of impairments	48	(1,065,450)	–
Finance costs	25	(146,531)	(268,853)
Lease rentals on operating lease		(6,408,947)	(6,161,303)
Debt Impairment	26	(62,432)	(36,521)
Repairs and maintenance		(12,071,710)	(14,231,559)
Loss on disposal of assets and liabilities		(2,840,501)	(1,318,697)
Loss on foreign exchange		(5,186,925)	–
Fair value adjustments		–	(1,565,659)
General Expenses	27	(688,672,942)	(661,781,489)
Total expenditure		(1,128,183,416)	(1,104,965,544)
Surplus for the period		79,218,334	43,041,986

The supplementary information presented does not form part of the financial statements and is unaudited

SPECIAL TRIBUTES

You must bear losses like a soldier, the voice told me, bravely and without complaint, and just when the day seems lost, grab your shield for another stand, another thrust forward. That is the juncture that separates heroes from the merely strong.

– Margaret George



JEANETTE
WYETH

Jeanette Wyeth passed away in April 2021 after losing her battle against COVID-19.

She started her career at the SAMRC in March 2002 as an administrative officer within the then Experimental Biology Programme (EBP) before joining the then Corporate Affairs Division later in February 2006.

Jeanette joined the HR Directorate in April 2015 where her responsibilities included support with job evaluation, career progression, performance management and services rendered. She eventually ended up spending most of her time on services rendered before advancing to the level of Chief Officer: Organisational Development in April 2016. Whilst working full-time Jeanette completed her BA Degree in 2019.

During her stay at HR she will be remembered for her laughter, impeccable dress sense and her compassion for her colleagues.



BRINTON SPIES

Brinton Spies passed away in hospital on 19 October 2020 after a short illness. He joined the SAMRC on 1 August 2016 as the Executive Director of Human Resources. As part of our Executive Management Committee, Brinton was a 'tour de force', enthusiastic and deeply committed to the goals of the SAMRC and always displayed integrity and compassion for all who worked at the organisation.

He often went beyond the call of duty to support the many issues facing staff.

His team spirit was manifested in his orchestration of the organisation's participation in the national Jerusalem Challenge demonstrating the organisation's resilient response to the COVID-19 pandemic.

We are immensely grateful to Brinton for his contributions at the SAMRC as we entered our 50th year as a transformed organisation, making health impact in South Africa and globally.



TASNIM MOHSAM

Tasnim Mohsam from the Project and Management Accounting Division, part of the Finance Division, passed away from Covid-19 related complications in August 2020.

She joined the SAMRC in March 1993 as a Finance Officer in the Finance Division before joining Project and Management Accounting Office in 1997 where she focused on research contract management and became a specialist in this area. Tasnim will always be remembered by her colleagues, research funders locally and internationally for her dedication, work ethic and attitude.



CEBO MNDZE

Cebo Mndze from the Finance Division passed away on 24 February 2020.

He joined the SAMRC in 2008 as an Intern after completing his Diploma at Cape Peninsula University of Technology and was subsequently appointed permanently on 01 April 2011 as a Chief Officer in the Subsistence and Travel team. In 2013, he was transferred to the Creditors team where he was responsible for processing creditors' invoices and following up on outstanding orders.

Cebo was a strong and principled individual, and will be sorely missed by all his colleagues at Finance and the broader organisation.

May their Souls Rest in Peace.