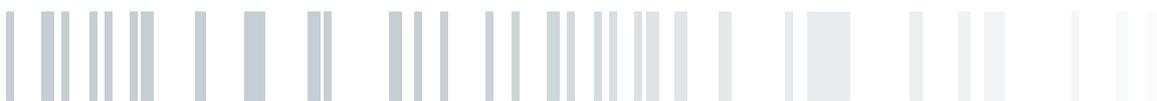




REIMAGINING HEALTH

ANNUAL REPORT 2021/2022



REGISTERED NAME

SOUTH AFRICAN MEDICAL RESEARCH COUNCIL

REGISTRATION NUMBER (if applicable)

Not applicable

PHYSICAL ADDRESS (headquarters)

Francie van Zijl Drive
Parow Valley
Cape Town

POSTAL ADDRESS

PO Box 19070
Tygerberg
7505

TELEPHONE NUMBER/S

+ (0)27 21 938-0911

FAX NUMBER

+ (0)27 21 938-0200

EMAIL ADDRESS

info@mrc.ac.za

EXTERNAL AUDITORS

Auditor General of South Africa, Western Cape

BANKERS

ABSA

COMPANY/BOARD SECRETARY

Mr Nizar Davids
nizar.davids@mrc.ac.za

DEPUTY INFORMATION OFFICER

Dr. Seeiso Koali
seeiso.koali@mrc.ac.za

Ms Nobubele Tandwa
nobubele.tandwa@mrc.ac.za

ISBN

978-1-928340-63-8

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 research, innovation, development, and technology transfer. The scope of research includes laboratory investigations, clinical research, and public health studies.

We conduct research on 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, medical diagnostics, medical devices, and therapeutics. We are 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, the 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, and strengthen our capacity to flourish in the 21st century. As a custodian of health research, the SAMRC is building a healthy nation through research and innovation.

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.

CONTENTS

p4

**A NOTE FROM THE BOARD
CHAIRPERSON**

p6

**A NOTE FROM THE
PRESIDENT AND CEO**

PART A ACHIEVEMENTS AND HIGHLIGHTS 8

Reimagination of transformation at the SAMRC	9
SAMRC's Wastewater Surveillance & Research programme	10
Network for Genomic Surveillance in South Africa	12
Supporting surveillance through innovative tools	12
mRNA technology transfer hub	13
Chan Soon-Shiong Foundation and SAMRC Scholarship program	13
NHI Evidence-Informed Planning and Implementation	13
Genomic Research Approach for Diversity and Optimising Therapeutics	13
Medical Device and Diagnostic Innovation Cluster	13

Global clinical trial reporting guidelines amidst the COVID-19 pandemic	14
Gender and Health	14
HIV Prevention	14
Saving lives through vaccines	16
The NExT study: A novel 6-month treatment regimen for multi-drug-resistant tuberculosis (MDR-TB)	17
SAMRC Bioinformatics Unit rolls out data analytics training for genomic surveillance to support the SADC region	17
Sisonke Study: SAMRC Report to the National Department of Health	18
RSA COVID-19 Vaccine Roll-out	21
Request for Applications: SAMRC Extramural Research Units	27
Partnerships with other countries	28

REIMAGINING HEALTH

PART B	30
PERFORMANCE INFORMATION	
Statement of responsibility for performance for the year ended 31 March 2022	31
Strategic outcome oriented goals	32
SAMRC's performance information	32
Strategic objectives, performance indicators, planned targets and actual achievements	36
Our research profile	42
FUNDING HEALTH INNOVATION	48
Grants, innovation and product development	49
Strategic Health Innovation Partnerships (SHIP)	54
The Newton Fund	55
The South African AIDS Vaccine Initiative	55
RESEARCH CAPACITY DEVELOPMENT	56
SAMRC STRATEGIC RESEARCH PROGRAMMES	62
Programme 1	63
Health Promotion & Disease Prevention	
Programme 2	92
Maternal, Child and Womens's Health	
Programme 3	105
HIV, Aids, TB and Other Communicable Diseases	
Programme 4	145
Health Systems Strengthening	
Programme 5	161
Public Health Innovation	
Programme 6	177
Biomedical Research	
SAMRC COLLABORATING CENTRES & TB REPORT SA	196
COMMUNICATIONS AND STAKEHOLDER ENGAGEMENTS	200
PART C	208
GOVERNANCE	
Introduction	209
Our Board	210
Enterprise Risk Management	218
B-BBEE compliance performance information	226

PART D	230
HUMAN RESOURCES	
SAMRC organogram	231
Executive summary	231
Executive management appointments	232
Transformation	232
Career/Capacity Development	232
Succession planning	232
Employee performance management	232
Employee relations	232
Coaching support	232
Human resource management information system (HRMIS)	233
A look towards the future	233
HUMAN RESOURCES STATISTICS	234
Remuneration	234
Employment	235
Job evaluation	236
Employment equity	236
Performance rewards	240
Foreign national workers	240
Leave utilisation	241
Employee wellness programme	243
Labour relations	244
Skills development	245
Injury on duty	246
PART E	248
FINANCIAL INFORMATION	
Nature of Business & Principal Activities	250
Report of the Chief Executive Officer & President	251
Report of the Auditor General to Parliament on the South African Medical Research Council	252
Accounting Authority's responsibilities and approval	256
Audit Committee Report	257
Audited Financial Statements	258

A NOTE FROM THE BOARD CHAIRPERSON

Working towards the SAMRC of the Future!

It has been more than two years since the world has had to navigate the COVID-19 pandemic and the SAMRC has been a true force in shaping South Africa's response. Now more than ever, it has become apparent the importance of creating a metanarrative around health and the critical role played by science. How we appeal to universal values and truth that centres on health equity and how health enables people to lead healthy and productive lives.

This theme of health and wealth is very much tied to the relationship between how healthy individuals, communities, and populations are more productive and enabled to lead a healthier, longer, and more fulfilling life. The COVID-19 pandemic has made this vision at a global level a challenge with lives and livelihoods affected. A coordinated response from governments working with in-country experts and global partners has been key in our response. The SAMRC stayed rooted in the national health research agenda by reprioritising funding and programs aimed at the COVID-19 response.

One of the most significant achievements of the COVID-19 response has been the incredible speed of vaccine development. However, vaccine access and uptake has remained a challenge. One of the most exciting developments is the launch of the first in Africa mRNA vaccine hub, an important step to allow the continent

to leapfrog the vaccine manufacturing gap. The mRNA technology transfer hub for COVID-19 vaccines brings together the private sector, research councils, and academics to harness the collective efforts of the continent.

With transformation as a pillar of the SAMRC's strategic focus, building health research capacity to respond to COVID-19 and future pandemics is important. The collaboration between the Chan Soon-Shiong Foundation and the SAMRC Scholarship Program to build a vaccine manufacturing workforce exemplifies how the SAMRC has established key partnerships to deliver on their strategic goals/programmes.

As the country's medical council conducting health research, the SAMRC has a track record of research into the top ten causes of mortality, reducing morbidity and improving health outcomes. In the 2021/22 financial year, the SAMRC continued to fund innovation, capacity development in health research, while supporting plans towards South Africa's National Health Insurance and Universal Health Coverage.

These achievements are against a backdrop of sound corporate governance with the SAMRC established as a public entity that has maintained clean audits, while promoting new funding streams and relations for health impact. The SAMRC continues to maintain strong reserves with assets exceeding liabilities by R420M.

The SAMRC has also, through a range of programmes, made significant contributions to science and how that science is translated into health policy and practice. Through the SAMRC Scientific Merit Awards, which were established in 2013, annually, the SAMRC recognises impactful science led by scientists who have made seminal contributions to health sciences and positively impacted lives in South Africa.



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.

It is not only the work of the many great scientists that have to be recognised through the Awards, but the contributions of the Department of Health, Minister Dr. Joe Phaahla, the SAMRC Board and Executive Management and the various teams of researchers and research support ambassadors of the SAMRC brand, that I would like to acknowledge for their achievements and thank for their contributions to the mission of the SAMRC.

Let's continue taking the steps forward towards the SAMRC of the future!

Sincerely

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

PROFESSOR JOHNNY MAHLANGU
SAMRC BOARD CHAIRPERSON

A NOTE FROM THE PRESIDENT AND CEO

Building a vibrant research organisation looking into the next 50 years!

When we celebrated 50 years of research and excellence in 2019, we also looked towards the SAMRC of the future, how the organisation would continue to influence science and policy, by making an impact and supporting the National Department of Health in improving the quality of lives of South Africans.

Through research, development, and technology transfer, the SAMRC responds to South Africa's quadruple burden of disease with the intramural units prioritising research into the 10 most common causes of morbidity and mortality and associated risk factors. The COVID-19 pandemic has also impacted on our ability to focus on South Africa's colliding epidemics.

Since the onset of the pandemic, the SAMRC has been at the forefront of the COVID-19 response, a total of around R250M was allocated to COVID-19 funding by March 2021, with the Department of Science and Innovation (DSI) contributing R65.7M by March 2021 and allocating an additional R81M in the 2021/22 financial year.

The SAMRC has also led significant studies on the pandemic and the Johnson & Johnson vaccine. Under South Africa's Sisonke programme, a real-world phase 3B implementation study, 496 424 South African health care workers received a first dose of the lifesaving vaccine. In late 2021, under the Sisonke Booster programme (Sisonke 2) 230 488 health care workers received a second dose of the vaccine.

The single dose Johnson & Johnson COVID-19 vaccine demonstrated effectiveness against severe COVID-19 disease and death post-vaccination, and against both

Beta and Delta variants of concern. In addition to Sisonke, the research teams conducted two additional studies, called ENSEMBLE 1 and 2, on the efficacy of the Johnson & Johnson Ad26.COVS vaccine in relation to a single and two-dose regimen. The results of the ENSEMBLE 2 study clearly demonstrated improved vaccine efficacy of a two-dose regimen of Ad26.COVS (Johnson & Johnson) vaccine given 2 months apart.

To understand the impact of the pandemic on mortality, our Burden of Disease Research Unit has provided to the National Department of Health and the public data on Excess Deaths. The Report on Weekly Deaths in South Africa provides information on both natural (diseases and other medical conditions), and unnatural deaths (injuries) registered on the national population register. The SAMRC has been tracking mortality for decades, and this system has enabled South Africa to be one of the few middle-income countries able to track excess deaths associated with the COVID-19 pandemic.

The better understanding of genetics and disease will enable the SAMRC to harness the science of genomics for personalised medicine, and to respond to emerging and future pandemics. The SAMRC has developed key collaborations leading to the first Genomics Institute in Africa, the Cochrane African Network, and the BRICS TB Research Network. Now, the Network for Genomic Surveillance in South Africa (NGS-SA) has been launched, a Network of laboratories, scientists and academic institutions that have joined forces to rapidly respond to public health threats in South Africa (refer to Achievements and Highlights section on the NGS-SA).

Early warning systems for COVID-19 are also an integral part of responding to the pandemic, the SAMRC Wastewater Surveillance Programme has been rolled out at more than 80 wastewater treatment plants, across 6 provinces, namely Western Cape, Eastern Cape, Gauteng, Limpopo, Free State and KwaZulu-Natal, servicing an



estimated 4 million people. Wastewater results are distributed to public health officials in all provinces on a weekly basis.

These programmes and achievements would not be possible without the cutting-edge research of our scientists. To this end, we are looking towards a transformed SAMRC by intentionally strengthening our intramural programme and funding streams through the Research Capacity Development programmes and platforms.

We have announced winners of our Intramural Unit Early to Mid-Career Flagship awards, whose strategic aim is to address important health challenges in South Africa through research projects that will substantially advance knowledge of key health problems and their drivers and to improve health outcomes.

We remain committed as the SAMRC to supporting the National Department of Health in their endeavour of creating a healthier and better life for all South Africans. One which would not be possible without the support of the Minister of Health Dr. Joe Phaahla, researchers, and corporate support divisions at the SAMRC, research platforms and partner institutions and collaborating centers, who all support the mission of the SAMRC.

Let's stay the course, looking into the SAMRC of the future!

Sincerely

PROFESSOR GLENDA E GRAY
PRESIDENT & CEO: SAMRC

A large, ornate trophy is the central focus, held up by several hands. The background is a warm, golden sunset sky. The trophy has a wide, flared top and a slender stem. The hands are silhouetted against the bright light, creating a sense of collective achievement and celebration. The overall mood is one of triumph and shared success.

PART A
ACHIEVEMENTS
AND HIGHLIGHTS

REIMAGINATION OF TRANSFORMATION AT THE SAMRC

The South African Medical Research Council is **Reimagining Transformation**. Its Transformation Strategy: 2017 – 2021 yielded positive shifts toward ensuring that the population distribution within the organisation mirrors that of our country or provinces. We have demonstrated increases in the proportion of Black Africans employed in professional, technical and semi-skilled categories, and women count more than half of the SAMRC community. An important focus going forward is a strategy of increasing the proportion of Black people in senior management and leadership positions – this will form our primary focus of the 2022 – 2026 Transformation Strategy currently being finalised.



As a first step, we have re-defined what we mean by transformation. Under the umbrella of our past definition of transformation, our efforts to achieve employment equity were exerted predominantly through our internal systems when job opportunities became available through retirement or resignation, coupled with support for a range of development opportunities, including financial support to obtain higher degrees, management and leadership training, mentorship, coaching and competitive research funding for emerging scientists. Following a process of study, scanning of published literature, consultation with industry experts and small-scale internal trials, our new strategy for the period 2022 – 2026 will adopt a broader definition of Transformation, that speaks to a multi-dimensional approach. Our new approach will strengthen our drive for employment equity and **“grow our own timber”** (SAMRC President, Professor Glenda Gray, March 2022), and simultaneously place emphasis on the need to ensure that we are fit for purpose in a 21st century increasingly associated with volatility, uncertainty, complexity and ambiguity (a VUCA world), as has been the case with the global COVID-19 pandemic and the social unrest of July 2021. To this end we have embarked on a programme of intrapersonal development, that seeks to

build traits such as resilience, agility and creativity, and assist all employees in the identification of their strengths and areas of development to increase their personal and our institutional prospects of flourishing. We expect our strategies to increase our prospects of successfully competing for dwindling resources, expand the South African pool of health scientists, help deliver excellence in the health sciences and ensure that our research leads to health benefits for South Africans.

In establishing the foundation for our reimagined approach to transformation, the following has been put in place:

- The SAMRC Board has designated a position of Executive Director: Transformation on the SAMRC Executive Management Committee and a Transformation Officer has been appointed.
- The Executive Director: Transformation reports to the SAMRC President & CEO.
- The SAMRC Transformation Forum is being strengthened and expanded to include representation from all Research Units and Research Support Divisions in the organisation.
- A Transformation Secretariat has been established.

TRANSFORMATIVE RESEARCH



SAMRC'S WASTEWATER SURVEILLANCE & RESEARCH PROGRAMME

The South African Medical Research Council's Wastewater Surveillance and Research Programme (SAMRC WSARP) has been tracking SARS-CoV-2 viral RNA in wastewater across 80+ wastewater treatment plants in the Western Cape, Eastern Cape, Limpopo, Gauteng, Free State and KwaZulu-Natal provinces of South Africa. To date, the trends of SARS-CoV-2 in wastewater have been used as an indicator of COVID-19 presence in communities and contribute to the management of COVID-19.

Capacity development is one of the key outcomes of this programme, with partnerships established with under-resourced institutions. A total of 23 students were trained in sampling and scarce skills such as the quantification of viral RNA fragments. The WSARP strives to promote transformation with 75% of trainees being Black African and 50% being female. This programme also enabled the funding of multiple honours, masters and doctoral students registered at partner universities. In addition to laboratory skills obtained, another part of the programme's research output objectives is research translation through publications and stakeholder engagement.



Wastewater Treatment Plant

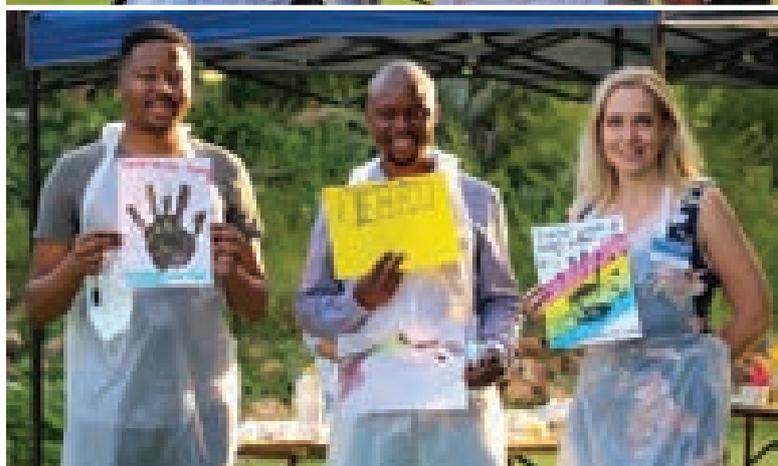
WSARP WRITING RETREAT WORKSHOP

The WSARP hosted writing retreats for its members from the partner institutions University of Venda, Sefako Makgatho Health Sciences University, Nelson Mandela University and the University of Fort Hare. Team members from SAMRC's Environment and Health Research Unit (EHRU), Biomedical Research and Innovation Platform (BRIP), Genomics Centre (GC) and Biostatistics Unit (BU) also attended.

The workshops encouraged networking, provided an opportunity for attendees to plan and make progress on research publications, learn about statistical analyses, and facilitated strategic planning for future projects. Interactive sessions were also organised to promote knowledge mobilisation related to wastewater and public health. Collectively, 25 students, of which 76% were female, and 92% Black African, attended the workshops. This empowered the upcoming and next generation of scientists with skills such as paper planning and writing, knowledge mobilisation tools and statistical analyses.

The first day focused on welcoming all attendees and outlining the purpose of the writing retreat. The remainder of the day centred on a session where WSARP partners planned the research outputs they would further develop. Ideas emanating from this planning session became the focus during the writing sessions scheduled throughout the retreat. As part of stimulating science engagement strategies through the WSARP, knowledge mobilisation sessions tasked attendees to propose how wastewater research and key findings can be communicated to public health authorities, policymakers, and the general public. This knowledge mobilisation session aligned the exercise and discussions around the Sustainable Development Goals to communicate the impact and relevance of results/findings to the general public and stakeholders and relevant officials. In a follow-up activity, the attendees were tasked to visually portray the imprint they want to leave on the wastewater project and the imprint they want the project to have on society by making a collage.

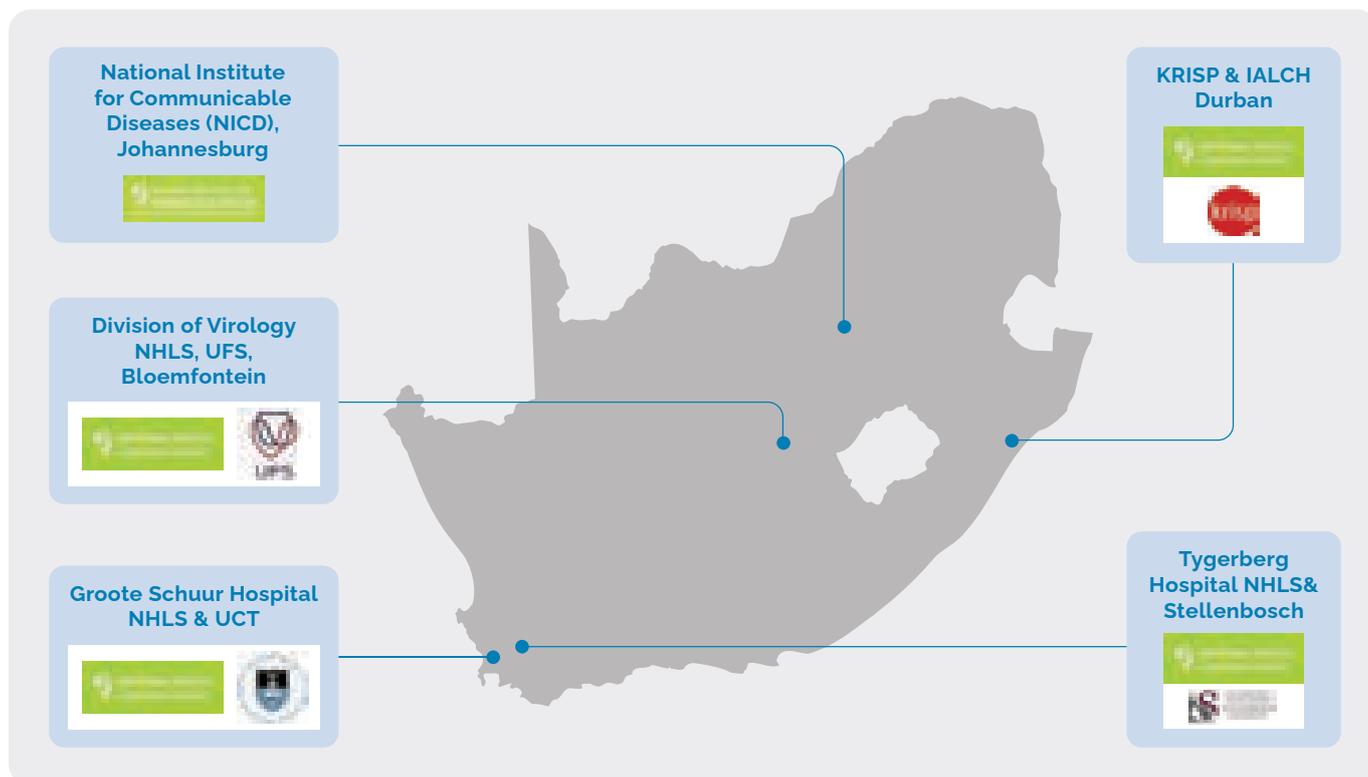
The writing retreat was a success as evidenced in the progress that attendees made in writing up manuscripts, positive responses on the topic of knowledge mobilisation, interactions among attendees, and strategic plans to advance collaborative research that draws on the strengths of the multi and transdisciplinary skillsets across the programme.



The art of science.

NETWORK FOR GENOMIC SURVEILLANCE IN SOUTH AFRICA

The Network for Genomic Surveillance in South Africa (NGS-SA) is a network of laboratories, scientists and academic institutions that have joined forces to rapidly respond to public health threats in South Africa, launched with 5 of the largest National Health Laboratory Service labs with funds from the Department of Science and Innovation (DSI) and SAMRC. The Network monitors the emergence and spread of new SARS-CoV-2 variants to inform a rapid response, working with the international science community to trace the movement of SARS-CoV-2 across countries. The NGS-SA also works with immunologists to evaluate the protection vaccines afford against the variants detected and the implications for vaccine rollouts. The Network is advancing scientific excellence in South Africa and in Africa, with more than 44 NGS-SA publications and pre-prints to date.



The Network for Genomic Surveillance in South Africa (NGS-SA) is a network of scientists from laboratories and academic institutions around the country.

SUPPORTING SURVEILLANCE THROUGH INNOVATIVE TOOLS

The Hyrax Biosciences Exatype software, originally developed to analyse data on HIV drug resistance with support from the SAMRC and DSI, was adapted to enable automatic SARS-CoV-2 variant typing on sequence data. Utilisation of the software does not require bioinformatics experience, provided that adequate user training is administered. Exatype integrates directly with DNA

sequencing machines, searches sequenced data for genetic features and translates these observations into clinically actionable reports. Exatype is used for routine genomic surveillance and has been used by SA public institutions to analyse >14,500 genomes (80% of SA SARS-CoV-2 genomes publicly available in GISAID). These outputs have been used to inform the South African government's response to the emergence and dominance of the Delta variant.

mRNA TECHNOLOGY TRANSFER HUB

The objective of the mRNA technology transfer hub is to build capacity in low- and middle-income countries to produce mRNA vaccines through a centre of excellence and training. The mRNA Hub will share technology and technical know-how with local and global producers. The mRNA Hub and its partners create a global common good for the benefit of all by providing a range of services along the entire vaccine value chain. The mRNA Hub is located at Afrigen, Cape Town, South Africa, and works with a network of technology recipients in low- and middle-income countries.

The initiative is supported by the WHO, the Medicines Patent Pool and the Act-Accelerator/COVAX. The South African mRNA hub comprises Afrigen Biologics, the SAMRC and Biovac, a South African vaccine producer. Within this consortium, Afrigen will establish the mRNA vaccine production technology, SAMRC is providing the research and Biovac is the first manufacturing spoke.

The Hub essentially has the following key objectives:

- mRNA technology transfer to South Africa and establishment of capacity to produce clinical batches of mRNA candidate vaccines for clinical trials
- Manufacturing readiness at Biovac for commercial production, Tech Transfer to international partners and training
- Establishment and advancement of a vaccine development pipeline through local innovation and expertise



CHAN SOON-SHIONG FOUNDATION AND SAMRC SCHOLARSHIP PROGRAM

The SAMRC is partnering with the Chan Soon-Shiong Foundation on an ambitious program to build a vaccine manufacturing workforce. The Chan Soon-Shiong Foundation is committing R100M over 3-5 years, which, together with a contribution from the SAMRC, will be used to train technical experts to work in a commercial biomanufacturing environment, including in laboratory science, process engineering and quality assurance. The program is currently in development with various academic institutions and other organisations.

NHI EVIDENCE-INFORMED PLANNING AND IMPLEMENTATION

The NHI Bill currently sets out a specific two-phased timeline for implementation (sections 57(1) and 57(2)) and the SAMRC has submitted comments to the parliamentary committee on health. The SAMRC supports the stepwise, resource-informed approach outlined in the Bill. NHI decisions should be evidence-based and partners such as the SAMRC are well placed to provide support for the conduct of relevant research.

The Government Pilot projects, as already conducted, are valuable. The SAMRC suggested that implementation steps be piloted, evaluated, and readjusted using research methods. Regular stakeholder engagement for example participatory decision-making with relevant stakeholders affected by decisions is important. This includes consultation with the public and providers at all levels of the health system.

GENOMIC RESEARCH APPROACH FOR DIVERSITY AND OPTIMISING THERAPEUTICS

A Framework agreement was signed on 3 February 2020 for a 4-year programme with GSK and Novartis, managed by the SAMRC. 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.

SAMRC is managing the programme on behalf of the funders for a service fee. The SAMRC launched an Africa-wide request for applications in African Pharmacogenetic Diversity on 18 January 2021. The programme, which is worth approximately R50M over 4 years, completed the pre- and full-proposal phases in 2021/22 and awards will be finalised in the next financial year.

MEDICAL DEVICE AND DIAGNOSTIC INNOVATION CLUSTER

Hosted by the SAMRC under the Global Health Innovation Accelerator and funded by the Technology Innovation Agency for 3 years, the Medical Device and Diagnostic Innovation Cluster (MeDDIC) was officially launched in March 2021. It aims to strengthen the medical devices and diagnostics innovation ecosystem in South Africa through a cluster-based approach.

The SAMRC is well-placed to host MeDDIC due to its:

- National footprint.
- Neutral convening power.
- Leadership role in supporting health innovation.

- Extensive networks in the academic, non-profit and funding sectors.
- Ability to leverage additional funding.
- Strong links to the National Department of Health and Department of Science and Innovation.
- Strong track record of managing large grants and programmes.
- Sound knowledge of health needs in South Africa and the rest of the Continent.

By hosting MeDDIC, the SAMRC is able to:

- Increase its footprint in the medical devices and diagnostics (MDD) arena in South Africa.
- Increase innovation support for MDD through strategic partnerships.
- Play a larger role in product development and commercialisation.
- Increase links with industry.
- Facilitate the delivery of new solutions for the Department of Health.
- Address priority health issues.

In 2021/22, MeDDIC established a collaboration with the CSIR to provide regulatory support to medical device innovators in academia and industry. It also, in collaboration with TIA, granted funds to 4 industry projects for the localisation of medical devices to replace imports and seed funding to 9 projects to develop novel medical devices. As part of MeDDIC's ecosystem support activities, the Global Health Innovation Accelerator, an innovation program within Grants, Innovation and Product Development, completed and launched a landscape analysis of the medical devices sector (www.samrc.ac.za/sites/default/files/files/2022-03-30/SAMRCMedicalDeviceLandscapeReport2022.pdf). This will be used to design and implement interventions to address bottlenecks hampering the sector.

GLOBAL CLINICAL TRIAL REPORTING GUIDELINES AMIDST THE COVID-19 PANDEMIC

Since the emergence of COVID-19, many therapeutic trials were suspended, others revised and altered, and some stopped entirely. The SAMRC was part of a global initiative seeking to improve the transparency, quality, and completeness of reporting of trials and trial protocols affected by the pandemic.

The implications for study participants, for medical innovation and practice, and for the health sciences enterprise are significant – leaving the questions: what should be done with the data and how should these unanticipated changes be reported?

To address these questions, an international team of clinicians, scientists, editors, funders, regulators and patient representatives, including Professor Nandi Siegfried, from the SAMRC, published the CONSERVE Statement. CONSERVE, short for: CONSORT and SPIRIT Extension for RCTs Revised in Extenuating Circumstances, provides practical guidance for researchers so that data is not lost from the research enterprise.

One of the key recommendations is that rather than abandoning trial data and the investments that contributed to data collection, it is better to report the unanticipated circumstances and trial modifications rigorously and transparently. Also, these were developed in the context of the COVID-19 pandemic, they applied to reporting on other important modifications to trials, which could help address a gap in existing trial reporting guidance that predates the COVID-19 pandemic and will persist beyond.

GENDER AND HEALTH

The SAMRC continues to reiterate its vital contribution to improving the health status and quality of life of women in South Africa by conducting high quality scientific research and leading dialogue on violence against women and how we can more effectively fight against the scourge of GBV.

- Female sex workers are exposed to extremely high levels of violence:
 - A study, in which we partnered with the Perinatal HIV Research Unit (PHRU), showed that female sex workers (FSWs) are exposed to extremely high levels of violence – the previous almost three quarters (71%) had been exposed to physical violence and more than half (58%) had been raped by clients, men they encountered in the community, as well as from their intimate partners. “However, a particularly concerning finding was that one in seven women had been raped by a policeman,” highlights the study.
- SAMRC research of nearly two decades reveals that intimate partner femicide is declining in South Africa.
- Another recent study by the SAMRC suggests that there is a decline in intimate partner femicide rate while non-intimate partner femicide has remained unchanged since 2009 in South Africa – however, the country remains ranked among those with the highest rates of femicide in the world. Despite the enormous problem of femicide in our country, these findings were described as evidence of change and an indication that the country is starting to reap the benefits of many years of activism from women and community-based organisations and from Government's policy and practice.

DECREASE IN FEMICIDE IN SOUTH AFRICA: THREE NATIONAL STUDIES ACROSS 18 YEARS

This study shows that murder of women and girls, in acts of femicide, is the most extreme form of gender-based violence (GBV). With South Africa being known for having one of the highest rates of femicide in the world, hardly a day passes without another case highlighted in the media. The Gender & Health Research Unit (GHRU) of the South African Medical Research Council has been studying femicide in South Africa for more than 20 years, with previous research showing that in 1999 four women, and in 2009 three women were killed every day by their husband or boyfriend (intimate partner). This evidence brief summarises the findings of the third National Femicide Study, which examined women murdered in 2017 and compares these findings with those of the 1999 and 2009 studies. In so doing, it seeks to address the key question: Is there any evidence that the national efforts to combat GBV in South Africa are having any impact on the problem of femicide?

HIV PREVENTION

For more than five decades, the SAMRC has been at the forefront of cutting-edge research and innovation to tackle the HIV epidemic – from prevention of HIV infection from mother-to-child to the development of newer and safer drug regimens, and the health service delivery of antiretroviral treatment.

- PrEPVacc HIV Prevention Vaccine clinical trial.
In October last year, the SAMRC's Verulam Clinical Research Site in Durban, KwaZulu-Natal became the fourth site on the African continent for the PrEPVacc HIV Prevention Vaccine Clinical Trial – other sites are in Masaka, Uganda; Mbeya and Dar es Salaam in Tanzania.
- Experimental HIV vaccine not effective in preventing HIV acquisition no safety concerns identified¹

A study analysing whether an experimental HIV vaccine regimen was safe and able to prevent HIV infection in a high-incidence population of young women in sub-Saharan Africa, will not progress further. This follows data that the experimental vaccine did not effectively prevent HIV acquisition – however, no significant safety concerns were identified throughout the trial.

While the rest of the world continue to grapple with the COVID-19 pandemic, the development of a safe and effective HIV vaccine also remains critical for global health. In the more than 40 years since the virus was discovered, a vaccine has proved elusive because of the virus' unique ability to attack and evade the immune system.

Launched in November 2017, the Imbokodo Study, also known as the HVTN 705/HPX2008, reached full enrolment in 2019, and completed vaccinations in June 2020. The primary aim of the study was to evaluate the experimental regimen in approximately 2,600 women between ages 18 and 35 across five sub-Saharan Africa countries including: Malawi, Mozambique, South Africa, Zambia and Zimbabwe. According to UNAIDS, women and girls accounted for 63% of all new HIV infections in this region in 2020. The South African Medical Research Council (SAMRC) was instrumental in the implementation of the study.

The experimental vaccine consisted of an adenovirus containing four "mosaic" immunogens – called mosaic because they are designed to induce immune responses against multiple global HIV strains. The regimen included four doses of the mosaic Ad26 vaccine; the final two doses were given together with doses of an HIV protein called clade Cgp140 mixed with an aluminium phosphate adjuvant to boost immune response. Different HIV subtypes, or clades, predominate in various geographic regions around the world. Clade C HIV is common in southern Africa, where the Imbokodo study was conducted.

In preclinical studies, regimens with mosaic-based vaccines elicited a strong immune response associated with protection against HIV in monkeys. Findings from two early-stage human clinical trials, called TRAVERSE and APPROACH, also suggested that these vaccines were well-tolerated and could generate anti-HIV responses in healthy adult volunteers, increasing hope for good results in the Imbokodo trial. The vaccine was initially developed by the laboratory of Dan H. Barouch, M.D., Ph.D., at Beth Israel Deaconess Medical Center and Co-Principal Investigator of the HVTN, together with Janssen and other partners. Although the study failed to meet its primary endpoint, with results falling short of statistical significance, the data and safety monitoring board (DSMB) did not express any concern regarding participant safety throughout the trial. Participants in this Phase2b proof-of-concept study will be unblinded and will continue to be referred to high-quality treatment and care.

According to study investigators, while they are disappointed with this outcome, the results are an important scientific finding in the ongoing pursuit for an effective vaccine to prevent HIV. They also say that the study has also provided enough data to proceed with key immunological correlates research. "HIV is a unique and complex virus which has long posed unprecedented challenges for vaccine development. The lack of natural human recovery combined with the virus' ability to attack, hijack and evade the immune system pose substantial challenges".

¹ Press release of 1 September 2021: <https://www.samrc.ac.za/media-release/experimental-hiv-vaccine-not-effective-preventing-hiv-acquisition-no-safety-concerns>

“The high rates of HIV acquisition seen in the Imbokodo study of young women in sub-Saharan Africa remind us that, despite great progress made in treatment and prevention, HIV remains a huge health challenge for the region,” said Prof. Glenda Gray, President and CEO of the SAMRC, who is also the Protocol Chair and Co-Principal Investigator and Director of HVTN Africa Programs. “This underpins the need to apply the knowledge gained from this trial to continue to advance the pursuit of a global HIV vaccine.”

Although the Imbokodo study will not continue, another HIV vaccine trial is ongoing in a different population and in different areas of the world. The Phase 3 Mosaico study, or HVTN 706/HPX3002, is testing the safety and efficacy of an “optimised” experimental vaccine regimen that includes the same mosaic Ad26 priming immunogen but has an optimised booster regimen that includes a mosaic envelope plus a Clade C booster. This optimised booster gives higher and broader immune responses than the booster used in Imbokodo. Study participants are men who have sex with men (MSM) and transgender populations in North America, Latin America, and Europe.

Prof. Gray, alongside her co-Principal Investigator, Prof. Larry Corey from the HVTN Leadership Operations Center, which is based at the Fred Hutchinson Cancer Research Center, said the Imbokodo research team will continue to analyse data from the study and publish complete findings to guide future investigations and vaccine development.

Prof. Corey highlighted that despite the use of the Ad26 technology, which is effective for COVID-19, the Imbokodo study illustrates that HIV is an infection that requires a higher degree of immune response to achieve effective protection. “We hope the details from the trial will provide evidence for what level of immune responses are required to achieve an effective vaccine. The study team and entire HVTN operations program thanks everyone who participated in this study, which will continue to provide important data to help drive forward the search for an HIV vaccine.”

SAVING LIVES THROUGH VACCINES

- Mobile COVID-19 Vaccine Project

In its continued efforts to support the country in ramping up its COVID-19 vaccination drive, the SAMRC in collaboration with the Chan Soon-Shiong Foundation launched the Mobile COVID-19 Vaccine Project. The project commenced on Tuesday, 6 July in Lusikisiki, Eastern Cape.

Through the project, the elderly citizens received the vaccine while queuing at various social grant pay points. Grant queues provide an innovative and

exciting opportunity to offer COVID-19 vaccines to the most marginalised and vulnerable people in South Africa – older are not at school or work and do not have money to travel to get vaccines, but they are in grant queues every month.

- Sisonke: solutions to save lives

Between 17 February and 17 May 2021, the SAMRC together with the National Department of Health, Desmond Tutu Health Foundation, CAPRISA and Johnson and Johnson, provided early access to the Ad26COV2.S vaccine (commonly referred to as J&J) to health workers. In total 496 424 health workers received a dose of this vaccine as part of a Phase 3B study to evaluate its effectiveness in South Africa at a time when there were concerns as to whether vaccines work well against variants of concern.

- This study provided evidence that the vaccine provided protection even against the Beta variant circulating in South Africa in early 2021.
- The Sisonke showed that this single dose vaccine was safe, easy to administer and provided good protection against severe disease and death.
- Subsequently the Ad26 vaccine was made available as Janssen® (J&J) vaccine in South Africa and became part of the National Vaccination Programme in the middle of 2021. The single-dose regimen has provided the backbone of campaigns for other essential workers like educators and members of the South African Police Service, and those who live in more rural locations.
- The Sisonke study offered protection to health care workers four months ahead of the national roll-out and ahead of the Delta driven third wave.

A new trial, ENSEMBLE 2, evaluated a booster dose given at least two months after the first dose in 31 300 participants from more than nine countries, and found that a booster shot substantially increases protection, especially against symptomatic and severe disease COVID-19, including when caused by SARS-CoV-2 variants of concern. Based on this data, the American FDA has recommended a second dose of the Janssen® (J&J) vaccine in anyone over 18 years of age in the USA.

- Based on new information from ENSEMBLE 2 and to bolster the immune response of our health workers ahead of a potential fourth wave, the SAMRC worked with the National Department of Health, SAHPRA and J&J to provide early access to J&J vaccine booster doses for all health workers who received a first dose of this vaccine as part of the Sisonke study.
- Similarly, SISONKE 2 could be accessed in the context of a Phase 3B study and results will be used to guide future decisions regarding booster vaccinations.

THE NExT STUDY: A NOVEL 6-MONTH TREATMENT REGIMEN FOR MULTI-DRUG-RESISTANT TUBERCULOSIS (MDR-TB)

A study funded by the South African Medical Research Council (SAMRC) as part of a number of flagship projects, has revealed that a novel all-oral super-short six (6)-month treatment regimen is effective for multi-drug-resistant tuberculosis (MDR-TB).

The NExT Study, a randomised TB trial whose primary aim was to determine whether treatment for multi-drug-resistant TB rifampicin-resistant TB (MDR/RR-TB) could be shortened to six months using oral medication – the same length currently used for drug-sensitive TB. It was performed across five different settings in South Africa, namely: Cape Town; George; Gqeberha (formerly Port Elizabeth); Durban and Klerksdorp, where participants were randomly assigned to receive the novel 6 month oral treatment regimen compared to the WHO approved 9 month injectable-based regimen. The NExT oral regimen was made up of 3 WHO group A drugs (levofloxacin, bedaquiline, and linezolid), and 2 other WHO group B or C drugs giving a total of 5 drugs taken for 6 months. The main comparison metric used in the study (the primary end point) was a WHO-defined favourable outcome 24 months after treatment initiation that was evaluated in each group.

- The key finding was that the new regimen was more than twice more likely to lead to favourable outcomes as compared to the traditional approach despite the regimen only being taken for 6 months.
- Culture conversion (the rate at which TB is no longer detectable in sputum samples) occurred 2.6 times faster in the intervention arm compared to the participants who only received the WHO recommended injectable-based regimen.
- Treatment success was achieved in 75% of patients in the intervention arm. By contrast, successful treatment outcomes of MDR TB in TB endemic countries in 2019 were between 50 and 60%.
- These findings suggest that a 6 month oral regimen for MDR TB is feasible, like it is for drug-sensitive TB.
- With better and more selective drug combinations, even better outcomes will likely be achievable. Using a shorter oral 6 month regimen will mean that painful and toxic injectable drugs will be avoided, and the shorter regimen is likely to improve compliance, completion rates, and reduce overall cost to TB programmes.

The NExT study appears to set a new benchmark for the treatment of MDR TB, which threatens to derail TB control in many parts of the world including Eastern Europe and Russia.

SAMRC BIOINFORMATICS UNIT ROLLS OUT DATA ANALYTICS TRAINING FOR GENOMIC SURVEILLANCE TO SUPPORT THE SADC REGION

In partnership with the World Health Organization (WHO) regional office for Africa, the South African Medical Research Council Extramural Bioinformatics Unit (SAMRCBU) based at the South African National Bioinformatics Institute (SANBI) at the University of the Western Cape (UWC) set up a regional center of excellence for genomic surveillance and bioinformatics in Cape Town in September 2021.

In February 2022, the SAMRCBU initiated its pathogen genome analysis training programme online for SADC countries to strengthen national public health institutes. The virtual training course is a prelude to hands-on data analytics training that will follow every quarter.

“Our role in leading the design specification of a data model to support the Pan-African NGS Pathogen Genomics Network through data management, storage and re-use, has been an exciting journey during the past two years. To shift gears now to the next phase of scaling up our training with WHO-AFRO and supporting future trainings with Africa CDC is rewarding because it demonstrates that we have meticulously shaped a vision of building systems that can respond to future pandemics” says Professor Christoffels, Director – SAMRCBU.

The SAMRC Bioinformatics Unit has led the Global Public Health Alliance for Genomic Epidemiology (PHA4GE) during the past two years through active engagement with National Public Health Institutes to formulate key infrastructure requirements needed to stand up a pandemic response that informs a public health action.

The current training programme will target laboratory personnel who generate and analyse genomic data, and technical support staff who strive to maintain data-intensive computing environments. In partnership with the UWC eLearning Department, they have secured an online teaching environment that facilitates continuous engagement with participants once training sessions are concluded. Postgrad students within SANBI provide online tutor support to all participants for extended periods of time after their training module is completed.

SISONKE STUDY: SAMRC REPORT TO THE NATIONAL DEPARTMENT OF HEALTH

A. INTRODUCTION

At the start of 2021, the SA government aimed to immunise 40 million individuals against COVID-19 by the end of 2021, starting with the ChAdOx1 nCoV-19 vaccine in healthcare workers (HCWs) in mid-February. However, the national vaccination roll-out was paused in February 2021 after reports of low efficacy of the ChAdOx1 nCoV-19 against the Beta variant in SA. The Johnson and Johnson Ad26.COVID.S vaccine was tested during the ENSEMBLE phase 3 randomised, double-blind, placebo-controlled study, with almost 44 000 adults across 8 countries, including 7 000 participants enrolled and followed up at 32 sites in SA. The vaccine was shown to be safe and the SA data demonstrated protection against the Beta variant and severe disease and hospitalisation. Given these findings and its suitability for seamless distribution using the existing vaccine supply chain channels in SA with less stringent cold chain requirements than most of the other vaccines, the vaccine was considered for the national roll-out programme. While waiting for registration of the Ad26.COVID.S vaccine by the South African Health Products Regulatory Authority (SAHPRA), the Sisonke study was initiated with donated vaccines with the aim of vaccinating 500 000 HCWs ahead of the third COVID-19 wave in SA.

The SAMRC worked with key partners, including the National Department of Health (NDOH), Johnson and Johnson, the Hutchinson Centre Research Institute for South Africa (HCRISA) and the study leaders from the Desmond Tutu Health Foundation, Clinical HIV Research Unit, Perinatal HIV Research Unit and CAPRISA, to rapidly design and obtain ethical and SAHPRA approval for a protocol for the study and to raise the required funding. It is in within this context that the SAMRC received an allocation of R150 million (including VAT) from National Treasury, through the NDOH, to implement this crucial study.

B. PROGRESS

1. Sisonke Main Study

Sisonke is a multicentre, open-label, single-arm phase 3B implementation study of healthcare workers (HCWs) in SA (ClinicalTrials.gov number, NCT04838795), with prospective surveillance for endpoints for 2 years. The primary endpoints are the rates of severe COVID-19 (hospitalisations and death) among vaccinated HCWs compared with the general unvaccinated SA population. The vaccines for the study were provided by Johnson

and Johnson. They were received, warehoused and repacked by the Biovac Institute and couriered under cold chain conditions to the vaccination sites by Biocair. A new program within the Electronic Vaccination Data System (EVDS) was rapidly developed by Mezzanine (part of the Vodacom group) for enrolment and consenting of participants into Sisonke. This was also used to send regular messages to participants via SMS both pre- and post-vaccination, including important safety information and contacts. All vaccinated participants were entered into the national COVID-19 vaccination register through EVDS. Active and ongoing communication was an important aspect of Sisonke and a team from the Knowledge Translation Unit at UCT managed regular messaging to all stakeholders.

The study began in 18 hospital-based vaccination sites, overseen by 16 clinical research sites, before expanding to a total of 122 urban and rural vaccination sites located across all 9 SA provinces, overseen by 43 clinical research sites. Research staff on the Sisonke study worked in collaboration with local designated vaccination sites and supported and trained vaccination site staff on standardised study procedures. The first vaccinations were administered on 17 February 2021 and included special vaccine advocates, the president and deputy-president of SA. For the first 2.5 months of the Sisonke study, patient-facing HCWs who worked on COVID-19 wards, intensive care units and operating theatres were prioritised for study enrolment. The study was paused on 13 April 2021 for around 2 weeks due to safety concerns about vaccine-induced thrombotic thrombocytopenia (VITT) but was resumed on 28 April 2021 with additional safety measures. From 11 May 2021, the HCW definition was expanded to non-patient-facing HCWs, support and administrative staff, staff at multilateral health agencies, laboratory staff, health research staff, community health workers, staff working in care homes, funeral workers and registered traditional health practitioners. When the National Roll-out commenced, participation was further opened to professional athletes, additional healthcare workers, individuals with co-morbidities and other national persons of interest after receiving approval from SAHPRA and in discussion with the NDOH. On 17 May 2021, the EVDS was closed to Sisonke registrations to open it up for the public vaccination roll-out. The remaining 18,000 plus vaccinations were delivered using paper-based records which were then back-captured on EVDS. The last vaccination was administered on 12 August 2021 through the Sisonke sub-study, bringing the total number enrolled and vaccinated on the Sisonke study to 496 424.

A safety desk was established at the start of the study and is being run by the Hutchinson Centre Research Institute of South Africa NPC (HCRISA), with an additional call centre managed by Right to Care. The latter fielded more than 31,400 inbound and 7,900 outbound calls from the start of the study to the end of August. Breakthrough infections (BTIs) and disease outcomes in Sisonke participants have been and continue to be actively monitored and followed up. All severe cases and deaths are followed up in detail, including analysis of medical records by the safety team. A paper on the safety of the single-dose Ad26.CoV2.S vaccine in the Sisonke study was published online. It reports on adverse events (AEs) at vaccination sites in respect of the 477,234 HCWs that received the Ad26.CoV2.S vaccine between 17 February 2021 and 17 May 2021. These AEs were identified through self-reporting triggered by text messages after vaccination, health care provider reports and by active case finding. The frequency and incidence rate of non-serious and serious AEs were evaluated from day of first vaccination (17 February 2021) until 28 days after the final vaccination (15 June 2021). COVID-19 breakthrough infections, hospitalisations and deaths were ascertained via linkage of the electronic vaccination register with existing national databases. Of 477,234 participants, 10,279 (2.2%) reported AEs, of which 139 (1.4%) were serious. Women reported more AEs than men (2.3% vs. 1.6%). AE reports decreased with increasing age (3.2% for 18–30, 2.1% for 31–45, 1.8% for 46–55 and 1.5% in >55-year-olds). Participants with previous COVID-19 infection reported slightly more AEs (2.6% vs. 2.1%). The commonest reactogenicity events were headache and body aches, followed by injection site pain and fever, and most occurred within 48 hours of vaccination. Two cases of Thrombosis with Thrombocytopenia Syndrome and four cases of Guillain-Barre Syndrome were reported post-vaccination. Serious AEs and AEs of special interest including vascular and nervous system events, immune system disorders and deaths occurred at lower than the expected population rates. This analysis demonstrated that the single-dose Ad26.CoV2.S vaccine had an acceptable safety profile, supporting the continued use of this vaccine in our setting (3). Another paper was published on 5 July 2021 on “Thromboembolic Events in the South African Ad26.CoV2.S Vaccine Study”.

The study team has worked with the National Department of Health (EVDS), NICD (COVID-19 Notifiable Medical Conditions Sentinel Surveillance (NMCSS) master list and DatCov), the SAMRC Burden of Disease unit (excess mortality data and South African Vital Register) and Biostatistics unit (managing all Sisonke data and statistical analysis), CAPRISA (statistical analysis), Discovery Health and the Government Employees Medical Scheme (GEMS) to gather and analyse the data on outcomes. The database was closed for analysis for the first time on 17 July 2021. The first effectiveness data on 477 102 health-care workers enrolled and vaccinated between 17 February and

17 May 2021 were presented to the Sisonke study funders on 5 August 2021 and were published in the Lancet in March 2022 (7). The key highlights are as follows. A total of 477 102 health-care workers were enrolled and vaccinated in this period of whom 357 401 (74.9%) were female and 119 701 (25.1%) were male, with a median age of 42.0 years (33.0–51.0). 215 813 vaccinated individuals were matched with 215 813 unvaccinated individuals. As of data cut-off (17 July 2021), vaccine effectiveness derived from the total matched cohort was 83% (95% CI 75–89) to prevent COVID-19-related deaths, 75% (69–82) to prevent COVID-19-related hospital admissions requiring critical or intensive care, and 67% (62–71) to prevent COVID-19-related hospitalisations. The vaccine effectiveness for all three outcomes were consistent across scheme A and scheme B. The vaccine effectiveness was maintained in older health-care workers and those with comorbidities including HIV infection. During the course of the study, the Beta (B.1.351) and then the Delta (B.1.617.2) SARS-CoV-2 variants of concerns were dominant, and vaccine effectiveness remained consistent (for scheme A plus B vaccine effectiveness against COVID-19-related hospital admission during Beta wave was 62% [95% CI 42–76] and during Delta wave was 67% [62–71], and vaccine effectiveness against COVID-19-related death during Beta wave was 86% [57–100] and during Delta wave was 82% [74–89]). The study therefore demonstrated that the single-dose Ad26.CoV2.S vaccine shows effectiveness against severe COVID-19 disease and COVID-19-related death after vaccination, and against both Beta and Delta variants, providing real-world evidence for its use globally.

A further paper was published on breakthrough infections during periods of circulating Beta, Delta and Omicron variants of concern, among HCWs participating in Sisonke. Data were gathered between 17 February and 15 December 2021. Duration of each period in this study was 89 days for Beta, 180 days for Delta and 30 days for Omicron. A total of 40 538 BTIs were observed, with 609 during Beta, 22 279 during Delta and 17 650 during Omicron. By 15 December 2021, daily infections during Omicron were three times that seen during the peak observed during Delta. However, unlike the Delta period, with Omicron there was a clear and early de-coupling of hospitalisation from cases as a percentage of the Delta peak curves. Omicron significantly infected a greater proportion of HCW in the 18–30 year age group, compared with the 55+ age group. There were 1 914 BTI-related hospitalisations – 77, 1 429 and 408 in the Beta (89 days), Delta (180 days) and Omicron (30 days) periods, respectively. During Omicron, 91% of hospitalised HCWs required general ward care, 6% high care and 3% intensive care, compared with 89% general ward care, 4% high care and 7% intensive care, during Delta and 78% general care, 7% high care and 16% intensive care during Beta ($p < 0.001$). During Beta and Delta, 43% of hospitalised HCW needed supplementary oxygen and 7–8% needed ventilation, compared with 16% and 0.2% respectively during the Omicron period

($p < 0.001$). Median length of hospitalisation was significantly lower with Omicron compared with Beta and Delta (3 days compared with 5-6 days, $p < 0.001$). The results illustrate more BTIs but reassuringly less severe COVID-19 with Omicron. Re-infections and Omicron-driven primary infections were likely driven by high population SARS-CoV-2 seroprevalence, waning vaccine effectiveness over time, increased Omicron infectivity, Omicron immune evasion or a combination of these and need further investigation. Follow-up of this cohort will continue, and reports will be updated, as time and infections accrue.

2. Sisonke Sub-study

The Sisonke sub-study seeks to understand the immunological responses and clotting parameters following Ad26.COVS vaccination of a sub-set of participants in Sisonke (up to 1 400), including:

- People living with HIV.
- People who are older (>55 years).
- People who have comorbidities, including clotting disorders.
- People who are "normal" and aged 18-55.
- Breastfeeding women.
- Pregnant women.

The sub-study is being conducted in 5 of the clinical research sites. It was initiated in mid-June 2021 and is fully enrolled, with all participants followed up for a total of 6 months. This sub-study is expected to provide valuable additional data on vaccine effectiveness in the selected sub-groups.

3. Sisonke 2/Boost

Following the results of the ENSEMBLE 2 study, which demonstrated improved vaccine efficacy of a two-dose regimen of Ad26.COVS vaccine given 2 months apart, the Sisonke study was expanded to include a booster dose of the Ad26.COVS. Sisonke 2 enrolled and boosted 230 488 HCW between 8 November 2021 and 17 December 2021. Enrolment commenced before the onset of the Omicron driven fourth wave in South Africa affording an opportunity to evaluate early VE in preventing hospital admissions of a homologous boost of the Ad26.COVS vaccine given 6-9 months after the initial vaccination in HCW. Sisonke 2 was conducted in approximately 350 vaccination centres, supported by 43 clinical research sites, across all nine provinces of South Africa.

The study team published a short comment on MedArchives in December 2021 on the first vaccine effectiveness results after boosting (6). They estimated vaccine effectiveness of the Ad26.COVS vaccine booster in 69 092 HCW as compared to unvaccinated individuals enrolled in the same managed care organisation using a test negative design. VE was compared against COVID-19 admission for Omicron during the period 15 November to 20 December

2021. After adjusting for confounders, it was observed that VE for hospitalisation increased over time since booster dose, from 63% (95% CI 31-81%); to 84% (95% CI 67-92%) and then 85% (95% CI: 54-95%), 0-13 days, 14-27 days, and 1-2 months post-boost. This provided the first evidence of the effectiveness of a homologous Ad26.COVS vaccine boost given 6-9 months after the initial single vaccination series during a period of Omicron variant circulation. This data is important given the increased reliance on the Ad26.COVS vaccine in Africa.

A Sisonke 2 sub-study protocol has been approved by SAHPRA and will be initiated in mid-May. This sub-study will seek to obtain additional immunogenicity data following boosting.

In March 2022, the NDOH opened up EVDS to allow for further boosting of Sisonke participants with either a Pfizer mRNA vaccine or a third dose of the JNJ Ad26.COVS vaccine. At the end of the 5th wave, further analyses will be undertaken to evaluate the effectiveness of these two approaches.

4. Outputs

Apart from the vaccination of 496,424 HCWs and the boosting of 230 488 of these, the study has provided a foundation for additional studies, including the BaSiS (Booster after Sisonke Study) trial, which is examining fractional heterologous (Pfizer BNT162b2) and homologous (Ad26.COVS) boosting, and the SHERPA (Sisonke Heterologous mRNA-1273 boost after prime with Ad26.COVS.S) study which will examine boosting of HCWs who received either a single or second dose of the Ad26.COVS vaccine with a Moderna mRNA-1273 vaccine.

The study has to date resulted in several publications/articles which report valuable data on the safety and real-world effectiveness of the Ad26.COVS vaccine and lessons for the national vaccine roll-out.

The Sisonke study has been funded to date by an allocation from National Treasury through the National Department of Health and grant funding from the Michael and Susan Dell Foundation, the ELMA Vaccines and Immunisation Foundation, the Solidarity Fund, the Bill and Melinda Gates Foundation and Janssen Vaccines & Prevention B.V.

5. Conclusion

The Sisonke study team and collaborators made history by moving from conceptualisation (following the ENSEMBLE phase 3 trial results) to implementation within 17 days. The Sisonke study is an example of what is possible when political will, science, hard work, partnership and a strong desire to act come together to serve public health. The speed at which the study was prepared and delivered, and funding raised, the number of collaborators involved, and level of collaboration and commitment provided from a variety of stakeholders was a testament to the joint commitment to protect HCWs and deliver on

Government's promise to vaccinate as many individuals as possible. The study has to date delivered valuable data on the real-world effectiveness of the Ad26.CO.V2 vaccine administered as a single shot and with a homologous booster in HCWs in South Africa. The participants will be

followed up until June 2023 and, together with the more in-depth sub-studies, the Sisonke study is expected to generate additional valuable data to inform the future national COVID-19 vaccination strategy.

RSA COVID-19 VACCINE ROLL-OUT: OPERATIONAL AND TRANSLATIONAL RESEARCH TO SUPPORT AND GUIDE THE EFFECTIVE IMPLEMENTATION AND MONITORING OF COVID-19 VACCINES IN SOUTH AFRICA: SAMRC REPORT TO THE NATIONAL DEPARTMENT OF HEALTH

A. INTRODUCTION

Since the onset of the global COVID-19 pandemic, researchers in South Africa have come together in unprecedented ways to form partnerships to answer critical questions relating to the epidemiology and pathogenesis of COVID-19 and to conduct COVID-19 vaccines research, with the Sisonke study being a key example of the latter. In addition, they have collaborated to develop, test, register and manufacture new products, assays and diagnostics to fight the pandemic. The South African Medical Research Council (SAMRC), together with its partners and key funders, including the National Department of Health (NDOH) and the National Department of Science and Innovation (DSI), has been leading the research and innovation response to COVID-19. As an independent entity with a national footprint, extensive networks and neutral convening power, the organisation has been well placed to drive this response. It has raised funding of more than R700 million since the start of the epidemic and allocated this to more than 60 projects addressing areas such as epidemiology, surveillance, diagnostics, treatment, genomics, immunology, vaccines and community engagement. The results of these investments have, to date, directly impacted on policy and practise in the national COVID-19 response, contributed to global knowledge and understanding of the pandemic and delivered new diagnostics, services and treatment and vaccination guidance.

February 2021 saw the first introduction of COVID-19 vaccines in South Africa with the Sisonke study, followed closely by initiation of the national vaccine roll-out. The South African COVID-19 Vaccination Strategy aimed to immunise 40 million individuals by the end of 2021. By 14 May 2022, a total of 21.49 million first dose vaccinations had been administered, including in 19.7 million adults (of which 17.96 million are fully vaccinated), which represents 49.68% of the total adult population in South Africa (<https://sacoronavirus.co.za/latest-vaccine-statistics/>). The total cost of this programme is estimated at R9-10 billion. Such a large-scale vaccination programme, delivered in a very short-time frame with a substantial financial investment, is extraordinary and unparalleled. The vaccination

programmes must succeed so that we save lives and protect South Africans without compromising livelihoods and the SA economy. Given these extraordinary investments and the need to deliver and administer vaccines safely, efficiently and as broadly as possible, it is critical that the COVID-19 vaccine roll-out is maximally supported, monitored and well understood and that its outcomes are measured. Measuring the real-life effectiveness of COVID-19 vaccines in the South African setting is pivotal, including clinical effectiveness and correlates of protection (such as neutralising antibodies, binding antibodies, etc.), especially in the context of a constantly evolving virus and a concomitant multiple disease burden. This will also inform global practices and contribute to international understanding of vaccine effectiveness in a variety of settings and viral variants.

It is within this context that the SAMRC requested additional funding from the National Treasury through the National Department of Health and was awarded an amount of R100 million, including VAT, on its baseline allocation in the 2021/22 financial year for a Vaccine Roll-out Research Programme.

B. Progress Report

It was proposed that this Vaccine Roll-out Research Programme would address 5 specific aims as follows:

A. Vaccine effectiveness:

1. What is the effectiveness of COVID-19 vaccines on the South African COVID-19 epidemic measured in real time during the roll-out, including the effect of vaccination on COVID-19 related cases, hospitalisations and deaths?
2. What is the effect of COVID-19 vaccine roll out on the evolving SARS CoV-2 virus, and are the immune responses elicited by the vaccines sufficient to neutralise viral variants?
3. How can early warning systems for COVID-19 outbreaks best guide and prioritise the vaccine roll-out?
4. Vaccine hesitancy: what is the extent of vaccine hesitancy and why?

B. Vaccine Safety:

5. How safe and tolerable are COVID-19 vaccines outside clinical trials in the South African population? Pharmacovigilance will be critical to inform the regulators and the manufacturers and will require appropriate reporting.

The SAMRC is coordinating the Vaccine Roll-out Research Programme in the context of its broader COVID-19 research and innovation program, which is being funded from a variety of sources and is, in its totality, addressing a broad range of topics of importance in understanding, quantifying and addressing the epidemic in South Africa, including the above topics. The Vaccine Roll-out Research Programme Funding has been specifically allocated to the following 3 areas:

1. An extended national research program to guide the effective implementation and monitoring of COVID-19 vaccines and address long term effects of COVID-19 in South Africa.
2. The BaSiS clinical study – a Phase II randomised open label trial of full and half dose J&J Ad26.CoV2.S and Pfizer BNT162b2 booster vaccinations after receiving the J&J Ad26.CoV2.S prime vaccine through the SISONKE phase IIIB implementation study.
3. The SAMRC's Wastewater Surveillance Program.

1. *Extended National Research Program on COVID-19*

A request for applications (RFA) titled "Research to support and guide the effective implementation and monitoring of COVID-19 vaccines and address long term effects of COVID-19 in South Africa" (SAMRC-RFA-GIPD-03-2021) was released by the SAMRC on 10 September 2021 and closed on 8 October 2021, seeking proposals that address the following areas:

Vaccine-related Topics

1. Vaccine safety and effectiveness and impact on the epidemic

- Real-world effectiveness of the vaccination roll-out (impact on COVID-19 related cases, hospitalisations and deaths) in specific/unique populations. This could include passive surveillance using and linking existing national and provincial population datasets with NHLS data or active surveillance of existing cohorts in hospitals, surveillance nodes, etc.
- Research to understand the safety of vaccines and rare events, including the role of host genetics.

2. Genomics and immunology

- Effect of the COVID-19 vaccine roll-out on the evolving SARS-CoV-2 virus, e.g., does the vaccine programme reduce the emergence of variants and/or the rate at which new variants spread across the country? What strains are driving breakthrough infections, etc.?
- Generation of data to support effectiveness measures of different vaccines against existing and emerging variants.
- Identification and validation of specific correlates of protection (e.g., neutralising antibodies, binding antibodies, T cell responses, etc.), considering vaccine type, viral strain, and clinical endpoint (e.g., asymptomatic infection, mild disease, severe disease).
- Characterisation of the immune response generated in response to vaccination in populations with known prior infection, exposure to new variants, vaccination boosts, co-morbidities and co-infections (e.g., HIV), etc.

3. Vaccine uptake and messaging

- Interventions to improve vaccine uptake.
- Ethics and human rights around vaccination.

COVID-19 Natural History and Impact

- COVID-19 in pregnancy and children.
- COVID-19 and HIV.
- Long-COVID-19.
- COVID-19 re-infection.
- Reducing the health systems impact of COVID-19.
- COVID-19 sero-prevalence rates in different cohorts/sub-populations.
- Host genetics and COVID-19.

In total, 31 proposals were received and submitted for peer review. The 10 projects listed in Table 1 were approved for funding by the EMC using funds from the Vaccine Roll-out Research Programme in the total amount of R49,902,246, excluding VAT.

Projects funded as part of the extended national research program to guide the effective implementation and monitoring of COVID-19 vaccines and address long term effects of COVID-19 in South Africa

PI NAME AND SURNAME	PROJECT TITLE
Reshmi Dassaye	SARS-CoV-2 seroprevalence and infections in a triad of learners, parents and teachers in the eThekweni District in KwaZulu-Natal, South Africa
Kate Webb	Investigating MIS-C and vaccination in children in South Africa
Terusha Chetty	Ad26.COVID-19 vaccine safety, effectiveness, durability and immunogenicity in pregnant and breastfeeding health care workers
Dale Kitchin	Defining the immunologic mechanism for increased breadth following Ad26.COVID-19 breakthrough infection.
Vimla Naicker	To characterise the immunological response to COVID-19 vaccination in individuals with immunosuppression from causes other than HIV.
Francois Venter	Characterising Long-COVID-19 in a large urban sample of South African adults
Andrew Musyoki	Investigating SARS-CoV-2 exposure, vaccination and breakthrough infections in a cohort of medical, dental and allied health students and healthcare workers at Sefako Makgatho Health Sciences University and Dr. George Mukhari Academic Hospital
Tian Johnson	Supporting Community & Individual Ownership of The National COVID-19 Vaccine Rollout through District & Provincial Community-Led Monitoring and Accountability Tracking
Justine Daramola	Data Analytics for Clinical Guidance on Immune Response to COVID-19 Vaccination for patients with co-morbidities and prior infection
Sana Mahtab	Sentinel surveillance of adverse events of special interest (AESI) after vaccination with COVID-19 vaccines in South Africa

2. The BaSiS Clinical Study

The BaSiS (Booster after Sisonke Study) clinical study, led by Associate Professor Lee Fairlie (Wits RHI), is a Phase II randomised open label trial of full and half dose J&J Ad26.CoV2.S and Pfizer BNT162b2 booster vaccinations after receiving the J&J Ad26.CoV2.S prime vaccine through the SISONKE phase IIIB implementation study. The aim of this study is to evaluate immunogenicity (humoral and cellular) and safety of a 1:4 randomisation of either homologous J&J Ad26.COVID-19 or heterologous Pfizer BNT162b2, at full or half dose booster vaccinations, given at least 4 months after a single J&J Ad26.COVID-19 prime. The rationale for the study is as follows:

- Ad26.COVID-19 prime alone triggers lower titres of neutralising antibodies than mRNA vaccines.
- Other heterologous combinations of adenovirus vectored prime (ChAdOx) and RNA vaccine boosts (Pfizer BNT162b2) are highly immunogenic.
- Few data exist for J&J Ad26.COVID-19 vaccine prime followed by an mRNA vaccine boost at fractional/half dose.
- There is a scarcity of data regarding the immunogenicity of vaccines in people living with HIV (PLHIV), who account for a significant proportion of South Africans.

- People over the age of 55 years have a progressively weakened immune response to vaccines and may benefit from a homologous or a heterologous prime boost.
- PLHIV have compromised immune responses even if well controlled on antiretrovirals (ARVs) and may benefit from a homologous or heterologous prime boost.
- There is public health benefit, including cost and increased availability for greater numbers of people, in addition to potential reduction in local and systemic adverse effects, with fractional dosing for booster vaccines. Available data, although limited, demonstrates that fractional dosing results in robust immune responses.

The trial sites involved in the study are Wits RHI Shandukani and PHRU Kliptown in Johannesburg, the CAPRISA eThekweni Clinical Research Site in Durban and the Desmond Tutu Health Foundation site in Masiphumelele in Cape Town. Approximately 300 participants ≥ 30 years will be enrolled across the four sites, including at least 100 participants living with HIV and 10% of participants > 55 years of age. To boost the immunogenicity of the J&J Ad26.COVID-19 vaccine already administered in the SISONKE phase IIIB implementation study, the study will

test a J&J Ad26.COVID.2.S /J&J Ad26.COVID.2.S homologous prime-boost vaccination design and a J&J Ad26.COVID.2.S/ Pfizer BNT162b2 heterologous prime-boost vaccination design, which will include the following four arms:

- a) J&J Ad26.COVID.2.S/ J&J Ad26.COVID.2.S full dose homologous prime-boost vaccination.
- b) J&J Ad26.COVID.2.S/ J&J Ad26.COVID.2.S half dose homologous prime-boost vaccination.
- c) J&J Ad26.COVID.2.S/Pfizer BNT162b2 full dose heterologous prime-boost vaccination.
- d) J&J Ad26.COVID.2.S/Pfizer BNT162b2 half dose heterologous prime-boost vaccination.

The primary objectives are to evaluate the immunogenicity of a homologous or heterologous vaccine boost as described above by comparing antibody and T cell responses before and after boosting; and to evaluate safety and reactogenicity. The secondary objectives are:

- To assess whether length of time between prime and booster dose impacts immunogenicity.
- To assess differences in immunogenicity by age and by HIV status.
- To evaluate boosted antibody responses against ancestral and novel SARS-CoV-2 strains including D614G, Beta, Delta, and other variants of concern (VOCs) compared to baseline.
- To evaluate the capacity of boosted T cell responses against ancestral and novel SARS- CoV-2 strains including D614G, Beta, Delta, and other relevant VOCs as they emerge compared to baseline.

The study received SAHPRA approval on 24 November 2021 and started screening on 8 December 2021. As of 15 March 2022, a total of 209 participants had been enrolled, which represents 70% of the cohort. A total of R29,228,185, excluding VAT, has been allocated to the BaSiS study.

3. The SAMRC's Wastewater Surveillance and Research Programme (WSARP)

Project overview

Historically, wastewater-based epidemiology (WBE) has played a key role in the development of early warning systems (EWS) for various enteric viruses, including poliovirus, norovirus and hepatitis A virus. In the current COVID-19 pandemic, WBE has been used as a platform for SARS-CoV-2 surveillance and become an important element of the public health strategy to combat the disease. To date, over 25 countries have detected SARS-CoV-2 RNA in wastewater including South Africa. 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. The initial proof of concept study has expanded, and the project was

formalised as the SAMRC Wastewater Surveillance and Research Programme (WSARP) in April 2021. The WSARP responded with agility and speed, utilising an adaptive design with stakeholder engagement as well as capacity development at its core. It is made up of a multi-disciplinary team, including environmental epidemiologists, geographers, laboratory scientists, statisticians and public health specialists working together with collaborators locally, regionally and internationally. Numerous funding agencies, both locally and internationally, have supported this initiative.

On a weekly basis, field teams collect wastewater samples from over 80 wastewater treatment plants (WWTPs). Since the inception of this programme, more than 4 000 wastewater samples have been analysed. Samples are collected using a standardised sampling guide designed specifically for this programme. After collection, samples are transported to partner laboratories across the six provinces. The laboratory teams quantify the SARS-CoV-2 RNA in the wastewater which reveals COVID-19 trends in the communities. Results are released to municipal and provincial authorities within a target period of 48 hours, and in key settings provided directly to strategic teams to inform decision-making to combat the disease. Weekly summary reports are also shared with national stakeholders. Our continued temporal and spatial assessments explore the amplitude of COVID-19 at a community level and evaluate the impact of the pandemic and the subsequent preventive measures. To date, our sites represent both urban (Metro) and peri-urban (district) catchments serving ±7.5 million inhabitants.

Capacity development

Monitoring of the SARS-CoV-2 levels takes place at over 80 sites every week. The programme was scaled up through partnerships with six local universities namely: University of Venda, Sefako Makgatho Health Sciences University, Nelson Mandela University, University of Zululand, University of Fort Hare, and University of Free State. The SAMRC Biomedical Research and Innovation Platform (BRIP) ensures quality control through weekly data review meetings for all laboratories. An inter-lab comparison component is also part of this study to evaluate the extent of result similarity between labs using the same methodology. While utilising available infrastructure at the universities, additional funding has been secured to set up their laboratories to ensure the labs are properly equipped to undertake the surveillance.

A total of 23 students were trained in sampling and laboratory techniques such as quantification of viral RNA fragments. The WSARP strives to promote transformation with 75% of trainees being Black African and 50% being female. In the past year the WSARP has also hosted scientific writing and capacity development retreats for partner laboratory team members. The workshops encouraged

networking, provided an opportunity for attendees to plan and make progress on research publications, learn about statistical analyses, and facilitated strategic planning for future projects. Interactive sessions were also organised to promote knowledge mobilisation related to wastewater and public health.

SAMRC Wastewater Surveillance Dashboard

Our results provide 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 rise in COVID-19 cases. The information generated through the programme is posted on the dedicated SAMRC SARS-CoV-2 Wastewater Surveillance Dashboard (<https://www.samrc.ac.za/wbe/>) in the form of graphs and maps. The public facing wastewater surveillance dashboard was launched in November 2020 to provide information on SARS-CoV-2 RNA detected across the WWTPs monitored under the programme.

Knowledge dissemination

Knowledge dissemination is at the core of WSARP. The programme has received extensive media coverage, both locally and abroad, featuring in 38 online articles, 3 TV interviews, and seven radio interviews/podcasts. To date, the team have published five scientific articles on the latest trends of SARS-CoV-2 in wastewater and been involved in numerous national and international webinars. The research is also translated through the publication of popular science articles and newsletters. For example, our WSARP featured in the GloPID-R newsletter 17th Edition-January 2022 (<https://www.glopid-r.org/newsletter-17th-edition/south-african-medical-research-council-samrcwastewater-surveillance-of-SARS-CoV-2-rna-in-south-africa/>) as well as the African Alliance's podcast series on COVID-19 in July 2021 (<https://anchor.fm/africanalliance/episodes/Whats-Poo-Got-To-Do-With-It-e14n2ev/a-a65vb2d>).

In addition, the WSARP had a feature in Quest: Science for South Africa, which is a popular science magazine issued by the Academy of Science of South Africa (ASSAf). Published in March 2022, the article focused on explaining to the youth and general public how wastewater surveillance



Examples of data provided on the SAMRC WSARP dashboard (<https://www.samrc.ac.za/wbe/>)

such as the WSARP can help identify areas where there may be COVID-19 outbreaks. This feature was the first ever full article to be published in isiZulu in the Quest magazine (ICoronavirus emanzini endle.pdf (assaf.org.za)).

Genomic sequencing

The SAMRC Genomics Centre has been involved in SARS-CoV-2 sequencing from wastewater using the ATOPLex platform supplied by MGI Technologies, which is a workflow designed for complete genome sequencing and epidemiological studies. This sequencing system is accurate, cost-efficient, sensitive and simple for virus detection and full-length genome analysis. As this technology was originally designed for SARS-CoV-2 studies in humans, we have optimised the protocol for wastewater sequencing to study the SARS-CoV-2 genome, track variants of concern and identify new mutations. Thus far, we have sequenced over three-hundred samples that have been received from the Gauteng and Western Cape Provinces using the DNBSEQ-G50RS sequencer. One MSc student and one Postdoctoral Fellow have been trained on this project and we have also hosted a delegation from the Zambian Ministry of Health to demonstrate our sequencing protocol and data analysis pipelines for the ATOPLex system. Our sequencing data complimented the genotyping data produced by BRIP and we further were able to identify new mutations within SARS-CoV-2 from wastewater treatment plants in and around the Western Cape. In addition to this, we were able to detect the frequent community spread of the Delta and Omicron variants in circulation in the Western Cape province driving the third and fourth wave, respectively.

As mentioned, the Wastewater project is funded from various sources. The project received R8,695,652, excluding VAT, through the Vaccine Roll-out Research Programme which was used for travel and personnel (field workers)

costs for weekly collection of wastewater samples; travel for site visits to the partner institutions in the Eastern Cape, KwaZulu-Natal, Free State, and Limpopo Provinces and for those institutions to receive training at the SAMRC; and laboratory consumables for sample testing across the partner network.

C. Conclusion

The funds received from National Treasury through the NDOH for the Vaccine Roll-out Research Programme have been allocated towards the proposed objectives with the aim of supporting and guiding the Government's National COVID-19 Vaccine Roll-out plan in real-time, supporting community and individual ownership of the National COVID-19 Vaccine Roll-out, continuing surveillance and pharmacovigilance, and examining issues specific to children and COVID-19 as well as long-COVID-19. These investments complement the broader SAMRC COVID-19 research and innovation portfolio, which includes the ongoing Sisonke study, which is examining real-world vaccine effectiveness with different booster combinations. The results of the funded studies are expected throughout the next 12-18 months, and it is anticipated that these will directly inform current and future responses to the pandemic in South Africa as they emerge.

REQUEST FOR APPLICATIONS: SAMRC EXTRAMURAL RESEARCH UNITS

The SAMRC issued an open call targeted at Black African researchers engaged in health research from all recognised South African research institutions for the establishment of new SAMRC Extramural Research Units (EMUs).

These new EMUs were to be approved for funding if they met specific criteria, e.g., to provide scientific leadership in key research areas, or to investigate important research questions where the need cannot easily be addressed through short-term grants.

The funding for the EMUs represents a secure, discretionary, financial incentive which is approved in 5-year cycles, for a maximum of 15-years depending on performance and should facilitate efforts to leverage external research funding. It is expected that institutional co-funding and the sum of external grants should exceed the amount invested in the EMU by the SAMRC by several-fold. Becoming an EMU, also provides research institutions with the opportunity to contribute to the development of the next generation of research leaders.

Following a rigorous peer review, selection, and approval processes, four new EMUs were identified as suitable for funding. As an important attribute in the selection criterion for the EMU, all four Unit Directors have made outstanding scientific contribution to advancing science and building the knowledge base in their respective discipline. Research focus areas of these new EMUs are summarised below.



1. The SAMRC/UJ Pan African Centre for Epidemics Research Unit

Unit Director: Prof. Refilwe Nancy Phaswana-Mafuya

Objective: Improving the understanding of current pandemics through cutting-edge Pan African and global research epidemiological, and public health studies among marginalised populations in diverse low-resource settings in South Africa, sub-Saharan Africa and globally.



2. SAMRC/UCT Platform for Pharmacogenomics Research and Translation Research Unit

Unit Director: Prof. Collet Dandara

Objective: Focuses on identifying inherited genetic variations, epigenetic changes and microbial profiles that are associated with interindividual differences in the ways patients respond to therapeutic treatment including herbal medicine, a field commonly referred to as Pharmacogenomics.



3. The SAMRC/UCT Intersection of Noncommunicable Disease and Infectious Diseases Research Unit

Unit Director Prof. Ntobeko Ntusi

Objective: Focusing on enhancing the understanding and management of the interaction between endemic infections (SARS-CoV-2, HIV, tuberculosis) and NCDs (heart failure, hypertension, diabetes mellitus, obesity, cancer, mental health).



4. The SAMRC/UNIVEN Antimicrobial Resistance and Global Health Research Unit

Unit Director: Prof. Pascal Bessong

Objective: Conducts research on microbial, human, and environmental determinants of the acquisition and transmission of antimicrobial resistance. The Unit collaborates with community and policy makers to enhance our understanding of the dynamics of antimicrobial resistance for improved antimicrobial resistance stewardship.

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 virtual meeting – hosted by India – was held in May 2021.
- The SAMRC hosts the Network's website (www.brics-tb.net) and is hosting the Network's secretariat until further notice.

SOUTH AFRICA-US PROGRAM 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 co-morbidities, 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.

Eighteen (18) joint U.S.- SA projects are being funded in Phase II of the program. The total funding awarded to these projects during 2021 was US \$5,657,183 to which the SAMRC contributed R45m during 2021.

BRICS STI COVID-19 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.

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 following collaborative projects were awarded under this programme.

BRICS STI COVID-19 collaborative projects

PROJECT TITLE	PRINCIPAL INVESTIGATOR	INSTITUTION
Multidisciplinary platform based on artificial intelligence for accelerating drug discovery and repurposing for COVID-19	Prof. Kelly Chibale	University of Cape Town
BRICS-ICT Alliance for Smart Resource Utilisation to Combat Global Pandemic Outbreaks	Prof. Hanlie Smuts	University of Pretoria
SARS-CoV-2 Network for Genomic Surveillance in Brazil, Russia, India, China and South Africa	Prof. Tulio de Oliveira	University of KwaZulu-Natal/ Stellenbosch University
Impact of COVID-19 on clinical manifestations, diagnosis, treatment outcome and immune response for pulmonary tuberculosis (Nickname: ABRICOT – Associative BRICS Research in COVID-19 and Tuberculosis)	Prof. Bavesh Kana,	University of the Witwatersrand & National Health Laboratory Services
Epidemiological impact and intersection of the COVID-19 and tuberculosis pandemics in Brazil, Russia, India and South Africa	Prof. Anneke C Hesseling	Stellenbosch University
Epidemiological features and geospatial evaluation of COVID-19: Correlation with comorbidities and prognostic biomarkers between SARS-CoV-2 and Mycobacterium tuberculosis	Prof. Uchechukwu Nwodo,	University of Fort Hare
Repurposing of drugs and validation of lead compounds against main protease and RNA dependent RNA polymerase of SARS-CoV-2	Prof. Anil Chuturgoon,	University of KwaZulu-Natal

BRICS MULTILATERAL JOINT SCIENCE AND TECHNOLOGY RESEARCH COLLABORATION – 2021 CALL FOR JOINT PROJECT PROPOSALS

The BRICS STI Framework Programme (FP) aims to support excellent research in priority areas which can best be addressed by a multinational approach. To this end, a call for joint project proposals in ten (10) thematic areas was launched in 2021.

DSI invited the SAMRC to manage the call in the following two thematic areas:

- Antimicrobial resistance: technologies for diagnosis and treatment.
- Simulation and big data analytics for advanced precision medicine and public healthcare.

The call for pre-proposals and full proposals (by invitation only) closed in October 2021 and February 2022, respectively. Eighteen (18) full proposals are presently being reviewed and the successful projects will be awarded in the third quarter of 2022.

13TH AFRICAN ROTAVIRUS SYMPOSIUM (ARS)

The 13th African Rotavirus Symposium (ARS) was held as a virtual event during 3 & 4 November 2021 (<http://afrn.samrc.ac.za/ars2021>). It was hosted by the University of Nairobi, Kenya and organised by the South African Medical Research Council (SAMRC) with SRI serving as the symposium secretariat.

This biennial event – organised under the auspices of the African Rotavirus Network (AfrRN) – shapes the agenda of rotavirus research and prevention globally, attracting key international opinion leaders in diarrheal diseases. The AfrRN is a regional network of institutions conducting research on paediatric diarrhoeal diseases in collaboration with the World Health Organization African Regional Office (WHO AFRO), Ministries of Health and other partners.

The ARS series is aimed at bringing together African rotavirus researchers, policymakers, clinicians, public health practitioners and health officials to share ideas, expertise and learning across organisations and countries in the areas of rotavirus vaccine introduction, vaccine impact and diarrheal disease prevention and control in Africa.

Two-hundred and ninety-two (292) delegates from thirty-nine (39) countries globally registered to participate in the symposium. Over the two days, there were 13 invited scientific presentations and 6 scientific presentations that were selected from the abstract submissions.



PART B
PERFORMANCE
INFORMATION

STATEMENT OF RESPONSIBILITY FOR PERFORMANCE FOR THE YEAR ENDED 31 MARCH 2022



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 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 2022. The South African Medical Research Council's performance information for the year ended 31 March 2022 has been examined by external auditors and their report is presented on pages 252 to 255.

The performance information of the South African Medical Research Council set out on the following pages 32 to 41 have been approved by the Board.

PROFESSOR GLENDA E GRAY
PRESIDENT & CHIEF EXECUTIVE OFFICER

South African Medical Research Council
31 March 2022

STRATEGIC OUTCOME ORIENTATED GOALS

The South African Medical Research Council is guided by five strategic goals/programmes, 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
2.3 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, 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 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 2021/22 PERFORMANCE REPORT

PURPOSE	OUTCOME	OUTPUT INDICATOR	SP TARGET 2020/21- 2024/25
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
	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%
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
		2.1.2 Number of accepted and published journal articles by SAMRC grant-holders with acknowledgement of the SAMRC	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	1925
	2.3 To provide funding for the conduct of health research	2.3.1 Number of research grants awarded by the SAMRC	750

FINAL 2020/21 PERFORMANCE	2021/22 PERFORMANCE TARGET	FINAL 2021/22 PERFORMANCE	VARIANCE
Clean Audit	Clean Audit	Clean Audit	
16%	20%	16%	Overperformance because of our efficient and effective processes, and directing more financial resources towards the mandate of the SAMRC of conducting and funding research.
1261	750	1169	Compliance to the publications standard operating procedures, mobilisation of additional (financial) resources and stakeholders' engagements increased outputs. At the time of setting target, it was not expected that SAMRC will receive temporary resources to conduct and fund more research.
281	200	265	Compliance to the publications standard operating procedures, mobilisation of additional (financial) resources and stakeholders' engagements increased outputs. At the time of setting target, it was not expected that SAMRC will receive temporary resources to conduct and fund more research.
718	450	637	Compliance to the publications standard operating procedures, mobilisation of additional (financial) resources and stakeholders' engagements increased outputs. At the time of setting target, it was not expected that SAMRC will receive temporary resources to conduct and fund more research .
190	140	152	Receipt of additional financial resources by the SAMRC led to awarding of more research grants than projected.

PURPOSE	OUTCOME	OUTPUT INDICATOR	SP TARGET 2020/21- 2024/25
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
		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
	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
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
		4.1.2 Number of awards by the SAMRC to female MSc, PhD, Postdocs and Early Career Scientists	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	495
		4.1.4 Number of awards by the SAMRC to MSc, PhD, Postdocs and Early Career Scientists from historically disadvantaged institutions (HDIs)	368
		4.1.5 Number of MSc and PhD students graduated or completed	360

FINAL 2020/21 PERFORMANCE	2021/22 PERFORMANCE TARGET	FINAL 2021/22 PERFORMANCE	VARIANCE
29	4	18	Mobilisation of more funds led to more support for innovation projects, including but not limited to mRNA Hub, COVID, TIA-MeDDIC Seed fund and BRICS-COVID-19 projects, hence the target is exceeded.
41	30	40	Exceeding of the target for new innovation projects (3.1.1) in the previous year and the delay in many of the projects due to COVID-19 has resulted in a larger portfolio of ongoing innovation projects carried over to this financial year, and thus these projects fall into this indicator.
1	1	3	The research programs of most of the intramural research Units are not necessarily conducive to the development of new innovations with the exception of Biomedical Research Innovation Platform. Two projects in this platform reached a level of proof of concept that warranted disclosure and evaluation of potential IP in the FY. A third invention disclosure was received from the TB unit at Stellenbosch University which fortuitously included an SAMRC researcher as an inventor, hence the target was exceeded.
144	130	167	Projected target exceeded because of mobilisation and redirection of resources leading to funding more scholars.
106	90	122	Projected target exceeded because of mobilisation and redirection of resources, and targeted funding strategy leading to funding more female scholars.
86	100	108	Projected target exceeded because of mobilisation and redirection of resources, and targeted funding strategy leading to funding more Black South African citizens and permanent resident scholars.
38	70	52	Target was overestimated at the time of development of the strategic plan. However, SAMRC does not intend to adjust the targets as they set the tone for the organisation to significantly drive inclusion of HDI's in the process of building next generation of research leaders. During the reporting period, SAMRC put resources to improve performance on this indicator, hence the was slight increase from 63% (2020/21) to 71% (2021/22). As part of its transformation strategy, SAMRC aims to continue with this improvement trajectory.
72	75	81	Projected target exceeded because SAMRC funded more scholars and SAMRC researchers supported and supervised more scholars.

PURPOSE	OUTCOME	OUTPUT INDICATOR	SP TARGET 2020/21- 2024/25
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
		5.1.2 Number of reports and guidelines (co)produced by the SAMRC intramural researchers	25
		5.1.3 Number of national or international bodies/ committees that SAMRC employees serve on	250
		5.1.4 Number of conferences, seminars and continuing development points workshops supported by the SAMRC	50

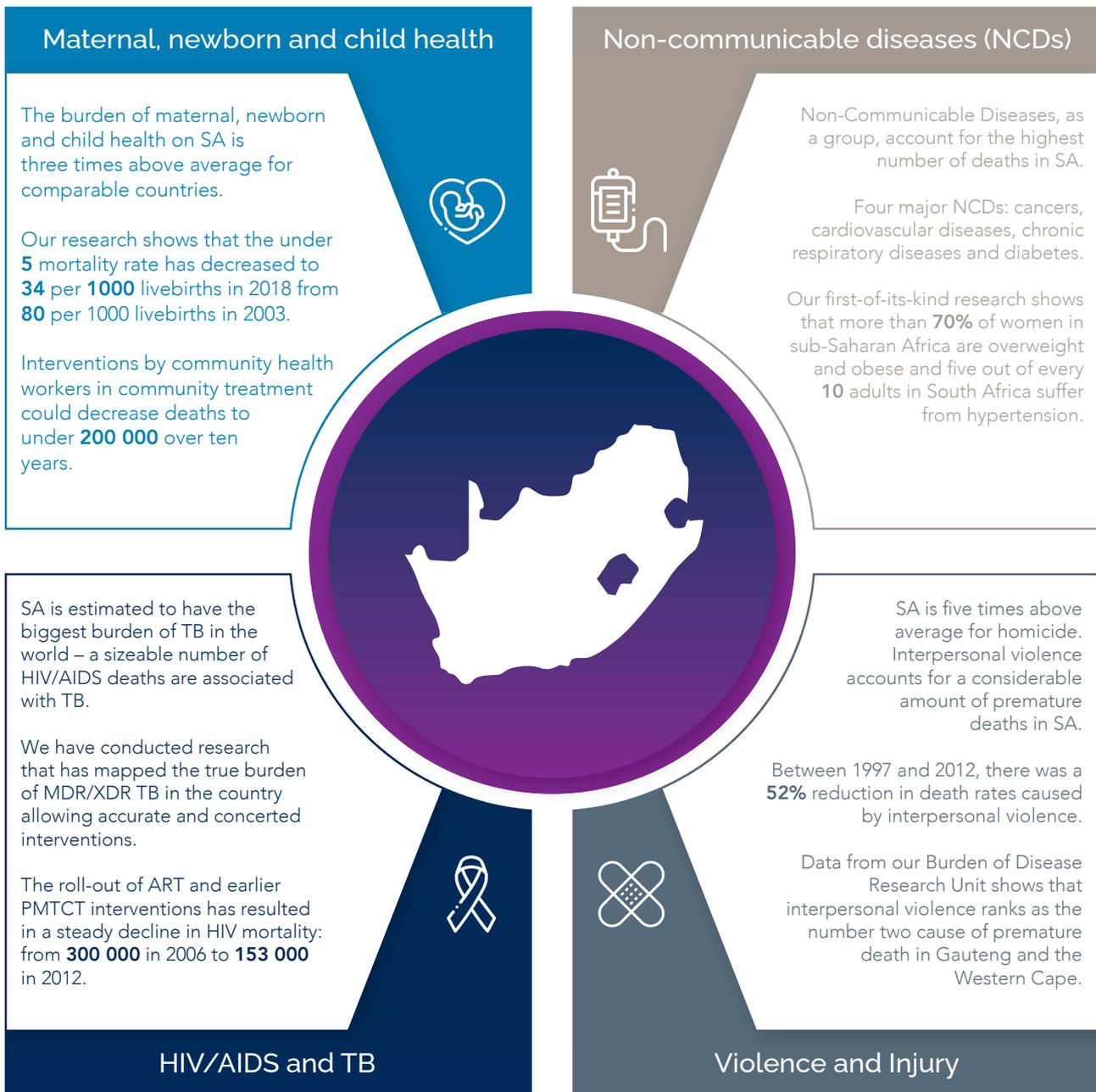
FINAL 2020/21 PERFORMANCE	2021/22 PERFORMANCE TARGET	FINAL 2021/22 PERFORMANCE	VARIANCE
44	5	58	SAMRC is a world-renowned science council, and its researchers are invariably approached for scientific input into finding solutions for health issues, lately regarding COVID-19. These inputs and guidance provided led overperformance when compared to the target set for 2020/21. Overperformance is not a concern to us as indicates that SAMRC plays a role in research translation by producing these documents that inform health policies and practices.
58	5	64	SAMRC is a world-renowned science council, and its researchers were highly involved in production of reports and guidelines mostly as a result of the prevailing COVID-19 situation, hence the target is exceeded. Overperformance is not a concern to us as indicates that SAMRC plays a role in research translation by producing these documents that inform health policies and practices.
90	50	96	SAMRC researchers are well sought after for their scientific expertise. This is evident in the number of committees and bodies that staff serve on, Overperformance is not a concern to us as indicates that SAMRC researchers are good national and international "citizens", and they play a role in research translation.
26	10	72	The continuing COVID-19 situation led to SAMRC supporting and hosting many meetings and workshops than projected, hence the target is exceeded. Overperformance is not a concern to us as indicates that SAMRC plays a role in research translation by hosting and supporting these engagements.

OUR RESEARCH PROFILE

THE BURDEN OF DISEASE IN SOUTH AFRICA

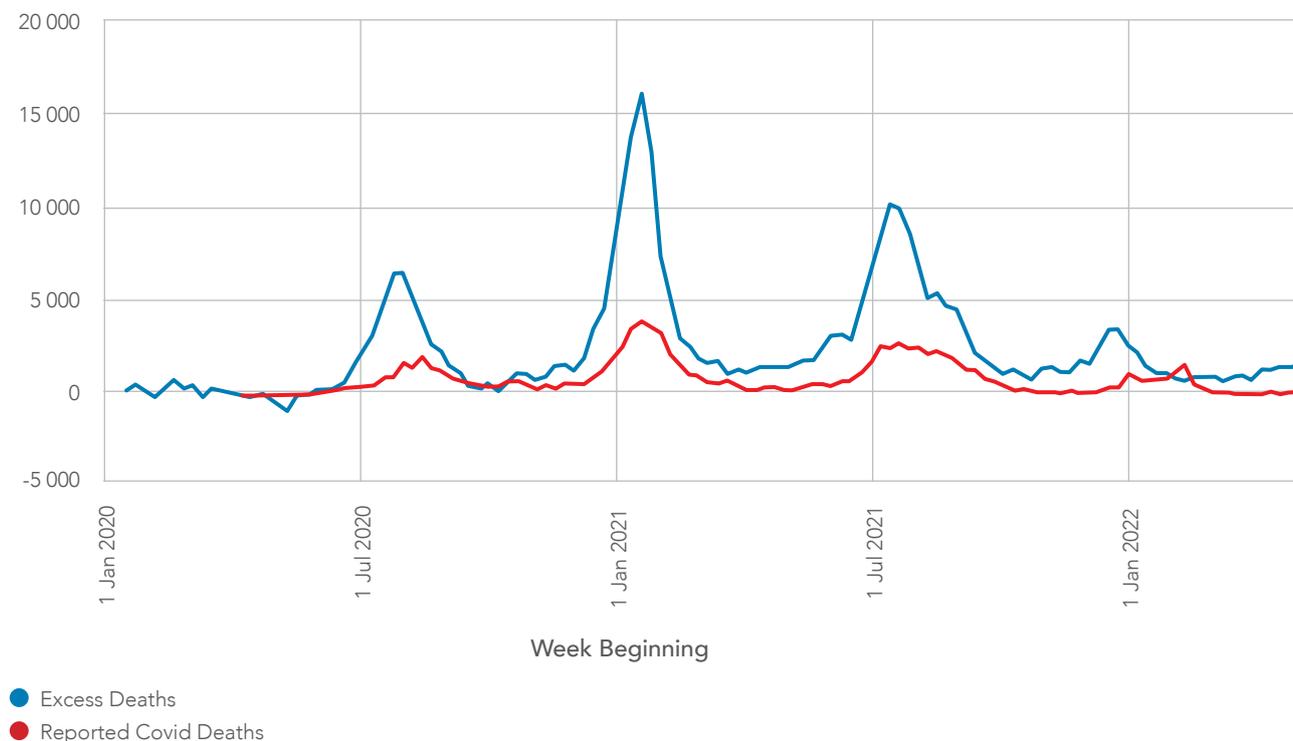
The SAMRC's steadfast focus on the key strategic pillars guides our teams of scientists and support staff to help us in enabling the National Department of Health (NDOH) to deliver on their commitment and promise of a long and healthy life for all South Africans. Our research facilitates and supports the NDOH in implementing evidenced-based policies and programmes. We have provided research support to the NDOH programmes through task teams, commissioned research, national surveys, and ministerial committees.

South Africa still faces a huge burden of four colliding epidemics as depicted in the picture below. In response to this burden of diseases, SAMRCs research focus on top ten causes of death and disability and associated factors. We assess how the health care system functions 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



South Africa faces a huge burden of four colliding epidemics

COVID-19 may be grouped with other communicable diseases, HIV/AIDS and TB burden, but has been shown to create havoc in management of the diseases. The work undertaken by the SAMRC's Burden of Disease Research Unit has supported the understanding of morbidity and mortality in South Africa and has during the COVID-19 pandemic tracked the number of deaths and estimate the number of excess deaths from natural causes on a weekly basis (see figure below).



RSA (Natural) Excess Deaths and Reported COVID-19 Deaths

LEADING CAUSES OF DEATH IN SOUTH AFRICA

- The **Rapid Mortality Surveillance Report 2019 & 2020** derives estimates of key health status indicators primarily from data obtained from the National Population Register.
- This report shows that in 2020, **the average life expectancy in South Africa was 64.7 years**, a slight decline from the 65.3 years experienced in 2019 after having increased by more than 10 years since the low of 53.7 in 2005. The increase in life expectancy prior to 2019 is due to both the decrease in child mortality as well as the decrease in young adult mortality while the decrease in life expectancy in 2020 resulted from SARS-CoV-2. **Infant and under-five mortality rates reached lows of 21 and 28 per 1 000 live births, respectively, in 2020** having increased to 27 and 37 per 1 000 livebirths in 2019, respectively. However, the neonatal mortality rate continues to show little change at 12 per 1 000 live births.
- There was also a noticeable decline in the level of mortality of older children and young adolescents aged 5-14 years (10q5) in 2020, again due to effects of lockdown on both natural and unnatural deaths.
- Mortality among older adolescents and youth (the probability of a 15-year-olds dying before the age of 25 years) has dropped from 25.5 to 22.7 per 1 000 in 2020 for males and from 15.5 to 14.8 per 1000 for females. The decrease in deaths from unnatural causes likely contributed to this decline.
- Life expectancy at age 60 had shown little change between 2000 and 2019. However, associated with COVID-19, life expectancy at age 60 dropped from 19.6 to 18.9 years for females, and from 16.1 to 14.8 years for males, resulting in an overall decrease of 1.5 years.

The rates of premature mortality from preventable non-communicable diseases (NCDs) also declined from 2016 to 2017, mainly due to a decline in deaths due to cardiovascular disease, and in males also cancer. The impact of COVID-19 cannot be assessed until more recent cause of death data become available.

Key Mortality Indicators, Rapid Mortality Survey 2015-2020

INDICATORS	2015	2016	2017	2018	2019	2020
LIFE EXPECTANCY AT BIRTH						
Life expectancy at birth Total	63.3	63.9	64.6	64.8	65.3	64.7
Life expectancy at birth Male	60.1	60.9	61.6	61.8	62.4	62.2
Life expectancy at birth Female	66.6	66.9	67.6	67.9	68.2	67.2
YOUNG CHILD MORTALITY (0-5 YEARS)						
Under-5 mortality rate (U5MR) per 1 000 live births	39	36	33	35	36	28
Infant mortality rate (IMR) per 1 000 live births	28	26	23	26	27	21
Neonatal mortality rate (<28 days) per 1 000 live births	12	12	12	11	12	12
OLDER CHILDREN & YOUNG ADOLESCENTS (5-14 YEARS)						
Older children & young adolescents ($_{10}q_5$ per 1000) Total	7.0	6.5	6.0	6.2	5.9	5.3
Older children & young adolescents ($_{10}q_5$ per 1000) Male	7.8	7.4	7.0	7.0	6.7	6.1
Older children & young adolescents ($_{10}q_5$ per 1000) Female	6.2	5.6	5.1	5.3	5.0	4.5
OLDER ADOLESCENTS & YOUTH (15-24 YEARS)						
Older adolescents & youth ($_{10}q_{15}$ per 1000) Total	22.3	21.7	21.4	20.8	20.5	18.7
Older adolescents & youth ($_{10}q_{15}$ per 1000) Male	26.3	25.8	26.0	25.2	25.5	22.7
Older adolescents & youth ($_{10}q_{15}$ per 1000) Female	18.4	17.5	16.9	16.4	15.5	14.8
ADULT MORTALITY (15-59 YEARS)						
Adult mortality ($_{45}q_{15}$) Total	34%	33%	32%	31%	29%	31%
Adult mortality ($_{45}q_{15}$) Male	40%	39%	38%	37%	35%	36%
Adult mortality ($_{45}q_{15}$) Female	28%	27%	26%	25%	24%	26%
LIFE EXPECTANCY AT AGE 60						
Life expectancy at age 60 Total	17.6	17.7	17.8	17.9	18.0	16.5
Life expectancy at age 60 Male	15.5	15.6	15.7	15.9	16.1	14.8
Life expectancy at age 60 Female	19.3	19.3	19.5	19.6	19.6	18.0

CAUSE SPECIFIC INDICATORS	2012	2013	2014	2015	2016	2017
MATERNAL MORTALITY (15-49 YEARS)						
Maternal mortality ratio (MMR) per 100 000 live births	164	153	166	153	137	109
PREMATURE MORTALITY ATTRIBUTED TO CARDIOVASCULAR DISEASE, CANCER, DIABETES OR CHRONIC RESPIRATORY DISEASE (PEOPLE AGED 30-69 YEARS)						
NCD $_{40}q_{30}$ Total	29%	29%	30%	30%	29%	27%
NCD $_{40}q_{30}$ Male	34%	34%	35%	35%	34%	32%
NCD $_{40}q_{30}$ Female	24%	24%	24%	24%	24%	23%
Cardiovascular disease $_{40}q_{30}$ Total	14%	14%	14%	14%	14%	13%
Cardiovascular disease $_{40}q_{30}$ Male	18%	17%	18%	18%	17%	16%
Cardiovascular disease $_{40}q_{30}$ Female	12%	11%	11%	11%	11%	10%
Cancer $_{40}q_{30}$ Total	9%	9%	9%	9%	9%	9%
Cancer $_{40}q_{30}$ Male	10%	11%	11%	11%	10%	10%
Cancer $_{40}q_{30}$ Female	7%	7%	8%	8%	8%	7%
Diabetes $_{40}q_{30}$ Total	5%	5%	5%	5%	5%	5%
Diabetes $_{40}q_{30}$ Male	5%	5%	6%	6%	5%	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%	5%
Chronic respiratory disease $_{40}q_{30}$ Female	3%	2%	2%	2%	2%	2%

Source: Dorrington RE, Bradshaw D, Laubscher R, Nannan N (2021). Rapid mortality surveillance report 2019 & 2020. Cape Town: South African Medical Research Council. ISBN: 978-1-928340-58-4. Available at www.mrc.ac.za/bod/reports.htm

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 Hypertension and Cardiovascular Disease Research Unit (ERU) |
| 2 Non-Communicable Diseases Research Unit (IRU) | 7 Microbial Water Quality Monitoring Research Unit (ERU) |
| 3 Environment and Health Research Unit (IRU) | 8 Centre for Health Economics and Priority Setting Research Unit (ERU) |
| 4 Rural Public Health and Health Transition Research Unit (ERU) | 9 Risk and Resilience in Mental Disorders Research Unit (ERU) |
| 5 Masculinity and Health Research Unit (ERU) | 10 Antimicrobial Resistance and Global Health Research Unit Research Unit (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 and other Infectious Diseases Research Unit (IRU) | 5 Centre for the Study of Antimicrobial Resistance Research Unit (ERU) |
| 2 Centre for Tuberculosis Research Unit (IRU) | 6 Antibody Immunity Research Unit (ERU) |
| 3 HIV-CAPRISA TB Pathogenesis and Treatment Research Unit (ERU) | 7 Intersection of Communicable Disease and Infectious Disease Research Unit (ERU) |
| 4 Vaccine and Infectious Diseases Analytics Research Unit (ERU) | 8 Office of AIDS and TB Research (IRU) |

RESEARCH PROGRAMME 3 CONTINUED

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

- 9 TB Platform (IRU)
- 10 Malaria Research Group (IRU)
- 11 Molecular Mycobacteriology 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)
- 2 Biostatistics Research Unit (IRU)
- 3 South African Cochrane Centre (IRU)
- 4 Health Systems Research Unit (IRU)
- 5 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)
- 2 Primate Unit and Delft Animal Centre (IRU)
- 3 The Biomedical Research and Innovation Platform (IRU)
- 4 Genomics Center (IRU)
- 5 Pan African Center for Epidemics Research Unit (ERU)

RESEARCH PROGRAMME 6

BIOMEDICAL RESEARCH

UNITS THAT CONSTITUTE THIS PROGRAMME

- 1 Bioinformatics Capacity Development Research Unit (ERU)
- 2 Precision and Genomic Medicine Research Units (ERU)
- 3 Stem Cell Research and Therapy Unit (ERU)
- 4 Antiviral Gene Therapy Research Unit (ERU)
- 5 Genomics of Brain Disorders Research Unit (ERU)
- 6 Precision Oncology Research Unit (ERU)
- 7 Wound and Keloid Scarring Translational Research Unit (ERU)
- 8 Cardiometabolic Health Research Unit (ERU)
- 9 Platform for Pharmacogenomics Research and Translation Research Unit (ERU)



FUNDING HEALTH INNOVATION

GRANTS, INNOVATION AND PRODUCT DEVELOPMENT

The Grants, Innovation and Product Development (GIPD) Unit at the SAMRC is the custodian of grant funding and innovation 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 250 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 several peer reviewed articles in 2021/22 and supported a substantial number of young researchers to build their research programs and experienced researchers to train new post-graduates. The SAMRC's strategic goal 3, which is focussed on supporting innovation and technology development to improve health, is an important priority that falls within GIPD. The unit manages funding aimed specifically at product development and innovation and hosts the SAMRC's Technology Transfer Office (TTO), the Global Health Innovation Accelerator (GHIA) and the Medical Device and Diagnostic Innovation Cluster (MeDDIC), all of which provide innovation support to protect and advance technologies towards commercialised 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. These innovation support mechanisms also contribute to strategic goal 5 to translate new knowledge for improved health through the delivery of novel health technologies.

The funding and innovation programs that are managed within GIPD are depicted in the figure below. The SAMRC has been very successful at establishing and maintaining strategic partnerships to leverage additional funding for research and innovation with organisations that include the Department of Science and Innovation (DSI), the Newton

Fund, the Bill and Melinda Gates Foundation (BMGF) and the Technology Innovation Agency (TIA). These have expanded in the last 2 years, particularly as a result of the COVID-19 pandemic, to include additional funding partners such as the Solidarity Response Fund, the ELMA Vaccines and Immunisation Foundation and the Michael and Susan Dell Foundation. GIPD's funding programs, which focus on the key health priorities in the country, have collectively allocated a total of R360 708 179 to research and innovation during the 2021/22 financial year.

During the 2021/22 financial year, the partnership with the DSI for the Strategic Health Innovation Partnerships (SHIP) Program was extended for a further 2 years. The partnership with the Canadian Institutes of Health Research (CIHR) for the Healthy Life Trajectories Initiatives (HeLTI) has also been renewed for a further 5 years to enable the research teams from South Africa and Canada to continue an important pre-conception to early childhood intervention study to prevent obesity and non-communicable diseases. This forms part of a broader international HeLTI collaboration that includes harmonised intervention studies in South Africa, Canada, India and China. The SAMRC has expanded this program in South Africa by awarding 6 new grants to South African institutions to utilise the HeLTI data and samples to address additional priority research questions.

In 2020, a Framework Agreement was signed to provide for the SAMRC to manage Project AFRICA GRADIENT (Genomic Research Approach for Diversity and Optimising Therapeutics) on behalf of GSK and Novartis. The primary focus of Project Africa GRADIENT is 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. The Africa-wide call for the program was launched in 2021 and, after successful completion of the letter of intent and full proposal stage reviews, 5 Investigator Sponsored Research and 4 Fellowship awards were processed, totalling R33,6 million over 2 years.

Two new strategic projects were established in 2021/22. A Traumatic Brain Injury (TBI) Research Program has been established at UCT, co-funded by the Gabriel Foundation. TBI is a major contributor to the disease burden in South Africa and is closely related to several other causes of death and growing research areas such as road traffic accidents, concussion from sport and gender-based violence. The funding will also be used to build research capacity in TBI in SA through mentorship and scholarships. The SAMRC has renewed its participation in the national Indigenous Knowledge Systems research agenda by making strategic investments in in vitro assessment of African Traditional Medicines and in specific product development projects aimed at gathering in vitro and in vivo data on such medicines.

In addition to the above programs and strategic projects, the primary focus of GIPD this financial year has been on sustaining and expanding its response to the COVID-19 pandemic. GIPD has been the driving engine of the SAMRC and DSI's COVID-19 response, with more than R600 million raised and/or reallocated for COVID-19 research and innovation since the start of the pandemic in March 2020. With funding from the SAMRC baseline grant (including additional ring-fenced allocations from National Treasury through the National Department of Health), the DSI, TIA, the Solidarity Response Fund, the ELMA Vaccines and Immunisation Foundation, the Michael and Susan Dell Foundation and the BMGF, GIPD has been supporting in excess of 40 projects, with a further 13 new awards in February 2022, 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 guiding national policy and programmes. They have also resulted in two SAHPRA approved, locally developed and manufactured diagnostic tests for COVID-19. Most notably, in 2021, the funds raised have enabled the rapid planning and implementation of the Sisonke open label study, which saw the vaccination of >496,000 healthcare workers with the J&J Ad26.COVID-19 vaccine ahead of the national vaccination roll-out. This was followed by Sisonke 2 in which more than 230,000 Sisonke participants received a booster dose of the J&J vaccine ahead of the fourth wave. GIPD was instrumental in raising and managing the funding for these studies and driving the administrative aspects. GIPD has, further, been involved, together with the scientific leadership, in strategic discussions with additional companies to test their COVID-19 vaccines as boosters or in specific cohorts of interest such as HIV positive individuals and pregnant and breastfeeding women in South Africa.

Since the first introduction of COVID-19 vaccines in South Africa in February 2021 with the Sisonke study, followed closely by initiation of the national vaccine roll-out, a total of 21.49 million first dose vaccinations have been administered. Given the extraordinary investments involved and the need to deliver and administer vaccines safely, efficiently and as broadly as possible, it is critical that the COVID-19 vaccine roll-out is maximally supported, monitored and well understood and that its outcomes are measured. In 2021/22, the SAMRC received additional funding of R100 million, including VAT, from the National Treasury through the National Department of Health to implement a Vaccine Roll-out Research Programme. The SAMRC is coordinating this programme in the context of its broader COVID-19 research and innovation program, with the funding specifically allocated to the following 3 areas:

- An extended national research program to guide the effective implementation and monitoring of COVID-19 vaccines and address long term effects of COVID-19 in South Africa. In total 10 projects are being funded addressing these topics, stemming from a request for applications process run in 2021.
- The BaSiS clinical study – a Phase II randomised open label trial of full and half dose J&J Ad26.CoV2.S and Pfizer BNT162b2 booster vaccinations after receiving the J&J Ad26.CoV2.S prime vaccine through the SISONKE phase IIIB implementation study.
- The SAMRC's Wastewater Surveillance Program.

Another notable initiative in 2021 was the successful bid by Afrigen Biologics, the Biovac Institute and the SAMRC to the World Health Organization (WHO) for the establishment of an mRNA Technology Transfer Hub in South Africa. The SAMRC is managing Objective 3 of this initiative, which involves development of a pipeline of mRNA vaccines to feed into the pilot production plant at Afrigen for small scale manufacture for clinical trials and, ultimately into commercial production at Biovac. This objective builds on previous investments made through the SAMRC in genomic surveillance, immunology, preclinical studies and clinical trials for COVID-19 and other diseases and is expected to result in local manufacture of mRNA vaccines as well as the local development of novel vaccine candidates for COVID-19 and other diseases. The SAMRC and DSI have contributed funding for this development objective, which has been used to leverage international funds managed through the Medicines Patent Pool as well as philanthropic funds. The first investments in this program were made by the SAMRC in March 2022.

The SAMRC's response to COVID-19 has had enormous impact to date, enabling South African scientists to participate (and, in some cases, lead) globally in pandemic surveillance, diagnosis, treatment and prevention. Acceleration of processes within GIPD and the SAMRC more broadly (including the establishment of a COVID-19 Prioritisation of Grants Committee) for the review, award and management of funding for COVID-19 projects has enabled a rapid and agile response to the pandemic, while maintaining compliance with the PFMA and its principles of fairness, transparency and open competition. Two additional important outcomes of the pandemic have been the ability of the SAMRC to raise funding from non-traditional sources, thereby expanding its funding pool, and the unprecedented collaboration and data and information sharing between different organisations and sectors (including funders, Government, academia, industry, civil society and the regulator), all with a common goal of addressing the pandemic. It will be important to ensure that the lessons learnt, capacity developed, and new ways of working are harnessed and perpetuated to maximise and accelerate research and innovation for impact in other health areas.

On the innovation front, the SAMRC's partnership with PATH on the Global Health Innovation Accelerator to provide hands-on innovation support to advance technologies towards implementation received a further grant from the BMGF to expand its activities into other African countries. A highlight of GHIA this financial year was the completion and release of a landscape analysis of the South African medical devices sector. This will inform future interventions to build the health innovation ecosystem in South Africa through GHIA and MeDDIC. MeDDIC is a TIA-funded Medical Device and Diagnostic Innovation Cluster hosted by the SAMRC, through GHIA. The program, which was officially launched in March 2021, is aimed at intensifying technology innovation and increasing the cohesion and competitiveness of the medical devices and diagnostics innovation ecosystem through a cluster-based approach. MeDDIC is directly addressing regulatory hurdles in South Africa by facilitating regulatory support to SMEs and innovators through the CSIR's Industrial Sensors Impact Area (around 15 companies and innovators have been assisted to date) and support to SAHPRA in preparing for the online registration of individual devices and diagnostics. MeDDIC is also directly supporting the localisation of currently imported medical devices through 4 grants awarded from a Request for Applications (RFA) run in April 2021.

The SAMRC is an approved implementing partner for the TIA Seed Fund, managed through the SAMRC's TTO. The fund supported 7 projects from the first funding round starting in 2019, 3 projects from SMME's and 4 from publicly financed institutions, including 2 from the SAMRC.

All 7 projects were severely delayed due to COVID-19, but 6 are now complete and closed out with the last project due to be completed by April 2022. The projects have to date resulted in 1 product (a novel Inverta dental implant) on the market and 4 products substantially progressed in their development. Three new projects with a focus on indigenous knowledge systems were selected and approved for funding by TIA from the 2021 seed fund call and are currently being contracted. In 2021, GIPD received approval for the SAMRC to contribute R2.5M per annum for 3 years as co-funding with TIA towards a seed fund focused on medical devices and diagnostics. The first call for this seed fund was run in November 2021 and 9 awards were made in March 2022. These projects are being managed by the TTO and are expected to result in novel, locally developed and manufactured medical devices.

Innovation within the SAMRC is also supported by the SAMRC's TTO, which identifies, protects and commercialises intellectual property created by SAMRC researchers. A number of SAMRC-developed technologies, focusing on plant-based medicines, diagnostics and medical devices, are managed by the TTO and are being progressed towards commercialisation, together with partners from other science councils and universities. A license agreement was concluded in 2021 with a commercial partner for the manufacture, sales and distribution of the Umbiflow device, which continues to demonstrate clinical benefit in reducing stillbirths by identifying at risk foetuses and providing forewarning of growth restricted infants.

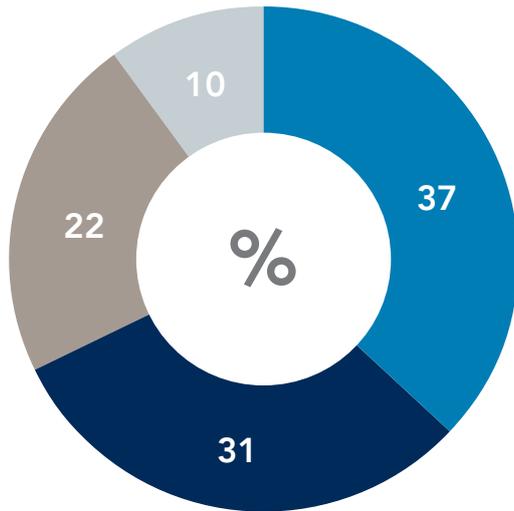
SPECIFIC PROGRAM UPDATES

Self-initiated Research Grants

The Self-initiated Research (SIR) program provides grants of up to R200,000 per annum for 3 years to early and mid-career researchers in a variety of health disciplines and priority areas. The program was impacted by COVID-19 in 2020/21 with reallocation of funding to the COVID-19 response. Only 26 awards were made from the call run in 2019 and no new call for proposals was run during 2020. The 2021 call focused on COVID-19 only, which resulted in a lower number of qualifying applications (90) but a higher success rate (76.7%) as 69 awards were made. The distribution of SIR awards by ethnic group over the last 4 SIR calls is shown in the figure below.

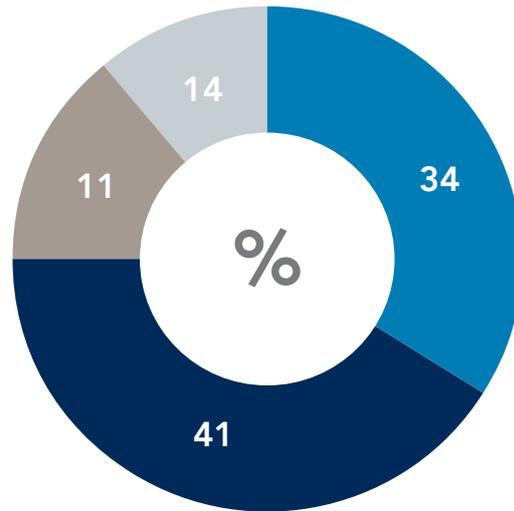
Application of a transformation matrix has resulted in a year-on-year increase in the number of awards to black applicants. This trend was unfortunately affected in 2021/22 as a result of the very narrow focus and smaller number of applicants overall. The distribution of awards with respect to ethnic group does, however, correlate with the distribution of applicants.

SIR New Awards by Race: 2017/18



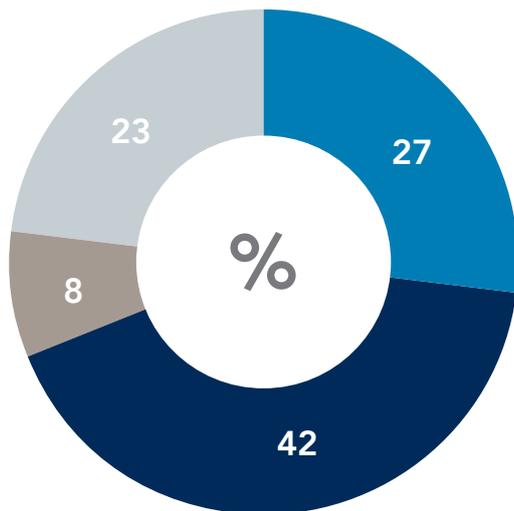
● White ● Indian
● African ● Coloured

SIR New Awards by Race: 2018/19



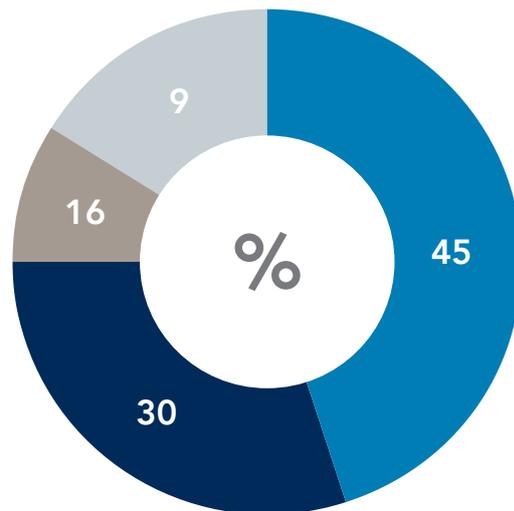
● White ● Indian
● African ● Coloured

SIR New Awards by Race: 2019/20



● White ● Indian
● African ● Coloured

SIR New Awards by Race: 2021/22



● White ● Indian
● African ● Coloured

Distribution of SIR awards by race between 2017/18 and 2021/22

STRATEGIC HEALTH INNOVATION PARTNERSHIPS (SHIP)

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. A new strategic plan for 2021/22-2023/24 for SHIP was developed and approved during 2021 and the SHIP partnership with the DSI was extended for a further 2 years. A SHIP Transformation Plan was also developed and approved and will form the basis of expansion of the program to include more historically disadvantaged individuals and institutions as grant recipients. This will build on, for example, the current program in the Eastern Cape which is supporting 7 projects at 3 universities in the province.

SHIP has continued its focus on TB, HIV, non-communicable diseases, maternal and child health, malaria, antimicrobial resistance, and COVID-19. It is also prioritising investments aimed at transitioning projects towards the market as well as support for cross-cutting platforms and technology areas, particularly precision medicine and digital health, to enable South Africa to harness the promise of the Fourth Industrial Revolution to improve healthcare in South Africa. The precision medicine program of SHIP is being enhanced through the SAMRC's participation in the European Africa Personalised Medicine (EU-Africa PerMed) project (<https://www.euafrica-permed.eu/>) on building links between Europe and Africa and facilitating the participation of African countries in the global personalised medicine research agenda. The initiative, funded by the European Commission through the Horizon 2020 programme, will contribute to reducing the existing health disparities between developed and developing countries, as well as facilitate the access of African

countries to new tools and technologies that have the potential to make healthcare more efficient and equitable. The project, which was launched in March 2021 and will run for 4 years, is being executed by a transnational consortium of 13 organisations, that includes 7 from Africa. As part of the project, a virtual EU-Africa Stakeholders Workshop was held from 9-10 February 2022 to bring together a rich mix of stakeholders from across the African continent to develop an understanding of the challenges, opportunities, and priorities for personalised medicine in Africa and discuss the precision medicine agenda. A further highlight in 2021 was an invitation for the SAMRC to participate in the ERA PerMed Joint Transnational Call 2022 on "Prevention in Personalised Medicine". Members of GIPD participated in the eligibility screening for proposals involving participants from South Africa. Three proposals involving SA researchers have been selected to proceed to peer review. If approved, the South African component will be funded through SHIP.

New COVID-19 projects were added to the SHIP portfolio in March 2022, following an RFA in 2021. The DSI allocated a further R21.7M towards the Network for Genomic Surveillance, which has been key in identifying new variants of concern soon after they arise. A further R6.9M has also been allocated by the DSI to support the National SARS-CoV-2 Wastewater Surveillance System. The DSI is also an important partner and contributor to the mRNA Technology Transfer Hub. The Department has allocated R43.6M in 2021/22 towards objective 3, managed by the SAMRC. These funds will support mRNA vaccine development and testing by South African institutions.

While the original Bill and Melinda Gates Foundation grant for HIV and TB projects within SHIP came to an end in 2021, the Foundation remains an important co-funder on SHIP's TB and malaria drug discovery programmes and has renewed its commitment to these, together with Medicines for Malaria Venture which is co-funding



GIPD SHIP Sub Saharan Africa Funders Forum

malaria drug discovery in South Africa. Furthermore, the Foundation also co-funds the Grand Challenges South Africa programme. Projects supported under this program during 2021 included scaling of a protein-to-creatinine rapid test for determining significant proteinuria in pregnancy in South Africa, Ghana and Kenya (co-funded by Grand Challenges Canada) and 5 projects addressing surveillance and ecology of anti-microbial resistance.

THE NEWTON FUND

The SAMRC-Newton Fund programs are the result of a co-funding initiative with the UKMRC, established in 2015, that supports South African projects that respond to national health priorities while simultaneously contributing to global health knowledge for social, economic and health impact.

The SAMRC-Newton Fund program has supported a total of 21 projects across 12 institutions on TB implementation science, non-communicable diseases, mental health and antimicrobial resistance. These projects have contributed 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 focused on improving TB outcomes, which have come to an end, 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. These were completed in 2021 with the exception of one which will continue in the next financial year.

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. These are due to be completed in 2023. 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 are benefiting from the guidance of an international and African external advisory board. The ultimate aim is 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.

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 activities that complement and contribute to the broader GIPD HIV Program and capacity development initiatives. SAAVI funds have been supporting a 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. This project is led by an early career researcher and forms part of the SAMRC's broader HIV cure research portfolio. SAAVI funds have also been utilised in this financial year to support the optimisation and maintenance of a SHIV challenge model at PUDAC which is critical for local HIV vaccine research.



RESEARCH CAPACITY DEVELOPMENT

OVERVIEW

Building capacity for the long-term sustainability of health research, while simultaneously attaining health research transformation, is a priority for the SAMRC. These are key responsibilities of the SAMRC's Research Capacity Development (RCD) division, which provides funding for the next generation of health researchers through a variety of scholarships and research grants aimed at early- and mid-career scientists at South African universities.

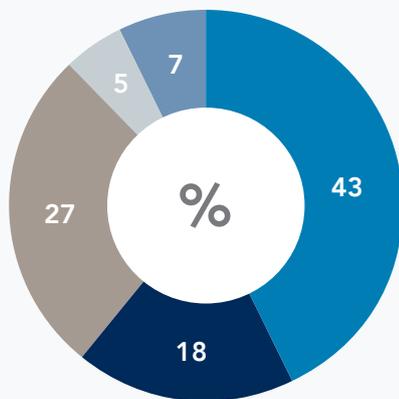
The performance of RCD programmes in 2021/2022 has remained consistent, with additional initiatives aimed at

improving and strengthening research capacity building contributing to career development and transformation. Through these programmes, RCD also contributes to the SAMRC's other strategic goals of administering health research effectively and efficiently, leading the generation of new knowledge, and supporting innovation and technology development.

The **scholarships portfolio** at RCD comprises 5 programmes as listed in the figures below. Between 2013/14 and 2021/22, RCD has funded over 300 scholars through these programmes, of which 76% are for PhDs. The distribution of scholarships by programme, ethnic group and gender over this 9-year period are depicted in the figures below.

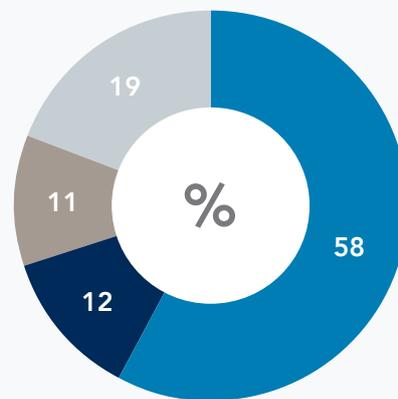
The three largest scholarship programmes are further broken down below by ethnic group and gender for the period 2013/14-2021/22. A highlight of these programmes has been increased participation of scholars from HDIs; however, this could still be substantially improved.

Scholarships by Programme (2013-2021)



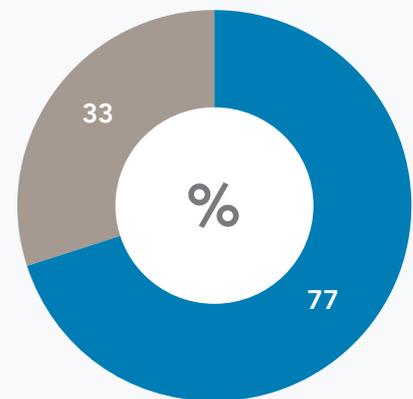
- Bongani Mayosi national Health Scholars Programme
- Clinician-Researcher (MBChB/PhD) Development Programme
- Internship Scholarship Programme
- Specialised Training in Vaccinology
- Researcher Development Programme

Demographics of RCD Funded Scholars (2013-2021)



- African Black
- Coloured
- Indian
- White

Proportion of Female Scholars (2013-2021)



- Female
- Male

Overall distribution of SAMRC scholarships by programme, ethnic group and gender from 2013/14-2021/22

Bongani Mayosi National Health Scholars Program (PhD and MSc)

157 awards made
145 retained
68 PhDs
12 MScs graduated

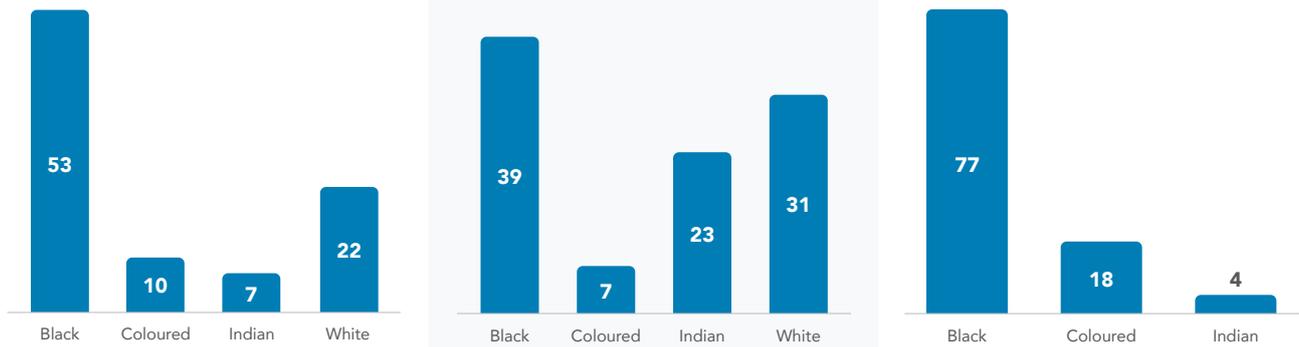
Clinician Research Development Awards (PhD)

61 funded scholars
24 graduated

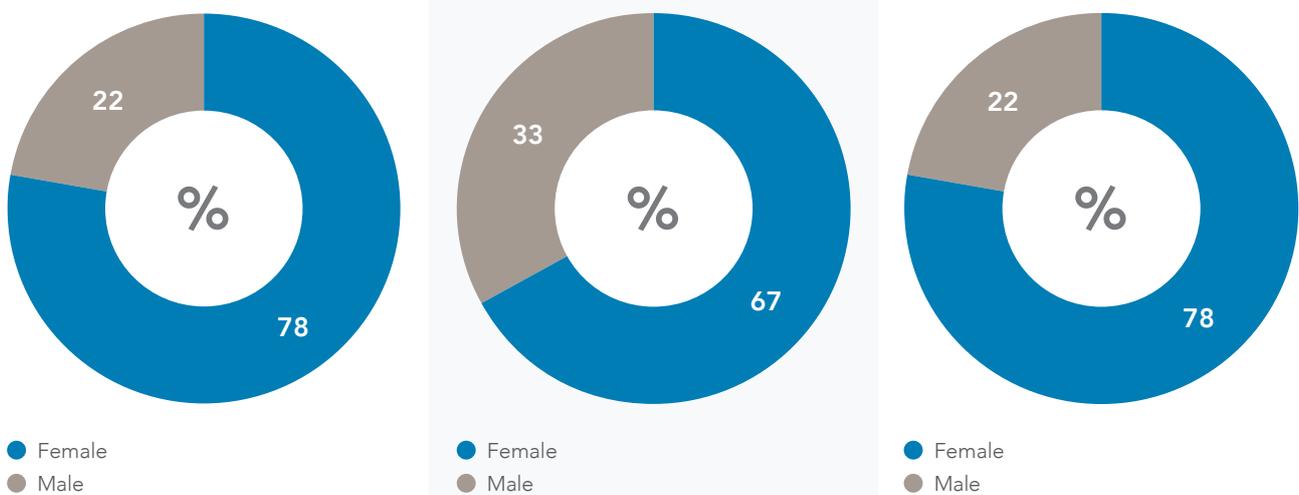
SAMRC Internship Programme (PhD and MSc)

157 funded scholars
58% in IMU's
42 graduated

% Awards distributed by race (2013-2021)



Awards by gender (2013-2021)



Statistics for the 3 largest scholarship programmes managed by the SAMRC for the period 2013/14-2021/22

The figures clearly demonstrate that, overall, the scholarships programmes are contributing significantly to the primary goals of transforming the health research system and particularly encouraging the development of clinician scientists. Challenges have been experienced with respect to the time taken by awardees to complete PhDs and a small percentage of drop-out in some of the programs. The reasons for this are being explored with a view to improving the programmes and increasing

completion within the prescribed terms. Further, RCD has introduced more value-add soft skills training activities. In 2021/22 RCD organised a series of communication workshops in partnership with Jive Media Africa in which scholars received training in communication of scientific concepts to non-specialist audiences. RCD also assisted with the Cochrane Systematic Review Virtual Workshop, providing introductory training for HDI principal investigators.

The financial year 2021/22 has seen the introduction of two new programmes, the Clinician Post-PhD Career Development Award and the Early Investigators Programme, together with additions to the RCDI-nested postdoctoral fellowship and postgraduate programmes and the reconfiguration of the RCDI-Staff Development Programme at MUT to address the dearth of qualified principle investigators at the institution. The latter involves collaboration with the University of Kwa-Zulu Natal (UKZN) to support beneficiaries conducting research at UKZN under supervisors from both MUT and UKZN. The two-year Clinicians Post-PhD Career Development Award was established to address the gap immediately following clinician PhD training and offers an opportunity for PhD graduates to be hosted in well-established research teams while they learn to build and lead a research program. The five-year Early Investigators Programme was initiated under the SAMRC President/CEO as an intervention to fund promising scientists with leadership potential who are not yet at the level of a mid-career scientist to become independent researchers. The aims of the programme are to i) support the early career development of South African scientists, ii) facilitate their transition to the next level of mid-career scientists, and iii) foster their retention in the public sector in areas of strategic interest to the National Department of Health (NDoH) and the SAMRC towards a solid scientific and academic leadership in the

country. The first cohort of early investigators, awarded in 2021/22, comprises mostly of female and historically disadvantaged individuals from eight Universities; namely, North-West University, University of Cape Town, University of KwaZulu Natal, University of Johannesburg, University of Limpopo, University of Stellenbosch, and the University of Witwatersrand.

Overall, in 2021/2022, RCD increased the number of grant beneficiaries and scholarship beneficiaries. Transformation and capacity building in historically disadvantaged institutions remain an important focus of all of the programmes. The priority research areas funded this financial year include, inter alia, COVID-19-related research, non-communicable diseases, HIV/TB and other infectious diseases, health systems, public health, maternal and child health and biomedical research. During the 2021-2022 financial year, the RCD programme completed many requests for applications (including requests for expression of interest) calls that aimed to improve capacity development and transformation (females and previously disadvantaged individuals). Overall, more of grants and scholarships were awarded to African Black applicants and females. New programmes (Early Investigators Programme and Clinician Post-PhD Career Development awards) have contributed to more than 40% of the new intake with a joint budget of R9 million.

Programmes and awards in 2021/22

NAME OF PROGRAM	LEVEL/DEGREE	NUMBER OF BENEFICIARIES	AMOUNT INVESTED (R)
SAMRC Mid-Career Scientists	Scientists (PI)	7	9, 125,000.00
SAMRC Research Capacity Development Initiative	Scientists (PI)	17	6, 900,000.00
	Postdoctoral Fellows	6	2, 450, 000.00
	PhD	7	1, 360, 000.00
	MSc	2	320, 000.00
SAMRC Intramural Postdoctoral Fellowship Programme	Postdoctoral Fellows	8	3, 162, 500.00
SAMRC Clinician Postdoctoral Career Development Award	Clinician Post-PhD	3	1, 950, 000.00
SAMRC Early Investigators Programme	Scientists (PI)	14	7, 000,000.00
SAMRC Researcher Development Grant	PhD	5	1 000 000.00
	MSc	1	160 000.00
Bongani Mayosi-National Health Scholars Programme	PhD	45	15 291 536.78
Biostatistics Capacity Development Program	PhD	1	200 000.00
SAMRC Clinician Researcher Development Programme	PhD	16	8 260 000.00
SAMRC Internship Scholarship Programme	MSc	2	320 000.00
	PhD	33	6 500 000.00



SPARK Talks provide an opportunity for the public to learn about research conducted by SAMRC funded scholars and to be inspired. From the left: Dimakatso Mashala (UL), Victoria Oyekunle (UKZN), Moabelo Koena (UWC) Maphepele Mshilo (Univen), Ntshunxeko Banda (Univen), Siphwe Ndllovu (WITS), Mulalo Salane (SMU), Nombeko Sikhosane (WITS), Sanele Khoza (UWC) and Samukelisiwe Madlala (UWC).

The impact of RCD funding on capacity building is evident from the ability of former and current RCD beneficiaries to compete for research funding, to find academic employment and to contribute to innovation. Nine former RCD beneficiaries have been retained as SAMRC permanent/contract employees and the following former and current RCD beneficiaries have secured additional research funding and other achievements:

- Prof. Pascal Bessong, a former RCDI PI beneficiary (UNIVEN), received a grant from the SAMRC to establish an SAMRC extramural unit- Antimicrobial Resistance and Global Health Research.
- Prof. Alan Christofells, former MCSP PI beneficiary (UWC), started its pathogen genome analysis training programme online for SADC countries to strengthen national public health institutes.
- Prof. Jacques Joubert, a current RCDI PI beneficiary (UWC), received grant funding of R1million from Perivoli Africa Research Centre (PARC).
- Dr. Phiwayinkosi Dlodla, a former SAMRC Intramural Postdoctoral fellow within the SAMRC's Biomedical Research and Innovation Platform (BRIP), received the Research Excellence Award for Early Career/ Emerging Researchers at the recent National Research Foundation (NFR) Awards.
- Dr. Carrie Brooke-Sumner, a former SAMRC Intramural Postdoctoral fellow, received the SAMRC Intramural Early – Mid Career Researcher Flagship Award; the study focuses on sexual violence and mental health interventions in higher education institutions.

ADAPTABILITY TO OPPORTUNITIES AND CHALLENGES POSED BY THE COVID-19 PANDEMIC

In keeping with the SAMRC priorities, RCD has funded COVID-19-related research through its programmes, specifically the RCDI and the Bongani Mayosi National Health Scholars Programmes. RCD beneficiaries are currently involved in the following COVID-19-related research projects:

- SARS-CoV-2 drug discovery using in silico screening and cell-based virus assays to identify novel antiviral compounds: Prof. Megan Shaw (UWC).
- Highly Sensitive Electrochemiluminescent Microfluidic Integrated SARS-CoV-2 Diagnostic Aptasensor Chips: Dr. Keagan Pokpas (UWC).
- The South African COVID-19 Surgical Outcomes Study (SACSOS) – A patient-centred research project piloting digital health at a micro-level: Prof. Hyla-Louise Kluyts (SMU).
- “A national study of injury-related mortality during the COVID-19 pandemic in South Africa with a focus on female and child homicide: Dr. Ardil Jabar (UCT).
- The Influence of Soil-Transmitted Helminth Coinfections on Coronavirus Disease 2019 (COVID-19) Outcomes: MicroRNA and Immune Profile Studies: Roxanne Pillay (MUT).
- Association of gut microbiota, immunity and glycated haemoglobin (HbA1c): A case-control study among type 2 diabetes Mellitus patients with or without COVID-19 in South Africa: Sara Pheeha (SUN, BM-NHSP).

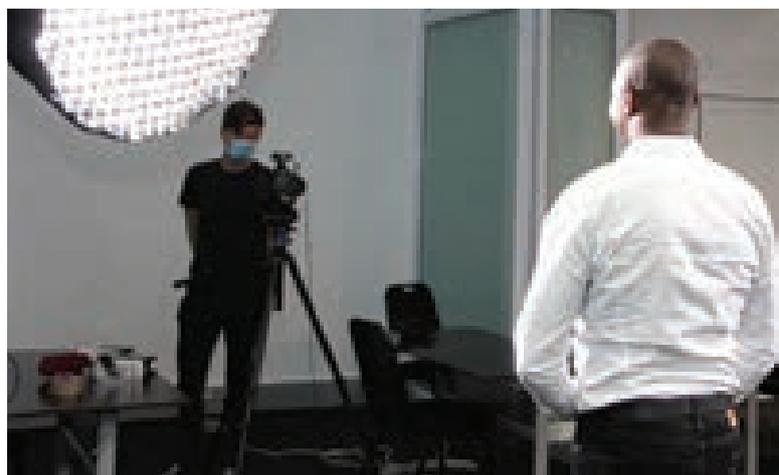
- Interactions between COVID-19 and Tuberculosis: Dr. Jane Shaw (SUN, BM-NHSP).
- SARS-CoV-2 antibody Kinetics in adults and Pregnant women by HIV status after natural infection: Ms Mashudu Mavhungu (WITS, BM-NHSP).
- Establishing gaps in South African healthcare worker knowledge of dolutegravir interactions and designing and testing a COVID-friendly, WhatsApp-based intervention to close the gaps: Ms Briony Chrisholm (UCT, BM-NHSP).
- Favourable outcomes in drug-resistant tuberculosis patients receiving bedaquiline: outcomes and transmission dynamics in the era of COVID-19: Dr. Susanna Oelofse (UCT, BM-NHSP).
- SAMRC Postdoctoral Fellow receives young scientist awarded research excellence for early career <https://www.samrc.ac.za/news/samrc-young-scientist-awarded-research-excellence-early-career>.
- SAMRC Postdoctoral Fellow receives the SAMRC Intramural Early–Mid Career Researcher Flagship Award <https://www.samrc.ac.za/news/three-year-study-focus-sexual-violence-and-mental-health-interventions-higher-education>.

REIMAGINING RCD WORK AND APPROACHES DUE TO COVID-19

The COVID-19 pandemic has tested the scientific community in unprecedented ways, such as moving all the conferences and workshops to online platforms, communication of scientific discoveries and mental health of researchers. The innovative approaches used by the scientific community to cope with the pandemic presented an opportunity to reimagine what the future of research might look like and what we need to do to build an appropriately skilled and globally competitive pipeline of researchers. Moreover, COVID-19 has placed science at the centre of every conversation, amplifying the social and economic value of research and highlighting the importance of bridging the communication gap between scientists and the public. This necessitates a more holistic approach to funding capacity development. Therefore, RCD has taken the approach not only to focus on developing research core skills but also to equip the next generation of researchers with soft skills competencies needed for the 21st-century challenges. In this financial year, RCD organised a series of science communication workshops and plan to introduce more value-add soft skills development courses in the next financial year. RCD assisted with Cochrane Systematic Review Virtual Workshop, mainly an introductory training for HDI's principal investigators. RCD also organised a science communication workshop with the partnership of Jive Media Africa, mainly virtually, for RCD funded PhD students.

RCD PROGRAMMES IMPORTANT MEDIA COVERAGE 2021/22

- SAMRC Mid-Career Scientist bringing public health and bioinformatics closer together <https://www.samrc.ac.za/news/samrc-bioinformatics-unit-rolls-out-data-analytics-training-genomic-surveillance-support-sadc>.



Filming of the Research Spark Tall of Siphwe Ndlovu, WITS PhD candidate funded under the Bongani Mayosi National Health Scholars Program.



SAMRC funded scholars attending an online training session on innovative ways of communicating research to wide audiences.



SAMRC STRATEGIC RESEARCH PROGRAMMES

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 (IRU) | 6 | Hypertension and Cardiovascular Disease Research Unit (ERU) |
| 2 | Non-Communicable Diseases Research Unit (IRU) | 7 | Microbial Water Quality Monitoring Research Unit (ERU) |
| 3 | Environment and Health Research Unit (IRU) | 8 | Centre for Health economics and Decision Science-Research Unit (ERU) |
| 4 | Rural Public Health and Health Transition Research Unit (ERU) | 9 | Risk and Resilience in Mental Disorders Research Unit (ERU) |
| 5 | Masculinity and Health Research Unit (ERU) | 10 | Antimicrobial Resistance and Global Health Research Unit (ERU) |

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



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

OVERVIEW

The SAMRC Alcohol, Tobacco and Other Drugs Research Unit (ATODRU) aims to reduce harm related to alcohol, tobacco and other drug (ATOD) use, by: assessing the prevalence, consequences, risk and protective factors for ATOD use; designing and evaluating appropriate interventions to prevent and treat ATOD use and co-occurring problems; strengthening the health system to facilitate implementation of evidence-based scalable interventions and improve standards of care; undertaking methods research; building capacity to conduct ATOD use research through mentoring, supervising masters and PhD students, teaching and other activities; facilitating the implementation of research findings by supporting advocacy efforts; as well as enabling policy makers and others to make informed decisions by providing relevant, accurate and up-to-date scientific information.

Particular areas for research, innovation and development during the reporting period included:

- an online survey of treatment centres to determine changes in the number of substance use disorder (SUD) treatment episodes provided during the height of the COVID-19 pandemic and treatment providers' perceptions of the impact of COVID-19-related restrictions on people with SUDs and the delivery of SUD treatment services.
- a study using Facebook to assess changes in drinking patterns during COVID-19.
- developing and piloting an innovative recovery focused intervention for people with severe co-morbid mental disorders and SUDs.
- the start of a randomised controlled trial (RCT) with young couples to assess the efficacy of a biobehavioural intervention to link individuals to ART or PrEP utilising a status neutral approach, as well as addressing stigma around HIV and substance use to improve healthcare for young couples.
- a study using RDS to determine how methamphetamine and Mandrax affect TB disease, including the rate of TB exposure, risk of disease progression, and disease burden.
- a methodological evaluation of the applicability, utility, and comparability of tools to measure cultural competency in a large cluster trial conducted in the unit.
- a study with pregnant and lactating women who drink alcohol to develop and evaluate a technology-based behavioural intervention to reduce maternal alcohol use incorporating biochemical alcohol monitoring, contingent financial incentives, text-based health promotion messaging, and referrals.

COVID-19 related research and development

The South African Community Epidemiology Network on Drug Use (SACEUDU) study

The study expanded its focus to investigate how COVID-19 disrupted access to substance use treatment. This included an online survey of treatment centres to monitor changes in the number of treatment sessions provided during the pandemic, and treatment providers' perceptions of the impact of COVID-19 restrictions on people with substance use disorders (SUDs). The results of this research were published in *Substance Abuse Treatment, Prevention and Policy* (2022). We also worked with international collaborators to investigate changes in drinking patterns during COVID-19, the results of which were published in *International Journal of Environmental Research and Public Health* (2022).

The Siyakhana C study

The study explored the impacts of COVID-19 health system changes on behavioural health among people living with HIV/AIDS (PLWHA). Project TRUST (The Impact of Alcohol Consumption on TB Treatment Outcomes) study included questions about the impact of COVID-19 on alcohol and tobacco use during periods when these substances were banned in a tuberculosis treatment cohort together with international collaborators. The findings were published.

The TOTAL (Transmission of Tuberculosis Among illicit drug use Linkages) Study

The study, which began recruitment in 2021, included the collection of COVID-19 serology and the Couples Health CoOp Plus (CHC+) project conducted qualitative research with stakeholders and young couples on the pandemic's impact on relationships and substance use during the formative work conducted in preparation for the larger RCT study.

Staff in the unit analysed secondary data on unnatural deaths and trauma to assess the effects of the temporary liquor sales bans implemented during 2020 and 2021 and found a clear correspondence between the sales restrictions on alcohol and reductions in trauma and unnatural deaths, with significant changes in the other direction when those restrictions were lifted; findings were published.

ATODRU continues to actively engage in methodological research related to clinical trials, contributing to the ongoing development of trial reporting standards. We published a paper describing the challenges posed by COVID-19 for an ongoing randomised feasibility trial of a psychological intervention for adolescents in Cape Town and the strategies employed to facilitate trial continuation.



Prise Peer support training.

We collaborated with a large international team to publish the CONSERVE (CONSORT and SPIRIT Extension for RCTs Revised in Extenuating Circumstances) Statement providing guidance for reporting trials and trial protocols that undergo important modifications in response to extenuating circumstances such as the COVID-19 pandemic.

Reimagining research in a time of COVID-19

Adjustments were made to facilitate staff management and re-organisation of work, including utilising information and communication technologies (ICT) for meetings and document sharing, procedures to ensure social distancing at work, and where possible ensuring staff maintained direct contact with one another to promote cohesion and teamwork. Rapid adjustments were made to research protocols to ensure project continuation. This entailed using ICT for remote data collection, modifying study designs (e.g., moving from focus groups to individual interviews), using alternative strategies (e.g., social media) to recruit participants, and implementing safety procedures for field workers.



Research interns (1–3 from the left) and PhD student (last from the right) with Dr. Egbe during the Beta ATIM SMU course.

Advancing research through collaborations and partnerships

The unit has a wide network of strong and established collaborative working relationships with academic and research institutions, service providers, government departments, and other stakeholders. These existing collaborations were maintained and strengthened during the reporting period. Examples of existing collaborations that were maintained include:

- Collaborations with service providers providing treatment for substance use disorders (including government departments and NGOs), primary health care facilities, and the Department of Health.
- International universities, including Massey University (New Zealand).

New collaborations were established during this period with:

- Researchers/clinicians working in the area of trauma at UCT and Stellenbosch University.
- Colleagues within the SAMRC working in the area of non-natural deaths to assess the impact of the temporary liquor sales bans.
- City of Cape Town HAST services, as part of the Couples Health CoOp Plus (CHC+) project.

- Western Cape Department of Health and other community organisations (e.g., SATVI) as part of the TRUST (The Impact of Alcohol Consumption on TB Treatment Outcomes) study
- An NGO serving the homeless population in Cape Town to evaluate and assess linkages between homelessness and ATOD use to improve data collection and record-keeping.

Capacity Development and Transformation

Staff in ATODRU have been encouraged and supported to supervise masters and PhD students. Several ATODRU staff graduated with PhDs.

We also hired a senior staff member with a disability. We continued to build research capacity through our HPCSA accredited research psychology internship programme for graduates with Masters degrees. ATODRU staff were further exposed to additional capacity development opportunities in areas such as journal writing, systematic reviews, good clinical practice and ethics training, project management, database management, qualitative research methods, protocol development, knowledge translation, and minute taking and meeting management. In addition, staff are encouraged to attend facilitated monthly journal club meetings during which staff actively engage in the research enterprise with particular attention on developing critical thinking regarding robust research methods.

Science Citizenship and Stakeholder Engagement

Staff in ATODRU serve on several national and international committees/bodies including but not limited to the United Nations Office on Drugs & Crime, World Health Organization and SANCA National.



ATODRU Delft: Maternal Alcohol Reduction in South Africa (MaRISA Study) Field Activities.

SAMRC/UCT RISK AND RESILIENCE IN MENTAL DISORDERS RESEARCH UNIT



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

OVERVIEW

The Risk & Resilience in Mental Disorders focuses on mental health. There is growing awareness of the high prevalence and costs of mental health conditions; these conditions contribute to a significant proportion of the global and local burden of disease. Furthermore, as we successfully combat infectious diseases, so we can expect that the contribution of non-communicable diseases, including mental disorders, will continue to increase. There is also an important need to transform health services to address mental disorders. 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. Our work ranges from basic neuroscience to clinical research, as well as 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, to transform services. In order to elevate the quality of our work, we also collaborate widely across the country, continent, and globe.

COVID-19 related research and development

Our work on COVID-19 has been comprised of three different aspects. Firstly, we have participated in a number of published expert consensus statements on the mental health implications of and response to COVID-19. We have argued that conceptual models of mental health in the aftermath of COVID-19 should focus less on trauma and more on resilience, and that a precision public mental health response is needed. We have also emphasised the value of digital mental health platforms during this time.

Secondly, as most work on the mental health associations of COVID-19 has been cross-sectional, we conducted a longitudinal analysis of mental health symptoms in university students, comparing data pre vs post-COVID-19 data. These data found that University students have not had a significant increase in prevalence of mental disorders during COVID-19, consistent with our emphasis on resilience.

Thirdly, as most research on mental health associations of COVID-19 has been undertaken in high income countries, we focused on the social determinants of depression during COVID-19 in South Africa. We found a close relationship between food insecurity and depression related to COVID-19 in our context; we concluded that it is important not to “medicalise” or “psychiatrise” depression in the context of the epidemic, as it has roots in poverty-related factors.



A meeting held between our Addictions Technology Transfer Centre (ATTC) (PI-Prof Goodman Sibeko) and the Central Drug Authority of South Africa.

Reimagining research in a time of COVID-19

We have conducted research on the mental health aspects of the COVID-19 epidemic. However, we did not want to lose the thrust and focus of our main research interests. Continuing with our work, with business as usual, during COVID-19 was, however, not possible. We had to be flexible and creative, and by using such innovations as assessments by telecon, were however able to continue with much of our work.

Capacity Development and Transformation

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. First, this is increasingly seen in the profile of our students, postdoctoral fellows, and staff. Second, examination of the achievements of past mentees of the unit indicates that many black researchers who have been members of our team 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).

Advancing research through collaborations and partnerships

Most of our projects are done in collaboration with a range of stakeholders, including collaborators at other institutions, policy makers in Provincial or National structures, and patients and their communities. As above this work ranges from basic research (often done with collaborators at other institutions), through to clinical research (often done in collaboration with decision-makers in the clinical space), through to epidemiological and public health research (often done in collaboration with communities).

Impactful Research Translation

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. 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. Finally, through our work with the National Dept of Health on a number of issues e.g., in recent years we led the development of guidelines for medically assisted therapy for opioid dependence. Our work in collaboration with the World Health Organization, which includes several projects, involves classification and assessment of psychiatric disorders.

NON-COMMUNICABLE DISEASES RESEARCH UNIT



Prof Andre Pascal Kengne Unit Director
andre.kengne@mrc.ac.za

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 control of non-communicable diseases (NCDs), with a major initial focus on cardiovascular and metabolic disorders in South Africa (SA). The research of NCDRU is organised into cross-cutting programs targeting determinants of NCDs as well as specific NCDs. Disease oriented research programs currently focus on cardiometabolic diseases (CVMD) and chronic kidney diseases (CKD). Determinant-oriented research programs focus on lifestyles and behavioural risk factors such as unhealthy diets, physical inactivity and smoking; ethnicity and NCDs; genetic, epigenetic and other emerging determinants of NCDs. Innovation in the work of NCDRU focuses on developing and testing locally appropriate screening, detection and control solutions for NCDs, with priority given to solutions that are amenable to implementation in community-based settings, and particularly in underserved communities. These include solutions delivered using lay health personnel (community health workers [CHW]) as implementers or using mHealth applications. NCDRU has for instance developed a CHW-led package of intervention for community-based diabetes risk screening and reduction in underserved communities in SA and is currently testing the effectiveness of Short Message Service (SMS) text messaging to improve the uptake and adherence to hypertension medications by people living with HIV and co-morbid hypertension.

COVID-19 related research and development

The major COVID-19 related research done by NCDRU, and which is still in progress, has been in the context of a contribution to a multi-country study to explore the status of NCDs care during the COVID-19 pandemic. The project is implemented in 13 countries including South Africa, Morocco and Kenya in Africa, and aims to investigate the perceptions of key stakeholders such as public health officers, health policy makers, health workers and patients with NCDs, on their needs and expectations of NCD care during the COVID-19 pandemic, to determine health system preparedness for NCD care in



Woman having her metabolic rate and fuel metabolism measured.



Participant having an MRI scan to measure liver, muscle and pancreatic fat content.



NCDRU Wellness day event 2022.

pandemics. More specifically, the study is collecting key stakeholder perceptions on existing NCDs care, support and services during the COVID-19 pandemic; identifying the unmet needs during and recommendations of key stakeholders for the COVID-19 pandemic; and will propose recommendations to improve quality of service/management for patients living with NCDs during the COVID-19 pandemic. The South African arm of the study is supported by baseline fundings of NCDRU.

Reimagining research 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. We have had to quickly learn how to perform most of our activities remotely and in particular using online approaches. These have included adoption of online meetings, conferences, and increasingly online administration of research questionnaires. We are also gradually adopting mobile clinics as an asset for recruitment of participants for research in the context of limited space in health facilities, but also for community-based recruitment of participants when they cannot access health facilities due to COVID-19-related restrictions. Finally, the interrelations between COVID-19 and NCDs are reinforcing the focus of our research on NCD prevention.

Capacity Development and Transformation

NCDRU has graduated PhD and Masters students. Furthermore, the unit has continuing PhD students and hosts one mixed-ancestry female NRF intern and female postdoctoral fellows. The unit has appointed 4 new staffs during the financial year under consideration including three African females and one mixed-ancestry male.

Science Citizenship and Stakeholder Engagement

NCDRU staff are members of many committees, attended conferences and workshop.

Impactful Research Translation

The research conducted by NCDRU is regularly published in peer-reviewed journals, including in high impact journals. Unit staff members have made appearance at virtual and face-to-face national and international conferences/seminars to present their work. For instance, Prof. Peer gave an oral presentation at the virtual joint ESH/ISH conference in April 2021 on the comparative performance of 5 estimator of kidney function to diagnose chronic kidney disease (CKD) in African populations. Prof. Goedecke gave an invited lecture at the South African Heart Virtual Conference in October 2021 on the pathogenesis



of type 2 diabetes in Black Africans. Dr. George gave a keynote lecture at the Cardiometabolic Health & Diabetes Africa Congress 2022 on CKD Africa Collaboration, which is an NCDRU-led initiative to improve the study of the epidemiology of CKD in Africa. Prof. Mchiza who joined the unit during this financial year made key presentations at important meetings including the Food Environment Research Network (FERN) Meeting in November 2021 (<https://summitdialogues.org/dialogue/6387/>) and the Food Marketing network meeting in March 2022, where she shared her research activities with the regional food and nutrition expert network organised by the UNICEF. The Unit Director gave a lecture on the African perspective on CVD epidemiology research in the post-COVID-19, in contribution to a symposium on CVD organised at the World Congress of Epidemiology in September 2021. He was further a co-contributor to the GE Healthcare podcast on the impact of COVID-19 pandemic on NCDs in South Africa (<https://pod.link/vitalvoices>).

NCDRU scientists have contributed to guidelines drafting, issued policy briefs and press releases, developed manuals and curriculum material for NCDs; and our work continues to be cited in clinical practice guidelines. Prof. Mchiza contributed in the guidelines to regulate Facebook food advertisements that are High in Fat, Sugar & Salt. She further took part in the Department of Social Development: Government – distribution Hybrid Model roundtable – to address poverty and hunger in South Africa especially the critical human need as a country dealing with the COVID-19 Pandemic. Our Specialist Scientist Dr. Jillian Hill co-organised the world diabetes day celebration to the benefit of SAMRC employees and their families at Meerendal Estate, with activities including communication on healthy lifestyles, diabetes risk screening and physical activity.



World Diabetes Day, Meerendal Estate.

ENVIRONMENT & HEALTH RESEARCH UNIT



Dr. Renee Street Interim Unit Director
rstreet@mrc.ac.za

OVERVIEW

The Environment & Health Research Unit (E&HRU) conducts research geared towards eliminating or reducing environmental hazards to health, especially in the most vulnerable or marginalised communities. This is achieved by identifying and characterising existing and emerging environmental risks to the health of the South African population, in support of evidence-informed decision making in public health. We also strive to design and evaluate interventions aimed at promoting health and preventing diseases of environmental origin. Our primary research focus areas are (1) persistent toxic substances, (2) climate change and health and (3) wastewater surveillance and research.

COVID-19 related research and development

- E&HRU conducted an online and telephonic survey to assess changes in fuel use behaviours and patterns affecting Household Air Pollution (HAP) exposure and HAP-related respiratory outcomes during COVID-19 Lockdown Levels 4 and 5. Among 2,505 participants, most used electricity but some did change to 'dirty fuels' such as paraffin and wood. 30% of participants also reported exposure to environmental tobacco smoke in the home.
- E&HRU is a key role player in SARS-CoV-2 surveillance at wastewater treatment facilities around the country. This programme grew from a small pilot project into

a multidisciplinary programme that now spans six provinces, provides timeous information to local authorities and other stakeholders on the distribution of COVID-19 and involves multiple disciplines across a range of sectors. Please see further details under the wastewater surveillance and research (WSARP) programme.

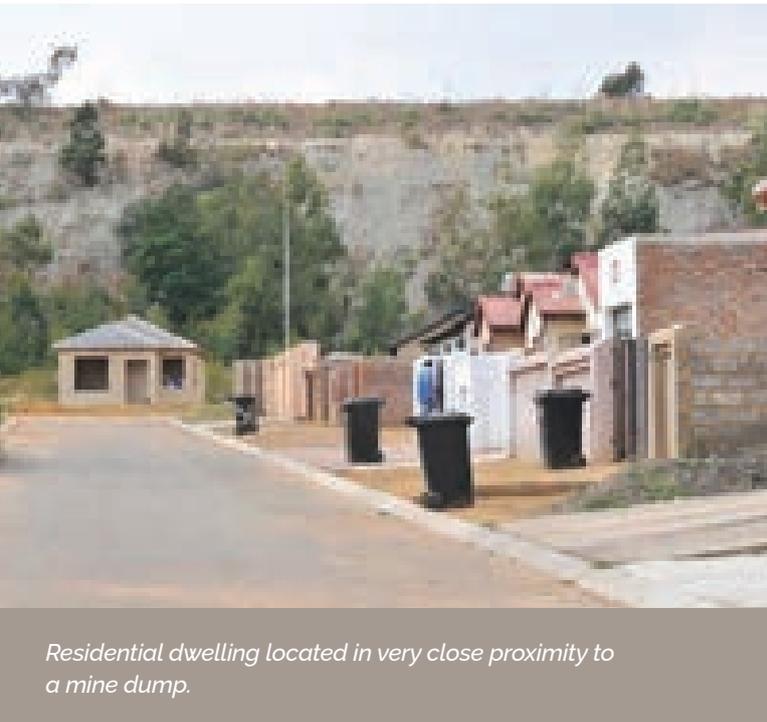
Bridging other research gaps

We initiated COVID-19 studies to support the pandemic response, and this has led to new and innovative research such as wastewater surveillance.

Reimagining research in a time of COVID-19

Regarding our E&HRU projects, during the past year, staff had to be agile and have contingency plans for fieldwork during a COVID-19 epidemic wave. The mandatory COVID-19 vaccination initiative led to thought provoking debates around reasons for getting or not getting vaccinated. Colleagues shared personal, religious or cultural perspectives which helped us better understand the diverse viewpoints across the SAMRC.

South Africa has a history of mining, the consequence of which has been the interspersed of mining operations and human settlements, with implications for human exposure to toxic substances and health, as well as social impacts studies within the E&HRU are underway.



Residential dwelling located in very close proximity to a mine dump.

Capacity Development and Transformation

The E&HRU has always had a balanced approach between supporting and understanding both IQ and EQ. Staff have personal development plans and continually strive for self-improvement on both personal and professional areas of growth.

Advancing research through collaborations and partnerships

As a matter of principle, we always collaborate with internal and external stakeholders. For example, in our mining and health study, our key stakeholders include ward councillors, community organisations, local universities and international organisations. Further examples are provided in the WSARP programme. To support evidence-informed environmental and management policies, which will in turn lead to healthier populations, with greater prospects of reaching their full potential in life. Specifically, we are working towards generating the evidence to support the institution of minimum, basic, mandatory buffer zones between future mining operations and human settlements throughout South Africa. Our current research includes characterising human exposure to uranium in communities close to mining sites. Aspects of this work are being done in collaboration with the WHO International Agency for Research on Cancer (IARC).

Science Citizenship and Stakeholder Engagement

During the reporting period, staff members of EH&RU collectively served on many committees.

Impactful Research Translation

In South Africa, there is limited information available on dust storm patterns, with a key reason being the lack of a detailed, long-term national system of data collection on dust storms. This database is needed to assess changes in the frequency, severity and distributions of dust storms in the country. Further research and information are needed to inform evidence-based policies related to dust storms and health. In the meantime, it is important to communicate to the public how to protect themselves during dust storms. As a starting point, E&HRU, in partnership with the National Department of Health and the Department of Forestry, Fisheries and the Environment, compiled basic health protection steps to take during dust storms.

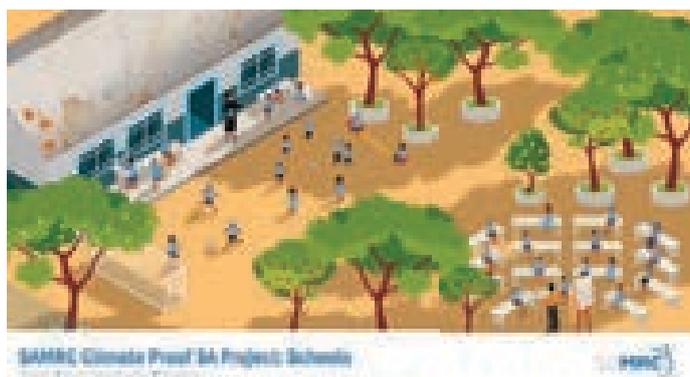
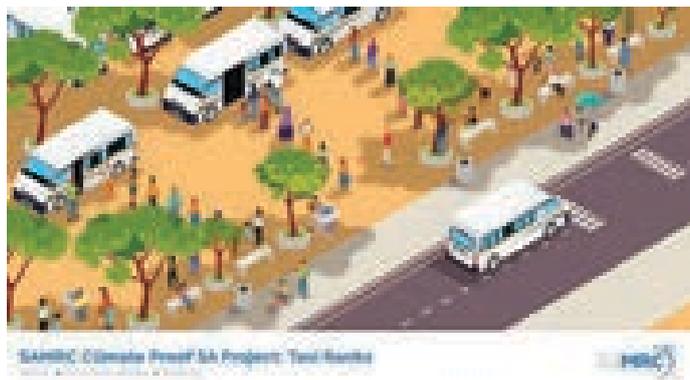
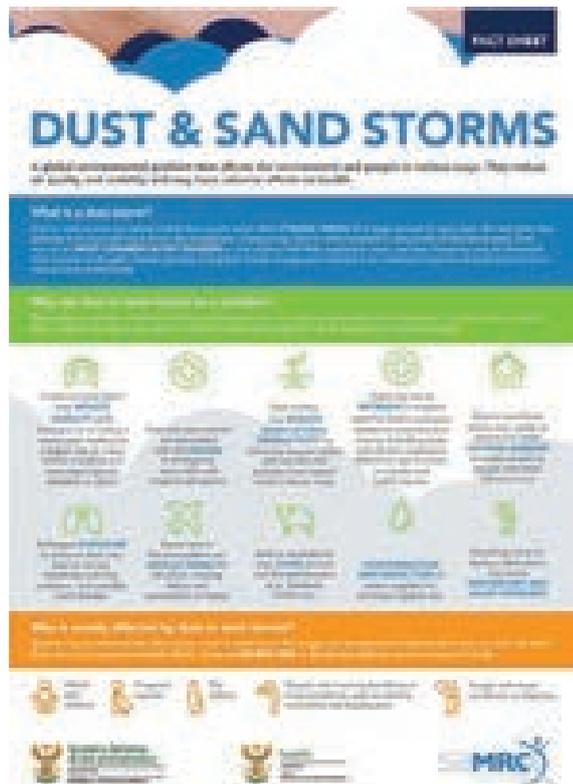


Waste water surveillance and research (WSARP) programme. Lab processing passive samples.

E&HRU has undertaken a visioning exercise to support the identification of interventions to reduce the climate-change related risks of exposure to rising heat and heatwaves, especially in settings of poverty. We have specifically focussed on the interventions that might be implemented in schools, taxi ranks and clinic or hospital settings. We are now working toward evaluating the impact of these interventions on heat exposure, and the associated health impacts, especially in the most vulnerable groups – children and the elderly.

E&HRU has also continued to support the efforts of the National Department of Health in strengthening regulations to control the use of lead in paint, and in the implementation of the national lead exposure reduction strategy.

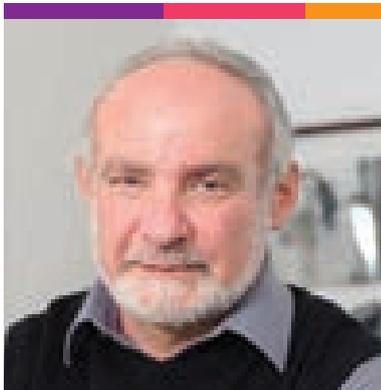
We have also been working with the Department of Forestry, Fisheries and the Environment to create awareness of, and reduce exposure to, toxic metals.



SAMRC Climate Proof SA Project: Clinics



SAMRC/WITS RURAL PUBLIC HEALTH AND HEALTH TRANSITION RESEARCH UNIT



Prof Stephen Tollman Unit Director
Stephen.Tollman@wits.ac.za

OVERVIEW

The MRC/Wits Rural Public Health and Health Transitions Research Unit (Agincourt) is a globally recognised health, population and development research initiative based on a high-functioning longitudinal research platform established in 1992. Now celebrating 30 years, the unit conducts ground-breaking research across the life-course, focusing particularly on adolescent and older adult stages; is highly productive, producing many publications annually over the past 5 years; is committed to sharing public access datasets; and engages with local, provincial/national, and regional and global stakeholders in research translation. Situated in resource-poor rural environments, the unit undertakes community-oriented research to elucidate causal pathways, test interventions across the life-course, inform health and social systems, and strengthen evidence to guide policy and programmes.

Research seeks local and national relevance and impact, while interacting with and contributing to important regional and global questions. Influencing our priorities and the conduct of research are long-standing, respectful relationships with local communities; a future-oriented longitudinal perspective; and empirical findings that capture changing health and social dynamics. Work is underpinned by a health and socio-demographic surveillance system platform (HDSS), covering a whole population cohort of approximately 117,000 persons in 31 adjacent villages, and involving ongoing monitoring of all vital events: births, deaths, in- and out-migrations.

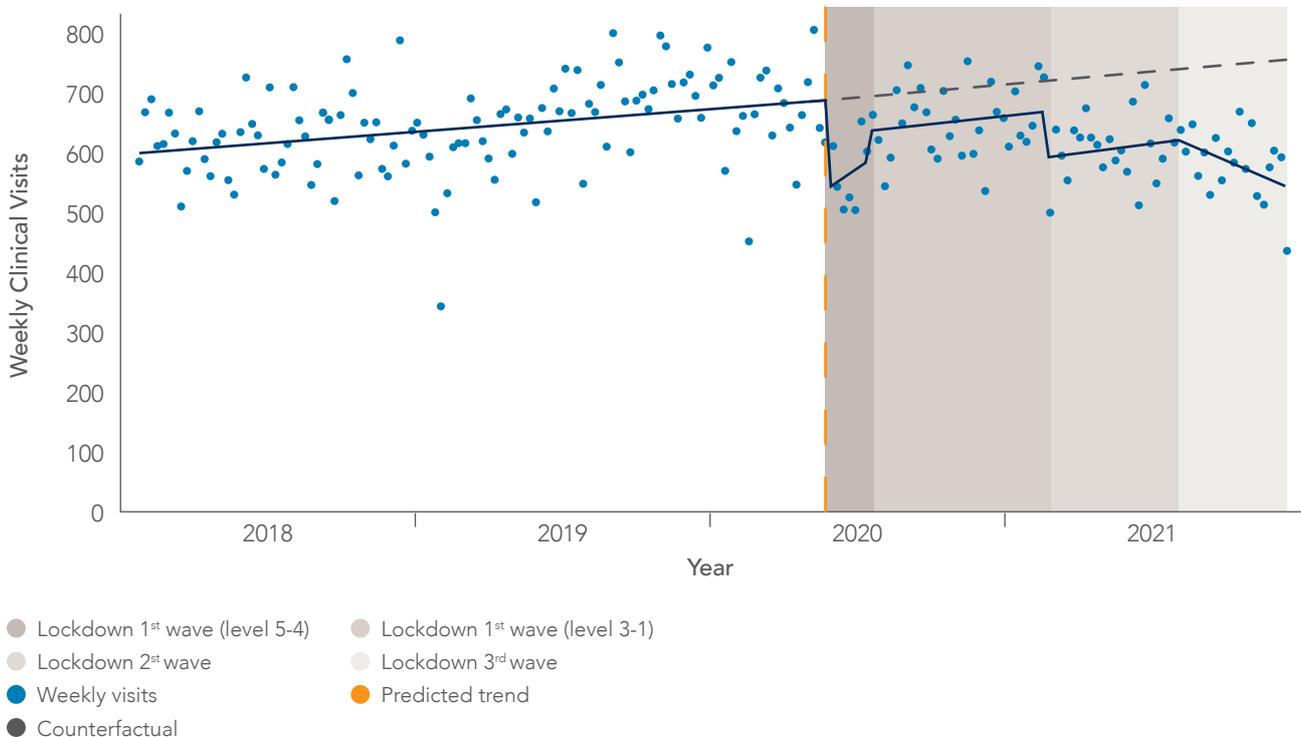
This population-based data is linked to clinic and district hospital records. Together, this provides an exceptional longitudinal platform for observational and intervention research along the life course, with special focus on children (respiratory infections), adolescents (HIV/AIDS, depression, NCD risk) and older adults (multi-morbidity, cognitive change). Focus on socio-environmental exposures (education, labour migration, socioeconomic status, natural resources, food security) interact with an emphasis on behavioural and physiological risk.

COVID-19 related research and development

- In rural Agincourt/Bushbuckridge, the delayed emergence of COVID-19 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.

- The Unit's longitudinal data platform and infrastructure enabled the unit to rapidly respond to the urgency of challenges posed by the COVID-19 pandemic, repurposing existing studies and tackling new questions that serve the national response and contribute the rural dimension – often otherwise missing – to the national picture.
- The unit's COVID-19 response, initiated within the first few months included: health systems R&D; analyses of HDSS and complementary data to provide evidence for decision-making; epidemiology on community burden and transmission dynamics of SARS-CoV-2 in a rural setting; and social, behavioural and economic impacts during and post-lockdown to guide local and provincial programmes and national policy. Linkage of the population platform to clinic and hospital records enabled the introduction of "dashboards" as a basis for decision-making and resource deployment by clinical and service leadership.
- By adding a COVID-19 module to the health and socio-demographic surveillance system (HDSS), capitalising on the HDSS-clinic-hospital link and SAPRIN* network, and conducting studies with key partners, we have illuminated facets of the pandemic in rural communities:
- COVID-19 screening module (added to HDSS update rounds): spectrum of illness, risks and comorbidities; non-pharmaceutical interventions.
- Prospective household study of SARS-CoV-2, transmission dynamics and viral interaction (PHIRST-C): extent and transmission of SARS-CoV-2, including asymptomatic infection.
- Social-behavioural-economic survey: impact of lockdown and post lockdown on rural communities.
- Measuring unanticipated opportunity costs of South Africa's COVID-19 response for children, mothers and people living with non-communicable diseases (MOCCA): burden of COVID-19 on clinic and hospital utilisation.
- Extending the HAALSI ageing cohort to address long-term cognitive impacts.
- Multi-centre study on excess mortality: quantifying excess mortality due to COVID-19 (direct and indirect) in several sub-Saharan African and South Asian settings, including three established SAPRIN nodes.
- 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.

Hypertension, 2018-2021



Reduction in clinic visits for hypertension across levels of lockdown and COVID-19 waves, Agincourt (under review)



Data collection during SARS-CoV-2 transmission studies: employing COVID-19 safety precautions .

Reimagining research in a time of COVID-19

The Unit rapidly redeployed its resources to mount a responsive portfolio of research and address pressing COVID-19 questions on the rural burden and experience of COVID-19. Since data collection for the platform and nested studies was largely field-based and had to be suspended temporarily, the emergence of COVID-19 required new data collection approaches which the unit embraced. In April 2020, a recently established call centre was rapidly expanded from 11 to 24 stations to conduct telephonic surveillance at scale, including TeleVA (telephonic verbal autopsy), surveys and cohort follow-up. The PHIRST-C** study to characterise community burden and transmissibility of SARS-CoV-2, conducted field-based data collection, requiring rigorous non-pharmaceutical interventions, PPE and hygiene protocols.

Capacity Development and Transformation

Clear leadership unified and led a team of capable researchers and administrators to rapidly repurpose the Agincourt population research platform. The call centre was expanded to increase our capacity for telephonic surveillance and surveys, hence leveraging the platform to host several COVID-19 community studies and build capacity within the unit’s data section. We reached out to local health services to offer staff and managers COVID-19 training and support, as well as working with schoolteachers and principals. Research data generated from COVID-19 studies were timeously used to strengthen district, hospital and clinic services to guide priorities, and focus investments where staff and equipment were most needed. Finally, interactions between the Public Engagement team and community stakeholders built capacity around the implementation of appropriate non-pharmaceutical interventions in a rural environment, such as construction of a ‘tippy tap’.



Data Managers participating in an MRC/Wits-Agincourt Research Unit-led multinational initiative on Excess Mortality, met at the School of Public Health, University of Witwatersrand for a data preparation workshop.



Community members using a 'tippy tap' in Agincourt: dispensing soap and water in areas with no running water.

Advancing research through collaborations and partnerships

All the projects were undertaken with key partners: National Institute for Communicable Diseases is the lead partner on the Prospective Household study of SARS-CoV-2, Transmission dynamics and viral interaction (PHIRST-C). Socio-behavioural-economic survey is a partnership with the University of Edinburgh, UK and the University of North Carolina, USA. Measuring unanticipated opportunity costs of South Africa's COVID-19 response for children, mothers and people living with non-communicable diseases (MOCCA) is a partnership with an extramural sister unit, the SAMRC/Wits Centre for Health Economics and Decision Science (PRICELESS SA). Effects of COVID-19 on cognitive performance over the longer term is based on a long-standing partnership with the Harvard Center for Population and Development. The multi-centre study on excess mortality, funded by the Bill and Melinda Gates Foundation, involves 14 health and demographic surveillance sites/centres and 4 CHAMPS-HDSS sites from 9 sub-Saharan African and 2 South Asian countries. Working closely with the Ehlazeni District Department of Health's COVID-19 Outbreak Response committee (including primary care coordination), we supported district planning, decision making and content creation. With the district DOH, we co-created locally adapted clinical guidelines, SOPs relating to COVID-19 (Occupational Health and Safety, Use of PPE, Infection Prevention Control and others), and organisational systems for COVID-19 preparedness (e.g., screening forms, triage advice, setting up of isolation wards, procurement of PPE and essential equipment) for district hospitals and clinics. We supported implementation of these systems in the Bushbuckridge subdistrict at Tintswalo, Matikwana, and Mapulaneng Hospitals. Working with district and sub-district Primary Health Care services we supported the training of hospital and clinic staff in correct use of PPE, COVID-19 testing techniques, Infection Prevention and Control measures, and supported their primary care facilities. Data Monitoring systems were established with local hospitals and clinics to quantify patient presentations, monitor PPE usage, and track patient results. The Unit was invited to join the Local Joint Operations Council (LJOC) to support the local municipality, creating opportunity to engage local schools and assist with training of teachers and principals to better prepare their facilities.

Impactful Research Translation

Work on SARS-CoV-2 and COVID-19 speaks to multiple stakeholders in rural environments. Foremost are local communities and their leaderships (civic and traditional), together with district health leaders and clinical/community care services (covering 3 district hospitals, >40 clinics, and a population close to 1 million). In communities, we focused on setting an example – and specifically for the few hundred staff of the unit, most of whom reside in local communities, to role-model aspects of non-pharmaceutical interventions (NPI). A key aspect was working with traditional healers, their use of PPE and PPE use by their clients/patients; with a trial-evaluation currently underway.

The VAPAR programme provided sustained support to community health workers – devising training and empowerment approaches now being applied with CHWs across Bushbuckridge. For local and district health system leaders/managers, our focus continues to be upskilling these personnel to apply data in response to direct COVID-19 impacts, while grasping the indirect ‘opportunity costs’ to chronic care; and strengthening core functions of decentralised health systems. Unit staff played pivotal roles supporting health sector strategic planning and implementation, while advising on support to the many non-clinical staff. Worth adding, following emergence of the Omicron variant and restricted travel, Xavier Gómez-Olivé, reader and epidemiologist, gave multiple interviews to mainstream media in Catalonia, Spain, and Colombia, responding to immense interest regarding COVID-19 in South Africa.



Kathy Kahn presenting on verbal autopsy methods.



Taking healthcare to SASSA queues: Pensioners being screened for hypertension while queuing for social grants.



PPE use training for traditional healers Agin court.



Sammy Khagayi Kenya Medical Research Institute (KEMRI).

SAMRC/UNISA MASCULINITY AND HEALTH RESEARCH UNIT



Prof. Ashley van Niekerk Unit Director
Ashley.vanNiekerk@mrc.ac.za

OVERVIEW

The Masculinity and Health Research Unit (MaHRU) is an SAMRC EMU located at the University of South Africa (Unisa), the first of its kind. It has the mission of engaging men and boys toward positive health outcomes for themselves and others. The strategic goal of the unit's research is grounded in the understanding that, globally, men tend to have a shorter life expectancy than women and are disproportionately involved in injury and violence as victims and perpetrators and are less likely to access healthcare than women. MaHRU's overall objective is to host research that contributes towards understandings of the contribution of boys, men, and masculinities in health, and how best to engage men and boys toward improved health outcomes. MaHRU is cognisant of the gender asymmetries in health, with a historical interest in the disproportionate involvement of men in injury and violence. While MaHRU's research portfolio is underpinned by the masculinities theme, its research recognises several intersecting materials, social, and psychological drivers of the country's high rates of injury and violence. The Unit's research is supplemented by an orientation towards community-mobilising interventions, research-based advocacy, and public dissemination. The unit's research aims are therefore to contribute to the prevention of violence and injury. This is through studies on key risks, determinants, and protectors against different forms of injury and violence where boys and men are involved or implicated; the development of methodological tools to assess injury and violence prevalence; studies on prevention interventions; and the mobilisation of support of promotive safety policy.

COVID-19 related research and development

MaHRU is hosted by the Unisa Institute for Social and Health Sciences (ISHS). The ISHS has a long history of research and activism that involves individuals, communities, and organisations – through the ISHS Demonstration Sites – building caring, compassionate, and safe communities.

The ISHS and MaHRU's response to the COVID-19 pandemic included an activism-driven programme of action centred around:

- a research focus on the psychosocial impacts and community responses to the pandemic and consequent control measures, through a national survey on the pandemic and injury and behavioural outcomes.
- strengthened knowledge brokerage activities that included opinion pieces, special journal issues, and social media messaging on safety during the pandemic.
- ongoing safety advocacy and services, through the mobilisation of gender-based violence containment and prevention activities, mobilising and networking for community food security provision, and child and elder home safety measures especially during lockdowns.

In 2021, the national pandemic survey collected data via Computer-Aided Telephonic Interviews. The survey comprised an interviewer-administered questionnaire with data from 2 118 respondents aged 18 years and older. Two papers were presented at the Africa Conference on Transdisciplinarity under the Theme 'Transdisciplinary responses to grand challenges in the COVID-19 pandemic and beyond' and a number of articles were prepared for submission in early in 2022.

MaHRU also supported the online launch of the ISHS's Social and Health Sciences (SAHS) journal, with MaHRU staff presenting on contributions included in the 2020 launch issue of SAHS which had focused on psychosocial and community-centred responses to COVID-19.

Finally, MaHRU staff supported COVID-19 and food relief initiatives in partner Demonstration Site communities that supplemented community-engaged initiatives that disseminated COVID-19 resources. We provided community partners with personal protective equipment, such as masks and sanitisers, and hosted community safety campaigns which focused both on the promotion of COVID-19 hygiene measures and psychosocial support for groups whose vulnerability to violence were heightened during the pandemic.

Bridging other research gaps

MaHRU's Violence Research portfolio concerns itself with the individual-structural nexus of violence and thus represents a critical area of investment within violence research, extending the conventional focus on individual or proximate determinants to incorporate the influence of larger structural systems in shaping formations of violence. Within the portfolio, causes of violence are understood to be multidimensional, interconnected, layered, and are both visible and invisible. MaHRU's violence research agenda is directed toward analysing violence and its prevention using an approach that accounts for the individual and social coordinates through which multiple and interconnected forms of violence manifest in context-specific ways. The Everyday Violence Project is the Flagship Project of this portfolio and examines how violence is lived and felt in people's day-to-day lives; how it relates to broader power systems and structures of violence; how it has been constituted by the global COVID-19 pandemic; and how we might facilitate the affective and material conditions that are able to reduce violence of this kind. In 2021, the project completed its first phase of data collection with analysis and initial write-up of the data.

The Injury Prevention Research portfolio focuses on specific injury prevention niche areas where there is a disproportionate involvement of boys and men. This portfolio follows a social justice approach that draws on public health and social science theories and methods for the conceptualisation and development of community-centred and locally responsive prevention measures. The Burns, Energy Justice and Community Safety is its flagship. It is informed by Africa's preponderance of burns in childhood and elderly populations, and in South Africa also amongst young adult men. In 2021, it drew on past research on burn determinants to inform the development, implementation, and evaluation of the No Paraffin! Campaign, a national safe energy campaign. A Campaign Statement calls for measures to eliminate the domestic use of paraffin and was distributed by the Academy of Science of South Africa (ASSAf) to government departments,

presented at the Department of Cooperative Governance's National Disaster Management Advisory Forum, and the South African Burns Congress in a Keynote Address.

MAHRU's Injury Information, and Monitoring and Evaluation Systems focus on the development of information systems and indicators to guide injury policy and prevention at national, provincial, city, and community levels. Such public health surveillance is key to the reduction of injury from all causes, through the deliverance of data and information that enables quality decision-making and effective, appropriately targeted actions. In 2021, much of this Stream's activities involved the National Injury Mortality Surveillance System (NIMSS). An evaluation of Mpumalanga's Forensic Pathology Services (FPS) user experiences with the manual and automated systems was conducted with FPS management and administrative teams providing in-depth reflections on user experiences of the NIMSS systems, both pre-COVID-19 and during the COVID-19 pandemic. The analysis and write-up of these data is underway.

Reimagining research in a time of COVID-19

In 2021, much of MaHRU's work continued to be constrained by the COVID-19 pandemic and the consequent lockdowns. Despite this, the year was still a successful one that highlighted the (i) adjusted implementation of research through virtual modes; (ii) strengthened community and public engagement again through virtual modes, and (iii) despite the constraints, visible research translation towards policy re-formulation. Thus, the delivery of research activities was adjusted to ensure continued community or public engagement, study implementation, and dissemination. This was illustrated in MaHRU's Burns, Energy Justice and Community Safety Project, which was primarily mobilised through virtual modes. The launch of a Safe Energy Campaign was initiated through a No Paraffin! Campaign Webinar Series, followed by an ASSAf Campaign Statement, Webinar Proceedings, and various stakeholder presentations. The rationale for the Campaign had previously been published in the South Africa Medical Journal (SAMJ).

Capacity Development and Transformation

Postgraduate training and capacitation is a key MaHRU objective. In 2021, Prof. Ashley van Niekerk supervised a number of students with studies on burns interventions, pedestrian traffic safety, and youth violence. These include three University of the Western Cape (UWC) MA students (Wayne Van Tonder, Masego Matsana and Reshmi Wilson), collaboratively supervised with Prof. Rashid Ahmed (UWC Department of Psychology), in an evaluation of a short, animated video intervention on the recovery needs of young burn survivors. These studies provided accounts



Data collection in Strand, Western Cape.

of experiences of this intervention and its suitability as a pre and post discharge recovery intervention. Prof. Van Niekerk also co-supervises Jimmy Osuret whose PhD study (Makerere University) is on the effectiveness of safe pedestrian crossings as used by primary school children in Kampala, and three studies on youth violence perpetration, by Dominique Serfontein whose Unisa MA is a psychobiographical study of a mother who murdered her child, a chronic and violent drug abuser, Benita Titus whose Unisa PHD study is on executive functioning in violent youth offenders, and Ashika Singh whose Unisa PhD is on digital dating violence among adolescents. MaHRU offers selected students an internship (in 2021, Wayne van Tonder was placed in MaHRU) but offered all theoretical, research and methodology workshops, seminars, and colloquia, either offered directly by MaHRU, its host the ISHS, or Unisa. Prof. Van Niekerk, with other MaHRU staff, provided mentoring to a number of students, as well as supervision and skills development, to deepen these students' repertoire of research skills, expand their knowledge base, and strengthen their research capacities. In 2021, much of this mentoring and training support was through virtual modes.

Advancing research through collaborations and partnerships

There was significant collaborative activity in MaHRU in 2021. These were primarily with partnerships that had been developed prior to 2021. However, in a number of MaHRU activities (e.g., in the Burns, Energy Justice and Community Safety's No Paraffin! Campaign) a range of new and important partnerships were formed. MaHRU initiated an important partnership with ASSAf to co-host a No Paraffin! Campaign Webinar, and to facilitate engagement with a multi-sectoral grouping of academics, civic coalitions, as well as government and corporate partners with a specific interest in policy reformulation around energy safety. Webinar speakers included leading international and national experts: Prof. Quarraisha Abdool Karim, Dr. Ethel Andrews, Prof. Diane Hildebrandt, Dr. Moses Khangale, Mr Tseliso Maqubela (DDG of Department of Energy), Prof. Angela Mathee, Prof. Thenjiwe Meyiwa, Mr Greg Murray, Dr. Debajit Palit, Prof. Stuart Piketh, Dr. Shonali Pachauri, Dr. Yussuf Saloojee, and Prof. Himla Soodyall, amongst others (see ASSAf Proceedings: <http://dx.doi.org/10.17159/assaf.2021/0078>). These partnerships allowed in-depth discussions on South Africa's inequalities to energy risks, global and continental best and emerging safe energy practices, and the institutional and policy pathways for an inclusive domestic energy transition in South Africa. ASSAf was instrumental in leveraging interest in this Series from its networks. The partnership also resulted in a number of important publications, including the 'No Paraffin! Campaign: A Call to Action' and a 'No Paraffin! Campaign' National Roundtable Discussion Webinar Series" Proceedings which was published and widely distributed by ASSAf. The Campaign was also presented to the Department of Cooperative Governance's National Disaster Management Advisory Forum in September 2021 and at the South African Burns Congress in November as a Keynote ('Energy Poverty, Burns and Prevention: A Systemic Energy Intervention for South Africa').



Evaluation sessions with NIMSS FPS in Mpumalanga.

Impactful Research Translation

Knowledge translation is a crucial component of MaHRU's work and integrated into each of its projects. Through this, MaHRU provides access to a specialised pool of knowledge and promotes knowledge-sharing to a wide audience, including the academic and scientific community; communities and community organisations; the general public; Non-Governmental Organisations; the private sector; government departments; regional and international bodies and organisations; policymakers; as well as media and regulatory bodies. In general, 2021 was a productive year for the unit's knowledge brokerage activities, which included conference presentations, op-ed pieces, workshops, lectures, webinars, social media campaigns, information sheets, booklets, reports, and community capacitation workshops. There were a number of highlights, one of which was the No! Paraffin Campaign Webinar Series. Collectively, these highlight the latest science on the scale and impact of energy impoverishment and the argument for Campaign championship and commitment from government, civil society, research and industry through a scaled-up implementation of suitable safe energy solutions.



SAMRC/NWU HYPERTENSION AND CARDIOVASCULAR DISEASE



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 programmes in the future.

This EMU 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, to focus on the unique disease profile of a large proportion of South Africans affected by co-morbidities in terms of HIV and CVD and to address the health implications of the high burden of CVD due to poor awareness and late diagnosis.

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.

COVID-19 related research and development

One of the larger projects within our EMU, the African-PREDICT study, has started to collect 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.

Reimagining research in a time of COVID-19

COVID-19 had a significant impact on the activities of the EMU, 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 of the unit made use of this unprecedented situation to finalise manuscripts, write funding applications, deliver post-graduate students and,



World Obesity day.

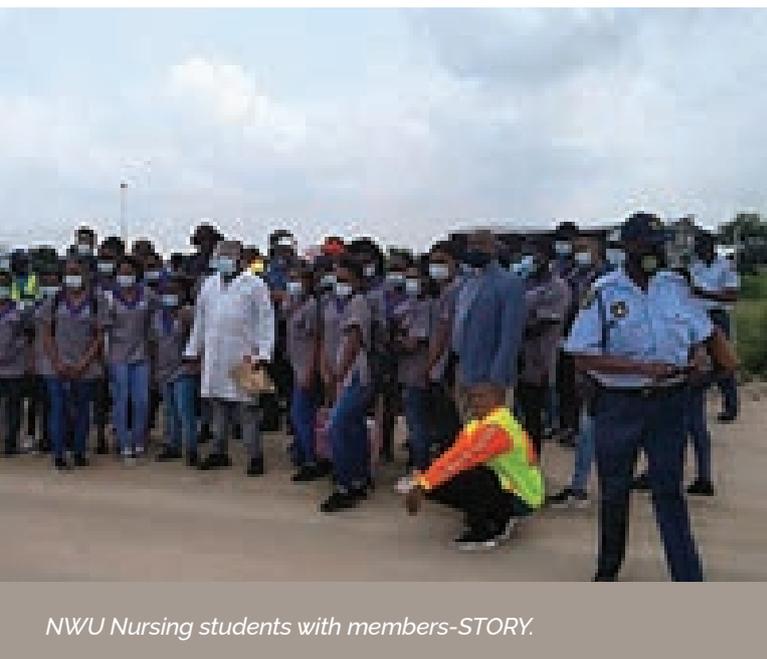
where applicable and possible, completed laboratory analyses of existing samples. Active data collection commenced again in the second half of 2021.

All our research projects include national and international researchers either as collaborators or in an advisory capacity to ensure rigor, scientific excellence, novelty, and relevance.

The ExAMIN Youth SA (Exercise, arterial modulation, and Nutrition in Youth South Africa) study and the African-PREDICT study (African Prospective study on the Early Detection and Identification of Cardiovascular disease and Hypertension) are currently actively busy with data collection that requires collaboration and partnering with different community leaders and schools as well as the Departments of Health and Basic Education.

Another example is the Desktop Review that was performed in collaboration with the SAMRC and the National Department of Health regarding the nutrition status of South African infants and children to provide background information to guide the National Food and Beverage Consumption Survey of 2021/2022. Members of this EMU are also involved in this Survey together with collaborators from the SAMRC, UWC, SUN, UFS, UP, UKZN and University of Limpopo. The aim of the Survey is to better understand the foods and drinks consumed by various age, gender, and population groups in SA and to understand factors influencing their intake.

Prof. Ruan Kruger is the Founding-Director of the Childhood Hypertension Consortium of South Africa (CHCSA). The mission of the CHCSA is to include all relevant stakeholders to develop clinical practice guidelines for the management of hypertension in the children of South Africa and to guide health education on primary prevention at community level. CHCSA members currently include prominent researchers and clinicians at medical schools, universities, and hospitals throughout SA.



NWU Nursing students with members-STORY.



Salt reduction comic strip.



Unit staff and post-graduate students were closely involved in the May Measurement Month (MMM), a global project run by the International Society of Hypertension to raise awareness of hypertension and the need for people to get their blood pressure checked.

Capacity Development and Transformation

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 EMU by support provided for research visits to leading international research laboratories in order to further their training.

The NWU furthermore has a Grow-Our-Own-Timber 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 Dr. Gontse Mokwatsi who was appointed after the retirement of another HART senior staff member and who is already project leader of the UPRIGHT-HTM study within the EMU.

Lastly, a concerted effort is made pertaining to succession planning for individuals from previously disadvantaged groups within the EMU. This includes such members forming part of the management team meetings of the EMU, PI positions in EMU 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 UD after the term of the current UD comes to an end.

Impactful Research Translation

Interactions of EMU 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. Members of the EMU are senior authors on authoritative guideline documents of relevant international societies, which guide the practical treatment of hypertension by clinicians and health care workers, with a special focus on application in developing countries.

The EMU further strives to connect with the community whilst transforming the cardiovascular health scene within South Africa through direct community interaction by visiting community members at their homes and workplaces, by visiting young research participants in schools and staying connected via social media. Not only did the EMU transform its staff complement, research approaches, projects, and funding over the past years, it also transformed its outreach towards the community. In addition, many unit members and post-graduate students were closely involved in the global project on raising awareness of hypertension (May Measurement Month) resulting in the largest ever global campaign for any risk factor.

SAMRC/UFH MICROBIAL WATER QUALITY MONITORING RESEARCH UNIT



Prof Anthony I Okoh Unit Director
aokoh@ufh.ac.za

OVERVIEW

The Microbial Water Quality Monitoring Research 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 offering 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 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”.

COVID-19 related research and development

Our EMU is a member of the SAMRC Wastewater surveillance team, being responsible for monitoring the wastewater treatment plants in Buffalo City Metropolitan Municipality and the Amathole District Municipality. Five Masters and Doctoral students and 2 postdocs are involved in the project during this reporting period. The project

entails weekly sampling of the wastewater treatment plants and screening for the presence of CoV2 genomes. Our data is reported weekly to the coordinating centre in SAMRC and forms part of the national wastewater coronavirus database. Manuscripts are currently being prepared for publications from the work. We also published systematic and review articles on COVID-19.

Bridging other research gaps

The EMU has remained very active in other projects during the reporting period which have resulted in publication of over 30 articles. These includes our chlorine disinfectant and antimicrobial resistance project, and evaluating 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, 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; Laccase and waste keratinous biomass valorisation studies; environmental Vibriology: bioactive compounds from aquatic environment; and road duct risk assessment studies.

Reimagining research in a time of COVID-19

Our EMU responded and adapted to the COVID-19 situation by reorganising our research agenda to be compliant with all government's rules on COVID-19, including travel, use of PPEs, appropriate distancing in the lab and provision of sanitisers in our laboratory facilities.

Capacity Development and Transformation

Our EMU has been a veritable hub for capacity development especially amongst previously disadvantaged demographic groups in the country. Indeed, during the reporting period, we have trained 9 doctoral and 16 Master's black South African students. Of the doctoral students 8 are females, while 1 is male; and of the Masters students 11 are females while 5 are males, which is consistent with the national agenda of empowerment of the female gender. Twenty-four Honours students made up of 16 females and 8 males all South Africans.

Advancing research through collaborations and partnerships

One such collaboration the EMU is involved in is the wastewater coronavirus surveillance project which involves the SAMRC and several other Universities in South Africa. We're also collaborating with the Buffalo City Municipality and the Amathole District Municipalities in this project, and they receive copies of our weekly findings. Our Antimicrobial, bioactive compounds, water chemistry and road duct projects involve collaborators in South Africa, Lesotho, USA, United Arab Emirates, Nigeria, Cote d'Ivoire, and the United Kingdom.

Impactful 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 present at national and international conferences.



Unit members during the May Measurement Month campaign.

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



Prof Karen Hofman Unit Director
karen.hofman@wits.ac.za

OVERVIEW

The demand for quality health services in SA outstrips available resources. Consequently, the central question that faces health policy makers is how to prioritise between competing needs. This unique SAMRC extramural unit (PRICELESS SA) focuses on innovative priority setting research, in two ways. Firstly, showing how to support evidence-based resource allocation decisions in a fair and equitable fashion to inform National Health Insurance (NHI), and secondly to generate evidence to inform policies to improve population health in South Africa, at a national and sub-national level.

Our multidisciplinary team addresses a critical gap by investigating and developing South African-specific processes for transparent decision-making that draws on cutting-edge methodologies to account for not just the health impact of interventions but also their economic and ethical implications, particularly for vulnerable populations. Since community views are considered critical, we have performed two innovative research projects – the South African Values and Ethics for Universal Health Coverage (SAVE-UHC) and the Choosing All together (CHAT). Both these projects integrate community together with a variety of stakeholders into decision-making around priorities for health interventions. The SAVE-UHC model framework was developed interactively, the first one in a LMIC, for use in a Health Technology Assessment (HTA) process. CHAT involves deliberative engagement with community members, to choose interventions that, in this case, demonstrate benefits for children in the first 1000 days. The

process involves costing of evidence-based interventions and community groups having to select interventions with a limited budget, thus community-based priority setting.

In order to achieve NHI, issues such as financial risk protection are critical. Our research team have the expertise to undertake robust evaluations of health interventions and policies targeting not only the quadruple burden of disease but to consider upstream factors that impact health including the social, commercial and economic determinants. This includes food environments in schools.

The Unit undertakes cutting-edge health economics research that addresses a series of policy-relevant questions; develops context-specific priority setting approaches to improve South Africa's resource allocation decisions, and exceptionally builds capacity to do so using health economics methods and modelling as well as and legal/ regulatory tools.

COVID-19 related research and development

In addition to the SAMRC, our unit was supported by The Global Effort on COVID-19 (GECO) –UKRI, to carry out some unique research in the broader context of the pandemic. We have specifically performed qualitative and quantitative analyses of the opportunity costs of COVID-19 in relation to child health and to chronic illness in an urban and rural SA. Our studies focus on mortality rates, attendance at primary health centres, as well as health workers and community member's experiences of health care services during the pandemic



PRICELESS members giving testimony at the Human Rights Commission about food marketing to children.

Additionally, supported by the IDRC (Canada), we investigated the impact of lockdown on informal food traders. This study revealed the unintended consequences of the lockdown on a sector providing food for countless poor urban dwellers. We looked at the acceptability and appropriateness of food parcels among HIV positive women in Johannesburg, finding that many who needed these did not access them, and those that did, although grateful, found the food inadequate. Another area of research was the “COVID-19 washing” of the food industry. This is advertising disguised as corporate social responsibility relating to COVID-19, resulted in “donations” of unhealthy food such as donuts and sugary beverages while simultaneously boosting their brand recognition and status with government and the public.

Reimagining research in a time of COVID-19

As with many organisations globally, we developed a hybrid method of working with mostly online meetings and doing fieldwork either by telephone or zoom where possible. The continued high output of our research team confirms that this approach served us well. The unit continued to provide technical and media support relating to vaccine hesitancy, nutrition and linking the issue of obesity, diabetes and hypertension to poor outcomes of the COVID-19 epidemic.

Advancing research through collaborations and partnerships

Most of our research involves collaboration with SA researchers such as Ezintsha, the MRC/WITS Agincourt unit particularly to work on the opportunity costs of COVID-19 in urban and rural areas. We also collaborated with organisations in seven sub-Saharan countries to support them to do an analysis of each country’s preparedness to implement a sugary beverage tax. We collaborate with the University of the Western Cape, the University of North Carolina, and advocacy partners HEALA and Vital Strategies working on the Food Policy Programme, looking for the most cost-effective policy levers to decrease obesity and non-communicable diseases in South Africa and across the globe.

We have renewed our partnerships with Universities of York to look at cross country financing for health, and the University of Cambridge UK, enabling us to analyse local food and transport policies for health; we are also working with the Centre of Excellence in Human Development on this and other nutrition related projects. We have new partnerships with the Harvard, Cape Town, Glasgow and the George Washington Universities. These partnerships allow us to extend our work in cost effectiveness and extended cost effectiveness analyses, ethics, analysing the commercial determinants of health, and that also support the unit’s teaching and supervision.

Capacity Development and Transformation

PRICELESS has, since 2018, been committed to expanding skills in health economics and decision science. Several staff are working on PhD and Masters Degrees. We run the Masters in Public Health in Health Economics at the Wits School of Public Health, in partnership with the Wits Centre for Health Policy. Lectures in 2021 were held online.

A diverse group of 14 students have enrolled in 2022 (selected from more than 100 applicants). The unit supervised many of these Masters theses. In June 2021, PRICELESS welcomed a young South African, Dr. Evelyn Thsehla, as the new Research Director. She is a skilled health economist with multiple interests, especially Sugary Beverage taxation and Health Technology Assessment (HTA). In addition to her PhD, she has a Masters in HTA from Glasgow University. As a unit, we actively seek transformation through capacity building and new appointments despite Health Economics being a scarce skill.

Impactful Research Translation

PRICELESS disseminates its research findings using different approaches to reach stakeholders. PRICELESS staff are active in translating research for public audiences firstly through articles in "The Conversation Africa" – include topics ranging from The Sugary beverage tax research in 7 sub-Saharan African countries, COVID-19 and the elections, road safety and the school food environment. These articles have reached many people and have been syndicated in local and international press.

Direct interaction with policy makers is critical to our research dissemination strategy. In 2021, we did presentations to stakeholders, including policy makers in the National Department of Health, the Treasury, the Human Rights Commission, the Moseneke Commission, and various parliamentary portfolio committees.

PRICELESS provides evidence to the Healthy Living Alliance (HEALA) and other advocacy organisations for advocacy to improve healthy eating in South Africa.

In addition, PRICELESS actively engages the media, translating research issues for the public. This has included interviews on ENCA, Radio 702, SAFM, and opinion pieces in the Daily Maverick.



Using the CHAT tool. Priceless.

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

2 Maternal and Infant Health Care Strategies Research Unit (ERU)

3 Development Pathways Research Unit (ERU)

4 Child and Adolescent Lung Health Research Unit (ERU)

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



Prof Naeemah Abrahams Unit Director
naeemah.abrahams@mrc.ac.za

OVERVIEW

The aim 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. The Unit's research focus is gender-based violence (GBV) and we recognise that gender inequality is a central driver of GBV. One of our objectives is to describe the prevalence, drivers and social context of GBV and its health impact.

Over the last year we have completed the 3rd National Femicide Study and we released the results on 8 March 2022 – International Women Day. This showed that the overall femicide rate has decreased since 1999 with the greatest decline seen in intimate partner femicide, which is extremely encouraging for our country. We also completed the first national community-centric study of the health, violence and life experiences of female sex workers. The research showed very a high burden of HIV and HIV drug resistance, rape exposure and poor mental health, which presents an on-going challenge for sex worker programmes at a time of shrinking resources.

The Unit's RICE Cohort study has made a major contribution to research on the health impact of rape and over the past

year has seen papers published on the impact of rape on hypertension and of rape stigma.

The Unit has a major focus on prevention of gender-based violence and the What Works to Prevent Violence against Women and Girls Global Programme. Over the last year we have continued to have a major impact on shaping the GBV prevention field globally through publishing a critical paper describing the ten features of prevention intervention design and implementation that are associated with success. This is very important in a field where our research has shown a critical need to continue innovation and testing of GBV prevention interventions to extend their impact, as despite that fact that over 100 interventions have now been tested, mainly in low-and-middle-income settings, many of them are not shown to be effective in reducing GBV. At times this is because they do not address the most important local drivers of violence and so research, on deepening understanding of drivers of GBV is critical, and this year we have published papers to re-affirm the important role of alcohol in this. We have also extended understanding of GBV prevention in the Higher Education Sector in South Africa with the development and testing of the Ntombi Vimbela GBV-prevention intervention.



Breaking the Silence adaptation to accommodate sexuality education for learners with different disabilities.

COVID-19 related research and development

GHRU has conducted five studies related to COVID-19, including studies of COVID-19 and its impact on gender-based violence experiences, on sexual reproductive health among young women with disabilities, and COVID-19 and its impact on families and front-line health care workers. Our research with women survivors' in GBV shelters during the period of hard lock-down has shown the tremendous challenge faced by women living with and leaving abusive partners under hard lock-down conditions. The women experienced the South African policies as highly gender-insensitive and described how these increased their vulnerabilities and increase risk of violence, with many describing near femicide experiences. Research on the impact on Femicide in the context of COVID-19 in the 4th National Femicide Study is on-going.

We also recognised that during the COVID-19 pandemic the sexual and reproductive health rights (SRHR) and needs of women with disabilities were a forgotten agenda. In our Forgotten Agenda project, we conducted a longitudinal study following young women with and without disabilities through the COVID-19 pandemic we conducted a series of

telephonic and face to face interviews and our data showed that women with and without disabilities experienced mental health challenges, food or income insecurities, and less frequently accessed SRHR services. These experiences were exacerbated for women with disabilities, who lacked access to COVID-19 information, were increasingly depended on others at home and were turned away from or didn't dare to go to clinics and access SRHR services. Young women with disabilities reported communication challenges and this increased their isolation, frustration, and abuse. <https://www.samrc.ac.za/intramural-research-units/covid-and-srhr-project>

The COVID-19 and families study provided insights about vulnerabilities which resulted from the lockdown measures introduced by Government to control the spread of COVID-19. A qualitative study with adult women and men in Gauteng province showed how risk factors for women and children's experiences of violence in the home differed by socio-economic class. High levels of stress were reported across the socio-economic groups, and all had limited psychosocial support available during lockdown. Job losses and reduction in earnings resulted in food insecurity which was a key driver of violence in most low SES families; whilst confinement at home with spouses was an unfamiliar and difficult experience, associated with conflict and perpetration of violence by men in high SES families. The qualitative study with frontline health care workers in Gauteng and Eastern Cape showed the high burden of mental-ill health associated with providing health care services during a pandemic which included experiences of stigma, spending less time with families and anxieties associated with being infected and infecting family members with COVID-19. These all affected their health and their productivity as frontline workers.

Reimagining research in a time of COVID-19

COVID-19 has differently impacted areas of our Units' research. Realising the likely impact of lockdown on GBV and gender-relations, we immediately developed research protocols to answer key questions about GBV and femicide during lock-down. We adapted our research data collection within the first few weeks using telephonic interviews, initiating training and skills development, sharing tools and materials to adjust working on various online platforms.

We also took advantage of lockdown to advance publishing from existing datasets and developing proposals for next stages of research. However, some areas of our work have been very adversely affected; in particular, the face-to-face GBV prevention work in communities and institutions has been very substantially disrupted by COVID-19 and so the research agenda around developing and evaluating prevention programming has been adversely affected.

Advancing research through collaborations and partnerships

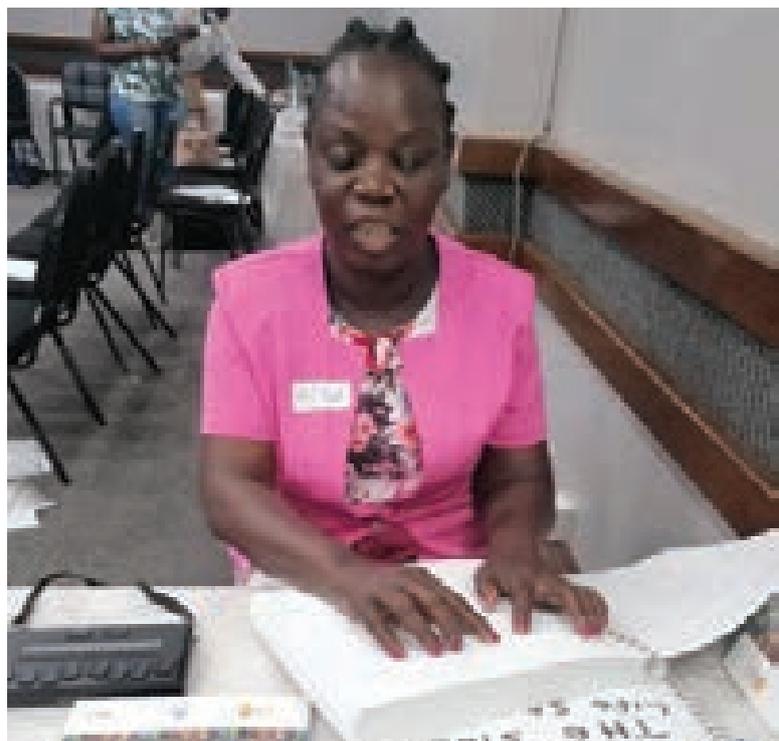
The major collaboration has been in the conduct and completion of the 3rd National Femicide Study. The research team included staff from across different Universities in South Africa, particularly their Forensic Medicine Departments. It has received strong support from the Department of Justice and Constitutional Development and extensive engagement with SAPS. The study data collection was conducted in a national sample of mortuaries gathering data on women and children murdered in 2017, with interviews conducted with the Investigating Officer in each case.

The study had an advantage in that the groundwork for the research was laid prior to 2020 lockdown and much of the mortuary data collected, but the SAPS interviews were completed thereafter both telephonically and in person. The research has provided impetus for an initiative of the Department of Justice and Constitutional Development to develop a National Femicide Strategy to be placed as an adjunct to the National Strategic Plan on GBV and Femicide. The Unit was contracted to develop the National Femicide Strategy and has worked on this across the year with an extensive programme of consultations of stakeholders and reflection to develop a Theory of Change and a Strategy which coherently flows from this and will be positioned to progress the work of Government and Civil Society in femicide prevention and removing the impunity with which it is perpetrated.

Capacity Development and Transformation

In the last year the Unit staff have supervised several PhD students and it is expected that some of the PhD students to submit their theses for examination in 2022. We have supported Post-Docs, including some who are our own staff members. Our post-docs have developed their own research portfolios and have been successful in winning grants for their research. We have interns and have supervised several Masters students and research assistants who are enrolled into Universities' Honours and Diploma courses to continue their postgraduate education. We have also contributed to capacity development through our role as examiners of PhD and Masters theses.

We have continued with a programme of bi-monthly 2 hour-long Academic Day meetings for all staff which provides an opportunity for in-house capacity development and support for emerging researchers in the unit. Capacity development is foundational for transformation, and we integrate leadership and management skills development as well as scientific capacity development in formal and informal training we provide through these sessions. Continuing reflection within the Unit has been on the



Visually impaired participant at the Breaking the Silence Workshop 2021.



Educators in the Breaking the Silence workshop 2021.

meaning of decolonisation of science within the context of our work in gender and health and on reflecting on ways to ensure that the Unit's work extends to deepen understanding of GBV experiences and prevention for LGBTQI persons.

Science Citizenship and Stakeholder Engagement

Our staff members are members of many national and international Advisory Committees and Boards.

Impactful Research Translation

Our Unit has prided itself on the extensive reach and strategic approach of its research translation activities. Over the last year it has published an account of how this work was designed and implemented in the What Works to Prevent Violence Against women and Girls Global Programme and the obstacles navigated in so doing. Adopting a strategic approach to research uptake

and translation, we start with stakeholder mapping from community to national, regional and global levels and develop our communication strategy around this, using multi-channel communication. In addition, we actively use the findings of our research in our in-house programme of developing GBV prevention interventions for testing.

Our research dissemination tools, and approaches have included releasing three research briefs and organising five webinars to release our research findings to the broader public. This has included the release of the 3rd National Femicide study results, findings from the formative research from the Ntombi Vimbela Intervention- a sexual violence prevention intervention with female students in higher education settings and webinars on the gaps in the sexual and reproductive health needs among young women with disabilities during COVID-19. We have reached out to the general public with engagement with TV, print media and radio, including community radio, discussing the findings of our research.

Over the last year our flagship products from What Works have been promoted to guide applications to the UN Trust Fund to end VAW. Our research translation has been extended by our active participation in many of the decision-making and advisory structures within the GBV field globally, including the UN Trust Fund's Global Programme Advisory Committee and the Sexual Violence Research Initiative's Leadership Council and the Technical Advisory Group of USAID's CARE-GBV Programme. We have also been invited to share our expertise on GBV prevention on a wide range of international platforms, delivered during these times of COVID-19 and lockdowns through the internet.

During the reporting period, members of the GHRU attended 32 conferences and webinars/seminars – both local and internal. Five of these were organised by the Unit:

- Femicide in South Africa: Prevalence and Prevention.
- Forgotten Agenda webinar one: Including young women with disabilities and their SRHR needs under the COVID-19 pandemic in South Africa: What do we know and where are the Gaps?
- Formative Research, Development and Pilot of Ntombi Vimbela A Sexual Violence Intervention for Post School Education and Training (PSET) Female Students in South Africa.
- Forgotten Agenda webinar two: People with disabilities, research ethics and processes under the COVID-19 pandemic. How do we conduct inclusive disability research during times of crisis?
- Forgotten Agenda webinar three: What do we know about people with disabilities under the COVID-19 pandemic in South Africa. How can we improve our responses in times of crisis?



Research staff engaging with government officials in Tajikistan: Reporting on an Income generation research project to prevent violence against women.

Photo credit: Aziz Satori

MATERNAL AND INFANT HEALTH CARE STRATEGIES RESEARCH UNIT



Prof Robert C Pattinson Unit Director
robert.pattinson@up.ac.za

OVERVIEW

The Unit aims to develop and test strategies to improve the maternal and infant health care in the primary and secondary levels of care in the South African public sector by seeking saleable, sustainable solutions. Our research focuses on improving the health of pregnant women and their fetuses/ neonates and infants. Currently the research focuses on clinically important aspects of placental function, fetal and early childhood growth and the effect of maternal HIV infection on fetal and child outcomes. Under this theme one of the studies that the research team embarked on is the UmbGodisa study, which follows up infants at the age of 18 months whose mothers were assessed with the Umbiflow™ device in pregnancy. This study aims to investigate further factors such as the influence of Doppler and mother's HIV status on infant growth and development.

Due to the COVID-19 pandemic the research team also became involved in various COVID-19 activities, to study and help mitigate the impacts of the pandemic on maternal and child health outcomes in the country.

COVID-19 related research and development

At the start of the pandemic, a multi-centre multi-university collaboration was set up (with funding received from the SAMRC), assessing the maternal and perinatal outcomes of COVID-19 infection in pregnancy. This project has already led to one publication at the end of 2020 in the IJGO, final data analysis is currently ongoing with a second manuscript currently being compiled. A second pilot study was continued during 2021 assessing placental histology for women with severe COVID-19 infection in pregnancy. Data analysis is currently ongoing.

Monitoring of COVID-19 in terms of maternal and perinatal mortality as well as the utilisation of health services was done on behalf of the National Department of Health. Two publications emanated from this work, in the O&G Forum and SA Health Review 2021. It was found that there had been a significant increase in maternal deaths and stillbirths, coinciding with shift of population to more rural areas and provinces, and less use of reproductive health services.



Dr Valerie Vannevel examines a pregnant mother with the Umbiflow™ device.

Photo credit: EyEscapestudios



The Umbiflow™ ultrasound probe.3.

Photo credit: EyEscapestudios

The unit is supporting the Tshwane District MNCH COVID-19 research study, which is a district-wide multi-disciplinary study to describe the impact of the COVID-19 pandemic on maternal and child health service utilisation and outcomes. One article has been published by this team so far, which focused on the effect of the Omicron variant COVID-19 outbreak in the Tshwane District (Lancet Child and Adolescent Health, February 2022). This work is ongoing.

The Research Unit is further supporting the SA COVID-19-kids study and the WHO multi-centre paediatric COVID-19 study.

Under the CLEVER Maternity Care project, a study was conducted to elicit maternity workers' self-perceptions of mental wellbeing as a result of the COVID-19 pandemic and an evaluation of the maintenance of new practices instituted by the CLEVER Maternity Care programme. The development of a Hypertension Pregnancy Wheel Calculator emanated from the changes that had to be made to the CLEVER programme as a result of the pandemic.

Reimagining research in a time of COVID-19

The staff at the Research Unit had to regroup and reprioritise at the start of the COVID-19 pandemic and the resultant national lock-down. Work continued home-based as far as this was possible, and meetings were held virtually.

At the time point at the start of the COVID-19 pandemic, the Unit had 2 ongoing longitudinal follow-up studies (UmbiBaby and Siyakhula), and the team had to try and minimise the effect of the lockdown regulations on the research activities. Initially all procedures for the mother-baby pairs were halted except for the required procedures which would be carried out at a normal child health visit, e.g., growth monitoring and immunisations. However new ways of evaluating for instance the infant body composition and neurodevelopmental tests were established, ensuring that social distancing was possible during the study procedures.

The CLEVER Maternity Care programme was still ongoing at the start of the pandemic and changes were made in the visiting schedule for district hospitals and midwife obstetric units to provide more support to facilities most in need, and programme activities were adapted and re-prioritised.

Advancing research through collaborations and partnerships

For the Umbiflow studies the collaborators are multiple, and include the SAMRC, the Council for Scientific and Industrial Research (CSIR) as well as the World Health Organization (WHO) and collaborators in the other sites of the Umbiflow International Study (India, Ghana, Rwanda, Kenya). Local collaborations include joint research activities with the Safe Passages Research Group of Stellenbosch University (as led by Prof. Hein Odendaal). A strong local multi-disciplinary team comprising of Obstetrics & Gynaecology, Paediatrics, Nutrition, Food Sciences,

Immunology and Statistics has also been established, with multiple workshop and conference outputs, and publication outputs in the process.

In addition, the research team has built strong collaborations with the staff members of the Department of Health in the Tshwane District, the Gauteng Province and the National Department of Health. This collaboration includes the Umbiflow™ implementation project in the Tshwane District (as the first public sector implementation site). Also, the staff of the research unit has been part of the core team in the writing of the MNCH COVID-19 Guidelines for South-Africa, as done for the NDOH.

The Unit also has strong collaborations in place with the Community Orientated Primary Care Unit of the University of Pretoria and is working on a joint project on implementation of Umbiflow™ in rural districts, in collaboration with a number of mining houses.

Team members are additionally involved in or collaborate with various national bodies and structures, including the National Committee for the Confidential Enquiries into Maternal Deaths (NCCEMD), the National Perinatal Mortality and Morbidity Committee (NaPeMMCo), the Society of Midwives in South Africa (SOMSA), the South African Society of Obstetricians and Gynaecologists (SASOG), the South Africa Paediatric Association (SAPA), Child PIP, the South African Child Priorities Association and South African Civil Society for Women's Adolescent's and Children's Health (SACSoWACH) Coalition.

Capacity Development and Transformation

Capacity building is a strong focus area, and the number of postgraduate students who are affiliated with the Unit has greatly expanded and is continuously growing. This includes several Masters and PhD students, at various stages of their research projects, including 1 PhD student who has submitted her thesis for examination. The PhD candidates include students from clinical disciplines (Obstetrics & Gynaecology), Nutrition, Food Sciences as well as from Basic Medical Sciences (Immunology). At least four additional PhD students are currently in the protocol development phase (Obstetrics & Gynaecology, Paediatrics, Family Medicine, Public Health), and will in future be affiliated to the Unit as PhD students. The research unit also created 19 job opportunities during the reporting period.



Sister Agnes Sefatjana examines a pregnant mother with the Umbiflow™ device. The computer shows the characteristic waveform of the umbilical artery.

Photo credit: EyEscapestudios

Impactful Research Translation

The Unit also presented scientific papers and a keynote address at the 40th Conference on Priorities in Perinatal Care in Southern Africa from 8 to 11 March 2022. This conference is the only research-based conference combining maternal, neonatal and midwifery care in Southern Africa, and is well attended by professors, doctors, midwives, allied health workers and researchers from various neonatal and obstetric units in the country.

On 20 October 2021, the Gauteng Province held its first DCST Research Symposium, with the Unit providing intensive logistical support to ensure the success of this meeting.

Multiple research papers were also presented by team members, and other conference presentations were also done, and feedback on the research work was also given to interested and relevant stakeholders, including UNICEF, CHAI, and at the Global Health Science and Practice Technical Exchange (GHTechX) (2021). Other translational activities included the core writing team activities in terms of the MNCH COVID-19 Guidelines and Policy Framework for South-Africa as an example. Multiple journal publications were also done by members of the research team.

SAMRC/WITS DEVELOPMENTAL PATHWAYS FOR HEALTH RESEARCH UNIT



Prof Shane Norris Unit Director
shane.norris@wits.ac.za

OVERVIEW

The 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 the health of all South Africans across the generations.

Specifically, DPHRU aims to elucidate important pathways to health and development in these areas:

- maternal and child health and nutrition.
- growth, psychosocial and physical development.
- obesity and non-communicable disease (NCD) risk in South Africa.

COVID-19 related research and development

In partnership with the DSI-NRF Centre of Excellence in Human Development, DPHRU researchers have been involved in coordinating a 'Think Tank' on COVID-19 and behaviour change in South Africa. This has involved a systematic review on the effectiveness of behavioural non-pharmaceutical interventions, a focus group study to qualitatively explore perceptions relating to COVID-19, and a national survey on these perceptions. These outputs will be used to provide a research translation document for policy makers in South Africa.

Bridging other research gaps

During the reporting period, DPHRU has contributed towards a transformed SAMRC and South Africa by publishing over 140 scientific publications and actively disseminating research findings to and engaging with the public while also completing several large studies with novel findings including:

- The identification of sex-specific relationships between adiposity and diabetes risk, with the association being stronger in men than women. This suggests that with increasing adiposity men will be at higher risk of developing diabetes than women.
- In the first longitudinal study in Africans, we showed that current Europid waist circumference cut points to predict dysglycemia and diabetes do not perform well in black South Africans, particularly women. We have proposed alternative cut points but these need to be verified in other cohorts.
- Another study that was completed last year entitled 'Understanding the impact of HIV infection and its treatment on the effect menopause has on the musculoskeletal health of African women' had several key outputs including a paper published in the Journal of Bone and Mineral Research reported a 19.4% prevalence of osteoporosis of the femoral neck in women, and more than double the prevalence in HIV positive compared to negative women. This raises concerns about future fracture risk in South Africa, particularly in those infected with HIV.

- Currently running a large preconception intervention study (Healthy Life Trajectories Initiative (HeLTI)) in young women, and about to start a new intervention study entitled 'Ntshembo (Hope): A complex intervention to optimise adolescent BMI pre-conception to address the double burden of malnutrition: A RCT in rural and urban South Africa'. The primary objective of this RCT which will be completed in Soweto and at Agincourt is to determine if an 18 to 24-month intervention delivered by community health workers (CHWs) can achieve directionally appropriate changes in BMI in underweight and overweight/obese nulliparous adolescent girls.

Reimagining research in a time of COVID-19

All studies in the Unit continued within the COVID-19 restrictions with almost 50% of the 6000 participants for the HeLTI study being recruited for the baseline assessment, and data collection for the AWI-Gen 2 study being completed. One of the major adaptations was the collection of qualitative and questionnaire data virtually for several studies, and although challenging due to changing contact details and data access this method of data collection allowed many studies to continue.

An important stakeholder in our work is the community themselves. Supplementary funding was received from a GCRF Impact development award (PI: Dr. Sarah Drew, University of Bristol) to develop information resources for women to improve their experience of menopause. We co-produced contextually relevant resources—booklets and poster—for women in Zimbabwe and South Africa (SA) to improve health literacy about menopause and health. Resources have been translated into several African languages and endorsed by the South African Menopause

Society. Further, the manuscript which describes this process of co-production of materials with community members as well as other stakeholders including menopause experts, has been accepted for publication in Social Sciences and is entitled 'Improving experiences of the menopause for women in Zimbabwe and South Africa: co-producing an information resource.'

Capacity Development and Transformation

Over the last reporting period, several PhD students have graduated, while some PhD and Masters students have submitted their dissertations.

As part of Healthy Life Trajectories Initiative (HeLTI), we have trained 'Health Helpers' (community health workers who deliver the intervention). These individuals have received training in Healthy Conversation Skills and have been trained to deliver materials that promote physical and mental health of young women preconception and through pregnancy. They are also trained to promote health and development in infancy, should the women give birth.

Impactful Research Translation

Researchers' proactive engagement with journalists and publication of articles in *The Conversation* has continued to be an important contribution to translation. Dr. Siphwe Dhlamini wrote a piece in *The Conversation* based on his publication entitled 'Why South Africa should introduce mandatory labelling for fast foods'. Associate Professor Catherine Draper also published article titled 'Childcare centres in South Africa need more support: principles tell of pandemic impact', *Children and screens – making it through the holidays*.

SAMRC/UCT CHILD AND ADOLESCENT HEALTH RESEARCH UNIT



Prof Heather Zar Unit Director
heather.zar@uct.ac.za

OVERVIEW

The SAMRC Unit on Child and Adolescent Health focuses on some of the key issues affecting child and adolescent health in South Africa, Africa, and globally. Key areas include childhood pneumonia, tuberculosis (TB), HIV-associated illness, and developmental origins of child health including respiratory disease, neurodevelopment, growth, and non-communicable diseases. Studies focus on the epidemiology, aetiology and risk factors for health or disease and the long-term impact on child health. The overall aim has been to develop better diagnostic, preventive, and treatment strategies to strengthen child health. The Unit has extended its scope and with increasing complexity of the research to promote multidisciplinary work, build capacity in clinical translational science and strengthen existing sites and build additional sites supporting infrastructure development and staff.

Summary of Objectives:

- To expand and strengthen existing research and collaborations in child lung health to improve lung health in South Africa and the region.
- To develop new research programs specifically focused on translational research and new collaborations addressing major African childhood respiratory diseases.
- To provide a platform for the training of clinician scientists in child lung health, particularly African and women scientists.
- To promote implementation of research findings into policy and practice.

COVID-19 related research and development

- Several COVID-related research projects have been done in this period. A key focus in the birth cohort study, the Drakenstein Child Health Study (DCHS) has been to investigate the spectrum, determinants, and long-term outcome of SARS-CoV-2 in African mother-child pairs, as well as immune responses and possible protective role of prior sHCoV in children. This work has been funded by an MRC UKRI GECO grant and a Wellcome Trust CIDRI award. Published data includes findings that antibodies to endemic coronavirus rarely cross react with SARS-CoV-2, and do not therefore explain why children are protected against severe disease.
- Longitudinal data on seroprevalence in children and mothers, and antibody protection against different variants in children and mothers is ongoing including development of models of thresholds for protection; data has been provided to the WHO.
- A study of health care workers (part of a multicentre global study) investigated seroprevalence over time and changes in antibody levels following vaccination, contributing data to high impact publications including one on antibody levels associated with protection from disease in populations.
- A longitudinal cohort study of HIV-infected adolescents on antiretroviral therapy has investigated seroprevalence, disease and determinants, as part of a multicentre global study (funded through the PENTA network, UK).

- Studies of TB in children have investigated the co-occurrence of SARS-CoV-2 infection or disease in a multicentre study of cohorts in Africa and India (funded through EDCTP and by NIH).
- A surveillance study of children hospitalised with lower respiratory tract infection at Red Cross Children's Hospital (RCCH) has included measurement of SARS-CoV-2 and of other viral pathogens (funded by the NICD); results have been published delineating the epidemiology, clinical features and outcomes of children hospitalised with SARS-CoV-2 in South Africa.

Reimagining research in a time of COVID-19

During the 2021/22 period, research activities have expanded to investigate aspects of COVID-19 (as described above). However, research activities were impacted by the pandemic, with challenges in recruitment of participants from clinics and hospitals, fear of coming to a health facility, transportation issues, poverty related issues and a reluctance for vaccine related research including non-COVID-19 studies (e.g., RSV vaccine). In addition, the epidemiology of other illnesses such as RSV, has changed. The Unit's Standard Operating Procedures and staff training has included: universal wearing of masks; daily screening of staff and participants; staggering of patient visits and room conversion to ensure maintenance of social distancing; updating of guidelines ensuring infection control. There has been substantial physical and psychological impact of the pandemic on staff.

Staff absenteeism due to COVID-19 illness or exposure impacted on daily activities and on the functioning of teams. However greater flexibility in working arrangements has occurred with substantial work done offsite, greater efficiency in some areas and hybrid models to enable work completion (e.g., telephonic, and in-person visits). Post lockdowns, an increase in participants needing to be seen for non-COVID-19 related illness occurred.

A large program to make cloth masks and distribute these to staff, study participants and families was successfully undertaken by members of the Unit. These were complemented by providing COVID-19 literacy messages. In the DCHS, poverty alleviation activities for families were instituted by the study given the increase in poverty that occurred.

Advancing research through collaborations and partnerships

Several new partnerships have been integrated into our COVID-19 research to maximise impact and ensure a coherent and integrated response to the pandemic. These partnerships include:

- David Goldblatt, Imperial College: collaborating on immunological aspects in the DCHS and seroprevalence and antibody responses in the health care worker study.



Baby being examined as part of the Drakenstein Child Health Study (DCHS) Community Engagement Project.



TB patient at the Red Cross Children's Hospital testing the homemade spacer.

- National Institute for Communicable Diseases (NICD) South Africa, Cheryl Cohen: the inclusion of hospitalised children with LRTI (COVID-19 and non-COVID-19) is in a collaboration with the NICD, with surveillance of all children hospitalised at RCCH with pneumonia.
- University of Cape Town, Division of Immunology (IDM), Wendy Burgers: contributing expertise in the areas of immunology for this project and supervising a doctoral student to undertake this work.
- University of Western Australia, Mark Nicol: providing expertise in microbiology and immunological aspects of the study.
- Stefan Flasche and Billy Quilty, Centre for Mathematical Modelling of Infectious Disease, the London School of Hygiene and Tropical Medicine: providing statistical modelling support to estimate protective antibody threshold levels through each wave.
- Galit Alter, Harvard Medical School: collaborating on immunological aspects.



Nasal swab on a baby at Drakenstein.



SAMRC Unit on Child and Adolescent Health clinical team.

Capacity Development and Transformation

The Unit has been working to build capacity in clinical translational science and continues to expand upon existing clinical networks and provide ongoing capacity building support to satellite sites and with international and domestic collaborators. Research has involved technology transfer, building of skills and training of many post-graduate students, building clinical scientist, laboratory science, and public health specialist expertise.

Transformation is also evident in the breadth and scope of work (encompassing diverse disciplines such as paediatrics and child health, microbiology, mental health, maternal health, public health, radiology, genetics, laboratory science) and the multi-disciplinary diverse nature of investigators, collaborators, and study teams. A large biorepository of samples with linked metadata has been established, strengthening capacity for translational, transformative research. Several staff members have advanced their careers through skill acquisition and collaborations including technologists, field workers, nurses, and doctors. An intern

program to upskill a historically disadvantaged student post matric in preparation for university study was successfully undertaken.

Impactful Research Translation

Research has contributed to new or updated guidelines related to the management of childhood illnesses as well as determinants of child and adolescent health. During the 2021/22 reporting period, many articles were published in peer-reviewed journals. Data has been provided to national or international databases contributing to national or international policies and guidelines. With regards to COVID-19, the Unit Director has served on several international (e.g., WHO, UNICEF) advisory committees including those focused on the use of masks in children and adolescents (with revised WHO guidelines in Feb 2022), and school responses to COVID-19, (e.g., opening and closing of schools, use of non-pharmacologic interventions). The Unit Director has also served in an advisory capacity to the local health department. The Unit Director chairs the WHO Technical Advisory Committee on new preventive interventions for RSV. Members of the Unit participated in many talks and discussions on different aspects of COVID-19 in children aimed at health care professionals locally, in Africa (e.g., through the Pan African Thoracic Society webinars), and internationally (through international meetings/ conferences).

Several public webinars and media interviews were held over this period, to inform the public and other stakeholders on health issues and research outcomes. In the DCHS, community engagement has included educational initiatives around COVID-19 for the community, provision of masks to all families and poverty alleviation activities.



Lung function test at Red Cross Children's Hospital

HIV, AIDS, TB AND OTHER COMMUNICABLE DISEASES

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 and other infections Diseases Research Unit (IRU) | 7 | Intersection of Communicable Disease and Infectious Disease Research Unit (ERU) |
| 2 | Centre for Tuberculosis Research Unit (IRU) | 8 | Office of AIDS and TB Research (IRU) |
| 3 | HIV-CAPRISA TB Pathogenesis and Treatment Research Unit (ERU) | 9 | TB Platform (IRU) |
| 4 | Vaccine and Infectious Diseases Analytics Research Unit (ERU) | 10 | Malaria Research Group (IRU) |
| 5 | Centre for the Study of Antimicrobial Resistance Research Unit (ERU) | 11 | Molecular Mycobacteriology Research Unit (ERU) |
| 6 | Antibody Immunity Research Unit (ERU) | | |

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.

HIV AND OTHER INFECTIOUS DISEASES RESEARCH UNIT



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

OVERVIEW

The HIV and other Infectious Diseases Research Unit (HIDRU) contributes to reducing the burden of key infectious diseases, particularly HIV, COVID-19 and TB, in South Africa and globally. HIDRU engages in translational research, and study methodologies include clinical trials (phase 1-3), effectiveness studies, epidemiological studies, implementation science and socio-behavioural science. HIDRU's research accelerates the development of new or improved prevention and treatment strategies, which include testing the safety, pharmacokinetics and efficacy of chemotherapeutic agents, vaccines, antibodies and microbicides, testing interventions that strengthen services for specific populations affected by HIV, COVID-19 and TB and testing the field-based effectiveness of diagnostic tests and health care interventions.

HIDRU has three disease-specific research focal areas (HIV, TB and COVID-19) and have 2 cross-cutting areas (maternal, family, child health and nutrition, and socio-behavioural science). The key research priorities in each area are: (i) Safety and efficacy of HIV vaccines (ii) What

combination and formulation of pre-exposure prophylaxis will prevent HIV acquisition amongst young women? (iii) Treatment outcomes of pregnant women and infants with multi-drug resistant TB (MDR-TB) (iv) Treatment outcomes and patient journeys in people with MDR-TB and COVID-19 (v) Safety, efficacy and effectiveness of COVID-19 vaccines (vi) What is the utility of rapid tests during the COVID-19 pandemic? (vii) How can breastmilk transmission of HIV be eliminated? (viii) Effectiveness of interventions to improve the quality of maternal and newborn health care, reduce maternal and child mortality and improve nutritional status (ix) Effectiveness of current communication strategies to enhance understanding of health care amongst community stakeholders (x) Barriers and enablers to uptake of novel HIV, COVID-19 and TB prevention and treatment strategies.

COVID-19 related research and development

During 2021-2022 HIDRU continued generating new knowledge about COVID-19, through several initiatives, including:

- COVID-19 vaccine studies: HIDRU clinical research sites, contributed data to the multi-country ENSEMBLE study (AD26.CoV2.S vaccine). In 2021-2022, this translated into quick action when HIDRU co-led the Sisonke studies (<https://sisonkestudy.samrc.ac.za/>). The combined efforts of HIDRU staff, working collaboratively with key partners including the National Department of Health (NDOH), Centre for AIDS Programme of Research in South Africa (CAPRISA), Desmond Tutu Health Foundation and Right to Care led to the vaccination of ~500 000 health care workers nationally (February-May 2021), and 250 000 received homologous booster vaccines (November-December 2021).
- HIDRU also participated in the CROWN and Phase 2B Novovax study. COVPN 3008 is underway evaluating the efficacy of different dosing regimens of the Moderna COVID-19 mRNA vaccine in people with HIV, with or without prior COVID-19.
- COVID-19 immune correlates study: HIDRU contributed to the CoVPN 5001 study and HVTN 405 study in acutely infected and convalescent participants.
- SA COVID-19 Point of care study: aimed to determine the utility of rapid tests for COVID-19 diagnosis and how these correlates with PCR tests, serology and clinical symptoms.
- COVID-19 and TB study: aimed to determine treatment outcomes and patient journeys among people with MDR-TB and COVID-19.
- The Longitudinal surveillance study, which aims to utilise a point of care platform for weekly antigen testing to study the epidemiology of SARS-CoV-2.
- COVID-19 KIDS studies: aim to describe severe COVID-19 amongst hospitalised children and determine risk factors for severe disease. The WHO COVID-19 KIDS study will pool data from four countries.
- Community perceptions of COVID-19 study is underway.
- The Mphatlalatsane study, was adapted to evaluate the effect of COVID-19 on maternal and newborn morbidity and mortality and health services.
- The COVID-19 and nutrition study: aimed to measure the impact of the COVID-19 pandemic on child morbidity including nutritional status, household food security, and dietary diversity, and access to health services.
- The Maternal and Child Health study, led by the University of Pretoria investigates the effect of COVID-19 on maternal and child health services.
- HIDRU scientists were technical advisors on the HSRC-led national COVID-19 antibody surveillance study.



Staff engaged with the Sisonke Vaccine Study



Group photo at the Isiphingo team building workshop.

Reimagining research in a time of COVID-19

The Unit changed its name, incorporating COVID-19 as a core research area. HIDRU conceptualised and played a leadership role in translational research studies with varying designs including Phase 3b clinical trial (Sisonke repertoire of studies), Field based rapid test effectiveness studies (SA COVID-19 Point of care study and Longitudinal surveillance study), Epidemiological COVID-19 and TB study and the COVID-19 KIDS studies, Implementation science Mphatlalatsane study, and the Socio-behavioural Community perceptions of COVID-19 study. Additionally, a COVID-19 Paediatrics interest group was initiated to promote research, synergy and collaboration on COVID-19 in children. This led to two HIDRU-led Paediatric COVID-19 research protocols.

Capacity Development and Transformation

HIDRU has a capacity development committee to review all staff applications for study support or seed funding to initiate a new original idea. Through this Committee and the SAMRC, one staff member was supported to attend a conference, 13 to register for degrees/diplomas, and 10 to register for short courses. Furthermore, the Unit has an active mentorship programme, coupled with a bi-weekly research development programme. 45 staff have been matched with a mentor to learn a specific skill or to plan ahead for their personal career development. The remaining staff (n=196) have been encouraged to enter into a mentorship relationship with their line managers. Additionally, staff participated in workshops on Resilience and Influencing skills and transformation, and coaching sessions were conducted during the COVID-19 pandemic.

Advancing research through collaborations and partnerships

During 2021-2022 HIDRU worked closely with CAPRISA to complete the first year of the joint KZN Clinical trials Unit. This brought together scientists and clinical research sites from the two organisations for regular discussions on how to build and implement high quality science. Additionally, through the Sisonke study, HIDRU strengthened collaborations and partnerships with the public and private sectors, including the NDOH, Provincial Departments of Health (PDOH), public hospitals, CAPRISA, Right to Care, Discovery Health, MedScheme, Netcare, Life Health care, Mediclinic, independent private hospitals and other clinical research sites. These large-scale unprecedented partnerships enabled the vaccination of approximately 500 000 health care workers.

Additionally, HIDRU collaborated with the Africa Health Research Institute (AHRI), Setshaba Research Centre (SRC), Gender and Health Unit (SAMRC), Institute of

Infectious Disease and Molecular Medicine, University of Cape Town, CAPRISA, National Institute of Communicable Diseases and National Health Laboratory Services on grant applications.

With regards to TB the partnership with UCT and Médecins Sans Frontières (MSF) is investigating mortality and morbidity after successful TB and Rifampicin-resistant-TB. In partnership with the Department of Clinical Pharmacology of UCT and Liverpool University we are exploring the pharmacokinetics of novel second-line anti-TB drugs in pregnant women and their infants.

In partnership with the SAMRC Centre for Tuberculosis Research, based within the Division of Molecular Biology and Human Genetics at Stellenbosch University, we are investigating the microbiome of pregnant women infected with RR-TB and their infants.

Cross training of community engagement stakeholders and staff occurred through the KZN Clinical Trials Unit (CTU) grant. In addition to working with community working groups at a ward and site level, the HIDRU Botha's Hill Community Liaison Officer and Community manager were elected chairperson and secretary of the KZN Research Sector, respectively.

HIDRU leadership participated in several talks with various stakeholders including Wits Reproductive Health and HIV Institute, on several media platforms to increase awareness of the COVID-19 and vaccines. This included partnering with youth groups. Members at HIDRU have joined the COVID-19 CAB Coalition (CCC), facilitated by the HIV/AIDS Network Coordination (HANC) and the HVTN Behaviourial Working group to share knowledge, skills and training.

Science Citizenship and Stakeholder Engagement

During the reporting period, staff members of HIDRU serve on many committees, hosted conferences, and attended workshops.

Impactful Research Translation

As part of the HIDRU communication and results dissemination plan, participants stakeholders, and community working groups received updates on all key results of HIV, TB and COVID-19 research outcomes. Innovative methods were used which included virtual platforms (Zoom, MS Teams), SMS and WhatsApp. Volunteers were also contacted telephonically to ensure that they received the research updates. This was led by the site community teams and investigators with support from the HIDRU Community manager. Furthermore, HIDRU invited the PDOH Research team, Community members and Office of the Premier to participate in the Unit Strategic planning meeting (September 2021) where



Chatsworth site team for Heritage day.

the Unit's research programme to ensure that it integrates with the province health needs and their input was sought.

The conduct of Sisonke, the first phase 3B implementation trial at HIDRU in partnership with NDOH and PDOH was an example of collaboration and cross training across private and public sectors to ensure that an effective COVID-19 vaccine was accessible to the Health Care Workers. HIDRU members were also part of research translation efforts where outreach sessions on COVID-19, TB and HIV were held with retail industry, schools, youth groups and advocates. Symposia, webinars, press releases and scientific presentations were conducted by scientists and non-scientists in the reporting period.

CENTRE FOR TUBERCULOSIS RESEARCH UNIT



Prof Rob Warren Unit Director

rw1@sun.ac.za

OVERVIEW

The collaboration between the South African Medical Research Council and Stellenbosch University forms the Centre for Tuberculosis Research (CTR) which continues to recognise the importance of Tuberculosis research during and after the SARS-CoV-2 pandemic. It is well recognised that prioritisation of SARS-CoV-2 diagnosis and care has significantly impacted the HIV and TB epidemics in South Africa – according to the Stop TB partnership it may take >5 years to regain the losses that have occurred. The CTR is a global partner in TB research using innovation and technology to address key knowledge gaps, develop and evaluate new technologies and contribute to global policy and guidelines. In addition, members of the CTR have published many peer-reviewed papers during the reporting period.

- **Innovation:** A novel device has been developed which allows additional reflex diagnostic tests to be done on specimen derivatives from patients (TB, HIV, SARS-CoV-2, pulmonary disease) that would normally be discarded. Application of this device will reduce cost, loss to follow-up and patient transport costs. Members from the CTR are investigating innate immunity in TB, particularly the role of regulatory myeloid cells (RMC), in *Mycobacterium tuberculosis* control. This includes ex vivo assessments of circulating (blood) and ex vivo site-of-disease (lung, heart, pleural) immune

responses through state-of-the-art platforms for detection and quantification of protein, genetic and epigenetic mechanisms. Our goal is to identify innate immunosuppressive mechanisms and other innate molecules/pathways as potential targets for host-directed-immunotherapy (HDT) in TB. As part of our investigations, we have developed a 3D-bioprinted TB lung granuloma model through levitation, building this structure using primary immune cells from the lung (published). The group is also involved in establishing the impact of SARS-CoV-2 on the lung Immunity to *Mycobacterium tuberculosis*. Members of the CTR were involved in the development of a SARS-CoV-2 cough classification algorithm.

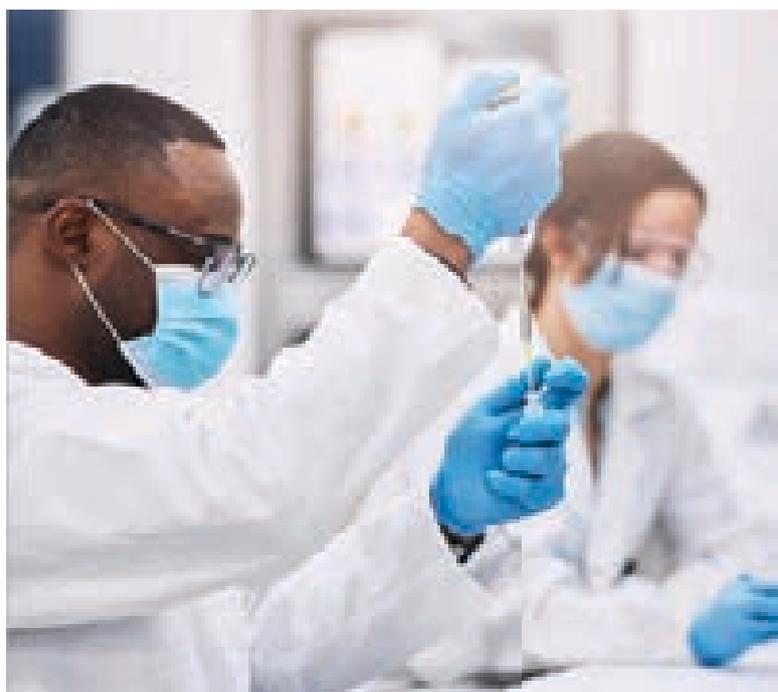
- **The following patents were granted during the reporting period:**
 - (i) The use of host serum biomarkers for the diagnosis of TB (granted by India).
 - (ii) The use of blood and CSF-based biomarkers for the diagnosis of tuberculous meningitis (granted in South Africa).
 - (iii) IFIT Polypeptides and Uses for Treating Tuberculosis Infection has been published on 15 April 2021 by the International Bureau of WIPO with Publication number WO 2021/070107 A1.

- **The following Patents were submitted during the reporting period:**

- (i) Novel biomarkers for the diagnosis of tuberculous meningitis in South Africa as well as national phase applications for existing international patent applications in various territories around the globe.
- (ii) The CTR has provisionally patented the extraction device (Stellenbosch University-SAMRC patent application).

- **National and Global Policy:** Members of the CTR led a WHO commissioned systematic review entitled, "Low complexity automated NAATs: Diagnostic accuracy for detection of resistance to isoniazid and second-line antiTB agents". This systematic review was used to inform policy on the diagnostic utility of the Xpert XDR assay for the diagnosis of first- and second-line drug resistance. This review will be published as a Cochrane review. The CTR was a major data contributor to the WHO catalogue of mutation in *Mycobacterium tuberculosis* complex and their association with drug resistance. This catalogue forms the foundation for the application of next generation sequencing as a rapid diagnostic to guide the treatment of both drug-susceptible and drug resistant TB. The CTR is part of a clinical trial investigating the use of NGS to guide treatment of Rifampicin-Resistant TB. Members of the CTR contributed data to a WHO meta-analysis showing CRP (c-reactive protein) is superior to symptom screening in people living with HIV. In addition, members of the CTR played key advisory and participatory roles in assisting SANParks, National Zoological Gardens, and others, such as the Namibian Wildlife Service regarding TB in wild animals and have recently reported evidence of *Mycobacterium bovis* infection in white and black Rhinos and have jointly formulated a response with the South African National Parks to this serious problem.

- **Key Knowledge Gaps:** As part of a global consortium, the CTR proposed a provisional critical concentration for the new anti-TB drug pretomanid of 1 mg/L for MGIT media. The observed strain specific level of intrinsic resistance to pretomanid underscores the importance of considering the global diversity of *Mycobacterium tuberculosis* complex during clinical development of drugs and when defining breakpoints for antimicrobial susceptibility testing. The absence of significant associations between genotype and phenotype for the new drug bedaquiline was highlighted in an CTR lead systematic review. This highlights the need for a unified global effort to enable the transition from phenotypic to rapid genotypic drug susceptibility testing methods.



Researchers conducting cutting-edge scientific experiments at Stellenbosch University's Biomedical Research Institute.



CTR Postgraduate students performing Ziehl-Neelsen staining to identify mycobacteria.

The TB treatment response biomarker group at the CTR worked on an EDCTP-funded TriageTB project, which dovetails with the NIH-funded ENDxTB project. The current focus is on a side-by-side comparison of two fingerstick blood, point of care (POC) tests that are based on host responses against TB with the outlook to evaluate the ability of host immune tests to differentiate

between TB and other respiratory diseases in symptomatic adult and paediatric patients presenting to primary health care settings. A key development comprises a multi-biomarker test, resulting from a collaboration with Leiden University Medical Centre (LUMC), that is based on the detection of CRP, IP-10 and SAA on a lateral flow device. This is being evaluated across Africa and Vietnam in collaboration with FIND and other partners. The study design includes a direct comparison with the Cepheid TB 3-gene host response cartridge and evaluation for treatment response monitoring, together with the ability predict disease progression in asymptomatic household contacts. A sub study funded by the BMGF to evaluate the impact of SARS-CoV-2 on the performance of these tests and the effect of SARS-CoV-2 infection on TB treatment outcome/progression is also underway. The EDCTP, BMGF and NIH-funded PredictTB study to evaluate treatment shortening based on PET/CT biomarkers has completed follow-up. The next step is the identification of blood-based biomarkers that could serve as surrogates for PET-CT measurements or that can identify a high risk for poor TB treatment outcome.

COVID-19 related research and development

Members of the CTR have developed the innovative idea of using cough sound classification – initially intended for TB diagnosis – to develop a SARS-CoV-2 cough classification algorithm. We applied machine learning to smartphone recordings of coughs of people with known SARS-CoV-2 test results, and the resulting algorithm was able to detect a SARS-CoV-2 cough with >93% accuracy. This algorithm will now be built into a smartphone app that can be used as a screening tool.

The CTR has secured two NIH supplemental funding grants to explore (1) the role of lung innate responses in resistance to *Mycobacterium tuberculosis*; and (2) Impact of SARS-CoV-2 on lung immunity to *Mycobacterium tuberculosis*.

Members of the CTR established a COVID-Host Genetics group, aimed at studying human genetic susceptibility to SARS-CoV-2 and since inception has joined the COVID-19 Host Genetics Initiative (<https://www.COVID-19hg.org>). The COVID-19 Host Genetics project focuses on the variability observed for SARS-CoV-2 infection and disease severity in adults as well as the development of a rare Multisystem Inflammatory Syndrome in Children (MIS-C) that previously tested positive or were exposed to SARS-CoV-2. The aim is therefore to identify the presence of host genetic variants contributing to the risk of infection during virus exposure and various COVID-19 outcomes, including severe phenotypes, in well-defined study cohorts from South Africa. In addition, a study on “Host genetic factors contributing to susceptibility to SARS-CoV-2” was initiated. This study had the additional benefit of compassionate counselling to family members of deceased participants.

This has also led to identifying participants who require assistance with mental health conditions and are referred for treatment.

Members of the CTR also participated in a clinical trial investigating the effect of BCG revaccination of front-line workers on SARS-CoV-2 disease severity and are currently contributing to the data analysis. We are investigating the impact of the SARS-CoV-2 epidemic on TB triage tests that are based on host biomarkers in a U01 study led by the CTR, including sites in Africa (SA, Gambia, Uganda) and Vietnam and partners in Germany, The Netherlands, the UK, and the USA. As part of the Together trial, we are working with partners in the USA and Brazil to study whether anti-viral medication (Lopinavir/Ritonavir) could prevent serious SARS-CoV-2 disease if administered early in treatment. We completed a study on volunteers working at a popular shopping complex and tourist attraction (the V&A Waterfront) in Cape Town and showed that there was high background seroprevalence of SARS-CoV-2 in Cape Town. Antibodies towards SARS-CoV-2 were more frequently observed in people living in informal houses with associated 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](https://www.timeslive.co.za)) and in a peer-reviewed journal publication.

The CTR continues to support the efforts of the Department of Health during the pandemic. We have loaned our entire freezer room, which already had strict access control in place and all the -80 freezers inside to the DOH to use for the storage of samples and vaccine doses.

Reimagining research in a time of COVID-19

The SARS-CoV-2 pandemic provided us an opportunity to use our existing skills and resources to address the challenges that SARS-CoV-2 infection brought about. We had to immediately apply for COVID-19-related funding to continue our work. Some of our laboratories and specialised theatres (for e.g., the bronchoscopy unit) had to be converted for COVID-19 related studies. The pandemic then allowed us an opportunity to research the effect of SARS-CoV-2 on the progression of diseases like TB. With the Sisonke trial, we had the opportunity to investigate and understand the immune responses against TB in the light of vaccination against SARS-CoV-2. This was all possible through our interactions in a hybrid (online and some face to face) interaction in the laboratories whilst maintaining our relations and interaction with the community that we serve and collaborate with. Prior to the global COVID-19 pandemic members of the CTR had initiated exploratory research on the use of highly selective calmodulin-dependent kinase 1 Delta (CaMK1) inhibitors, which had been developed as part of an international collaboration, for the modulation of the immune system. Start-up funds via the CTR have supported this research.



CTR Community Outreach Programme, Northern Cape.

Advancing research through collaborations and partnerships

The CTR developed numerous new partnerships during the initial phase of the COVID-19 pandemic.

- Tygerberg Hospital: For the calmodulin-dependent kinase 1 Delta (CaMK1) inhibitors-study funded by the SAMRC, the necessary ethics approval was obtained to recruit SARS-CoV-2 positive patients. Two cohorts have been recruited and blood samples taken, mild disease and severe disease (ICU patients). Preliminary data shows that there is a decreased amount of pro-inflammatory cytokines (IFN-gamma and TNF alpha) released in the presence of a highly selective CaMK1 inhibitor, while the release of anti-inflammatory cytokines is not affected by the presence of the highly selective CaMK1 inhibitor.
- SAMRC: We used the Sisonke trial and the vaccinees as an opportunity to further our understanding of vaccine-induced immunity. We followed up the health workers post vaccination and studies the immune responses to SARS-CoV-2 (the initial variant) by evaluating the responses on protein and RNA levels.
- Stellenbosch University: As one of the central pillars of the CTR is training and capacity development, efforts and resources were placed on investigating how to better support and facilitate virtual learning.
- French Embassy and Flemish Interuniversity Council: A 'Lab-in-a-box' project was initiated with the aim to provide training in three phases: 1) theory, lecture-style self-study modules, 2) mentor-led cohort discussion sessions and 3) practical, hands-on sessions. A pilot training course included students, scientists and collaborators from the NHLS/ Walter Sisulu University (Eastern Cape), Namibia Institute of Pathology/ University of Namibia (Namibia), Institute Pasteur Madagascar (Madagascar) and Tropical Diseases Research Centre (Zambia).
- Waterfront: During the initial lockdown in SA, the Immunology group within the CTR performed a study of seroprevalence of SARS-CoV-2 in people working at the V&A Waterfront in Cape Town. They found that there was a higher SARS-CoV-2 seroprevalence in workers with lower socioeconomic status.

- Discovery Health, NHLS, NICD, and WC DoH: We have engaged with these partners with the view to strengthen data collection strategy for the development of the cough app for SARS-CoV-2.
- Department of Virology: Archiving of nasopharyngeal swabs.
- Tygerberg Hospital, Stellenbosch University (Divisions of Haematological Pathology, Medical Microbiology Immunology, Rheumatology, and Medical Virology, Departments of Paediatrics and Child Health, and Psychiatry), the University of Cape Town (Department of Paediatrics and Child Health) the Centre for Proteomic and Genomic Research (CPGR), FARMOVS, Artisan Biomed, SAMRC Genomics Centre and the National Health Laboratory Service (NHLS). New collaborations formed to investigate genetic mechanisms of SARS-CoV-2 susceptibility and disease severity.
- Tygerberg Hospital, the Centre for Proteomic and Genomic Research (CPGR), Artisan Biomed, Mediclinic Southern Africa and FARMOVS: Recruitment of participants.
- COVID-19 Host Genetics Initiative: A global network of researchers investigating SARS-CoV-2 related host genetics

Capacity Development and Transformation

During the reporting period many students were registered for PhDs, MSc and BSc Hons. We supported Postdoctoral/ Early Career Fellows which made up 20% of the student training cohort. Of these, the majority were women and Black South Africans.

From the "Science by Women" perspective, the CTR continues to contribute to promoting women in science through various modalities including membership of SAWISE and the mentorship of junior researchers. As an example, Profs. Sampson and Kuivaniemi serve as formal mentors to emerging female academics, both through the African Academy of Sciences Mentoring Scheme and SU's Early Career Academic Development programme. Drs Liezel Smith, Leanie Kleynhans and Ndivhuwo Tshilillo continue to be part of the ECAD program as mentees. The BSc Hons mentoring programme continues to be led by Drs Liezel Smith, Taime Sylvester and Mrs Dannielle Kenny has expanded to include students from neighbouring divisions and departments at SU. CTR members have contributed to achieving various sustainable development goals, as set out by the United Nations General Assembly. This group consists of a majority of female members at various levels of seniority (goal 5), and hosts students and researchers with diverse demographic backgrounds. The CTR hosts three SARChI Chairs, of which two are women, Animal TB (Prof. Michele Miller) and Mycobactomics (Prof. Samantha Sampson). These world-class female researchers serve as excellent role models for women in science.

A number of female CTR members serve in veterinary, scientific and administrative role models. Dr. Charissa Naidoo former Postdoc was appointed as a lecturer at the CTR on the nGAP program. Some researchers received the Postdoc Awards 2021 for the outstanding scientific contributions. Of these three, two were women, namely, Drs Leigh Kotze and Caroline Beltran who is also a CRICK Fellow. Mrs Dannielle Kenny and her team actively participate in various science engagement and community outreach programs, including the Eskom Science Expo, Community health days, Schools Outreach, etc. Through this, the CTR has increased awareness of STEM career opportunities for young females. The team worked on a Social Impact Vision 2025 draft describing a 5-year implementation plan and envisaged an organogram for the Social Impact office at SU. The CTR thus directly supports the capacity development of female scientists and strongly recognises the growth of individuals in knowledge, skills acquisition and experience. These activities are consistent with national imperatives for the development, mentoring and nurturing of young scientists across the nation and from diverse backgrounds. It is envisaged that this in turn will contribute to the societal growth. Training and capacitating of individuals from previously marginalised communities and genders remain core objectives of the CTR and central to our primary mission.

Science Citizenship and Stakeholder Engagement

During the reporting period, members of the CTR attended many conferences and Workshops, both local and internal. Members of CTR also serve on many National and International Advisory Committees, Editorial committees, Boards and institutional committees.

Impactful Research Translation

The SAMRC Centre for Tuberculosis Research (CTR) in collaboration with Stellenbosch University (SU) is committed to facilitate the translation of research activities and investigative findings by way of innovative, inclusive, sustainable, and transformative engagement to individuals, social groups, organisations, and institutions we serve. It is our goal to address inequality and other underlying causes of ill health by empowering communities to take ownership of their health, promote trust and support in science as well as enthuse South African youth around Science, Technology, Engineering and Mathematics (STEM) careers.

To this end, the CTR was actively involved in numerous science communication and community engagement efforts to advance public and policymaker understanding of health, drivers of ill-health, and practice, interventions and technologies that can prevent ill-health and strengthen health services. A summary of these efforts categorised according to the nature and purpose of these engagements, as well as examples for each is listed below.

- Community Engagement:** Activities within this category include projects/initiatives at a grassroots level that facilitate active engagement between researchers and the community through open dialogue and hands-on activities with the aim to advance knowledge and/or change behaviour by employing an evidence-based methodology that has been shown to promote meaningful engagement resulting in a measurable impact on health-promoting practices. For example, “TB-1-2-3 Science engagement” project hosted from 8-11th November 2021 by the TB Host Genetics Research Group within the CTR hosted the TB-123 science engagement program in Upington. This project aimed to engage with school learners from Upington High School and community members within a high TB burden area through an interactive exhibition to increase TB awareness to combat disease spread and prevalence. The exhibition incorporated 5 themes, each focusing on a different aspect of TB disease, including what TB is and how its spread, how TB is diagnosed, the signs and symptoms of TB, how TB is treated and the inner workings of a TB laboratory. A key thread throughout the exhibition included destigmatising the disease to positively shift attitudes towards those suffering from TB.
- Public Awareness:** Many initiatives targeting various stakeholder groups were hosted by the CTR in 2021 and aimed to generate public recognition regarding research conducted and opportunities (study or training related) available at the CTR as well as increased disease awareness linked to key research focus areas.

Example: “TB in COVID-19 Times” short film published on YouTube, produced by the CTR. This film aimed to highlight the impact of the COVID-19 pandemic on the health research community with particular focus on our research activities, the resilience of the team to adapt and continue vital TB research and a call to action across government and academic sectors to achieve the EndTB goals. This video targets to convince funders, prospective students, as well as the public of the importance of clinical TB research, especially during the COVID-19 crisis. In addition to this, the overview video will profile the CTR as a preferred TB research service provider. By showcasing the research and clinical work done by people of diverse backgrounds (within a high-tech environment), the video will also extend an invitation to different stakeholders to collaborate. Watch at <https://youtu.be/AC95fKaN4zY>.
- Science Communication:** Many science communication outputs were recorded across various media platforms enabling effective means of mass communication enabling engagement with a wide audience. Of these, about half were media interviews, including interviews with journalists, radio interviews, TV appearances, podcast features and live streaming events, featuring postgraduate students, postdoctoral research fellows and senior scientists within the CTR. The remaining ones included popular science pieces, such as press releases, evidence briefs, e- or printed newspaper articles, opinion pieces, blog posts, science-focused websites, and newsletters, which were published across multiple media platforms. Majority of these activities are online and provide an opportunity to engage youthful audiences, as such the CTR invests considerable time in social media and STEM-focused campaigns to facilitate diverse engagement by means of real-time dialogue with several target audiences.
- Educational Presentations:** Many educational presentations, including educational reports, formal seminars, round table discussions, feedback meetings, academic meetings and science-related training workshops were presented by postdoctoral research fellows and senior scientists within the CTR facilitating translation of research findings into a coherent and cohesive format for the public. These engagements provide an opportunity for networking and initiating collaborations with community leaders, business leaders, policymakers, and influential community members, to further facilitate knowledge transfer through question-and-answer sessions and debate difference, which traditional media engagement does not cater for.

MALARIA RESEARCH GROUP



Prof Rajendra Maharaj Unit Director
rajendra.maharaj@mrc.ac.za

OVERVIEW

Considering the changing nature of the disease, nationally and in the region, in mid-2021 the Office of Malaria Research was renamed the Malaria Research Group (MRG). The MRG aims to further the elimination agenda set by the National Department of Health (NDoH) through appropriate research to fill in the gaps in our knowledge and to provide evidence in instances where the policy needs to be changed. The MRG is looking beyond elimination to the eradication of malaria as a public health problem through collaboration, research, and innovation. The MRG 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. As the country transitions from control to elimination, the role of the MRG is: (i) to generate new knowledge and tools to further the malaria elimination agenda and, (ii) to develop a platform for malaria scientists in the country and sub-region to share research information that contributes to the NDoH's elimination agenda. By getting students involved in malaria research, the MRG hopes to develop the next cadre of malaria researchers who over the next 18 years will take South Africa to the point where malaria has been eradicated.

COVID-19 related research and development

The COVID-19 pandemic presented a unique opportunity to study the importation of malaria from neighbouring countries. It has long been hypothesised that imported malaria plays a big role in the continued transmission of malaria in KwaZulu-Natal. The hard lockdown saw the closure of the border posts, effectively stopping the movement of people from outside the borders of the country into South Africa. In order to test our hypothesis, we used the 5-year data from 2015-2019 as our baseline for imported and local transmission. The hard lockdown and the movement to different levels of lockdown provided weekly data which was then compared to the corresponding month in our baseline period. Although the formal borders were closed, we still encountered movement between South Africa and Swaziland as well as between KwaZulu-Natal and southern Mozambique, and hence some imported cases. The restriction on movement of people did result in a significant difference between the imported cases pre-COVID-19 compared to the COVID-19 period. Also, the number of local cases decreased for the corresponding periods during lock down, presumably due to the decrease in secondary infections from imported cases. This study demonstrated that stricter measures to control the movement of people across borders is

necessary in curtailing imported malaria. However, border closures have huge financial implications and this study recommended that screening be conducted at border crossings to pick up the asymptomatic and gametocyte carrying individuals. To increase efficiency, alternate methods of screening should be investigated.

Bridging other research gaps

- Evaluation of new chemicals on different house surfaces for indoor residual spraying.
- Research to determine the insecticide resistance profile in vectors in the 3 endemic provinces in South Africa.
- KAP survey to determine communities understanding of malaria and their response to the malaria control programme in the 3 endemic provinces.
- Determining the use of new technology such as drones and the Internet of Things for surveillance, monitoring and evaluation.
- Development of new and less intrusive diagnostic tools for identifying individuals carrying malaria parasites.
- Impact of cross-border malaria on malaria elimination efforts in South Africa.

Reimagining research in a time of COVID-19

The Malaria Research Group had funded projects that were due to start at the beginning of 2021 but due to the various restrictions imposed by the COVID-19 pandemic, especially in terms of travel, all projects needed to be reviewed and discussions held with funders to agree on new timelines and expectations. It must be highlighted that almost all projects run by the MRG involve field work and travel to provinces in South Africa as well as internationally and is an integral part of the research conducted at the MRG. Therefore, to ensure that progress on projects continued, online meetings and planning was done. As travel restrictions were relaxed and flights became available, field work commenced.

Capacity Development and Transformation

The MRG has been involved in providing training to members of the malaria control programmes in the malaria endemic provinces. This involved training to conduct entomological monitoring as part of the foci clearing programme adopted by the provincial Departments of Health. Three black entomological technicians were recruited and trained by the MRG staff and deployed to

work in the malaria affected provinces in order to develop capacity within the provincial malaria control programmes.

Apart from short courses, Prof. Maharaj currently supervises 3 students from the University of KwaZulu-Natal and one student from the University of Pretoria. The MSc students consist of 1 coloured female and one black female. The PhD students consist of two black males and an Indian female. All three students are involved in different aspects of malaria related research.

Advancing research through collaborations and partnerships

Actellic Study: This was a field study funded by Syngenta and was undertaken to determine the long-term efficacy of a micro-encapsulated formulation of the organophosphate insecticide pirimiphos-methyl on mud, cement and cement-painted wall surfaces which are sprayed during routine spray campaigns. This project required collaboration between insecticide manufacturers and the provincial Departments of Health.

Insecticide Resistance: Due to the increasing levels of insecticide resistance on the continent, it is necessary to determine the resistance/susceptibility status of vectors in South Africa. The Lubombo Spatial Development Initiative 2 (LSDI2) funded research on the insecticide resistance profile of vectors in KwaZulu-Natal, Limpopo, and Mpumalanga provinces. This required the collaboration of the communities living in the study areas and partnering with the provincial Malaria Elimination Programmes, LSDI2 and the University of KwaZulu-Natal.

KAP survey: The survey was conducted in the malaria affected districts of the malaria endemic provinces to determine the uptake of malaria interventions in the light of decreasing morbidity and mortality. The survey was funded by the LSDI2 and involved collaboration with Humana-People-to-People and the provincial Malaria Elimination Programmes.

Source reduction in southern Mozambique: In order to eliminate the disease, there needs to be zero local or imported cases. Gaza and Inhambane provinces in southern Mozambique have been identified as the main source of imported infections into KwaZulu-Natal. The South African Treasury funded a project to monitor and evaluate the impact of source reduction activities on malaria importation into KwaZulu-Natal. This involved a collaboration between the National Department of Health, provincial Departments of Health, Centro de Investigação em Saúde de Manhiça (CISM) in Mozambique, LSDI2, Goodbye Malaria and University of KwaZulu-Natal.

Maintaining local and international footprint

MRG staff members served on several committees, attended conference and workshops.

Impactful Research Translation

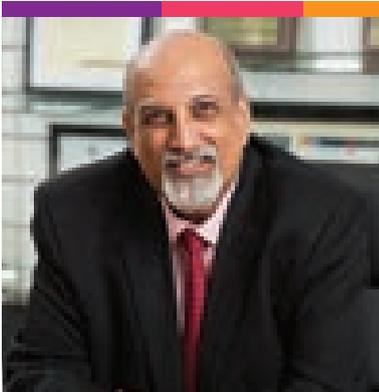
Most of the Group's research in the past year focused on testing new chemical ingredients that were formulated for public health use. South Africa currently relies on DDT for malaria vector control. Since the production of DDT is being diminished, the malaria control programmes require new insecticides to replace DDT and kick-start the elimination programme which has reversed since 2017. New chemicals manufactured by Bayer (Fludora Fusion), Syngenta (Actellic) and Sumitomo (SumiShield) were evaluated in mud, cement plastered and painted houses in the malaria endemic areas of KwaZulu-Natal. Insecticide efficacy results were shared with the insecticide manufacturers and the national Department of Health. The results of these studies will inform the replacement of DDT and influence the insecticide of choice for the malaria elimination programme in South Africa.

A Knowledge, Attitude and Practices (KAP) survey was conducted in KwaZulu-Natal, Limpopo, and Mpumalanga provinces to determine the uptake of malaria interventions in the light of the elimination agenda. The results of this survey are currently being analysed and will impact on the information, education, and communication (ICE) material produced by the provincial Health Promotion teams to improve public awareness in the provinces. The messages will be tailored to target KAP gaps in the community.



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

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



Prof Salim S. Abdool Karim Unit Director
salim.abdoolkarim@caprisa.org

OVERVIEW

The CAPRISA-MRC 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-MRC HIV and TB Pathogenesis and Treatment Unit are:

1. Implementation science to enhance translation of clinical trial evidence into effective integrated HIV-TB services to improve survival of HIV-TB co-infected patients.
2. Improving survival of HIV-TB co-infected patients through optimised treatment.
3. Generating new knowledge on immunological mechanisms associated with the high risk of TB recurrence and COVID-19 in HIV-infected patients.
4. Impacting policies and practices aimed at reducing burden of the dual TB HIV epidemics.
5. Building research capacity and sustainability of health research in South Africa.

COVID-19 related research and development

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

- CAP 221: Observational study on COVID-19 transmission and natural history: Epidemiological Investigation to Guide Prevention and Clinical Care.
- CAP 219: COVID-19 staff surveillance study.
- CAP 225: Vulindlela COVID-19 community survey.
- CAP 227: HAST screening survey.
- CAP 228: COVID-19 severity and outcomes in HIV and Tuberculosis co-infected patients.
- CAP 230: Natural History and Laboratory Tests for COVID-19 in South Africa, HALT COVID-19.
- Assessing the impact of the COVID-19 pandemic on investigation and diagnosis of TB meningitis at a Durban Regional Hospital.
- Characterisation of nasal T cell responses to COVID-19 vaccines.

During this reporting period, many COVID-19 related papers were published. In addition to the COVID-19 related research, the following suite of HIV and TB related studies has been recently funded:

- **TARGET-TB:** Targeting TB transmission hotspots to find undiagnosed TB in South Africa: A genomic, geospatial, and modelling study. This is a collaborative study with scientist Prof. Barun Mathema from Columbia University that tests a general hypothesis that spatial clusters of transmission drive most of the TB burden in a community and targeting these locations for active case-finding is effective and efficient. This NIH R01 will run over the next five years.
- **ADAPTIVE:** Advanced Genotypic and Phenotypic Monitoring of Drug-Resistant MTB to improve TB Treatment Outcomes. Adaptive evaluation of mHealth and conventional adherence support interventions to optimise outcomes with new treatment regimens for drug-resistant tuberculosis and HIV in South Africa is a NIH R01 that has been recently funded.
- **INSIGHT:** INSTI's for the management of HIV-associated TB, this is a phase 2b study to evaluate the efficacy, safety and pharmacokinetics of twice daily BIC/FTC/TAF in ART-naïve PLWHA co-infected with TB, receiving rifampicin-based TB therapy. This NIH R01 will run over the next four years.
- **TRIAD:** Triage Test for All Oral DR.-TB Regimen. A Phase 4 operational study to evaluate the effectiveness, operational feasibility, acceptability, and cost-effectiveness of implementing the Xpert MTB/XDR for rapid triage and selection of all-oral regimens for DR.-TB. INSTI's for the management of HIV-associated TB. This multi-site EDCTP study will run over the next four years.

Other ongoing research studies:

- CAPRISA driven research studies: CAP 020 Index Study, Praxis Study, CONTEXT Study, HARVEST study.
- Collaborative Gates Funded studies: REVAX, MESA.
- DAIDS funded: CLOFAST and Phoenix Studies.

Reimagining research in a time of COVID-19

The CAPRISA-MRC Unit have restructured staff effort, infrastructure, facilities, and our research portfolio to accommodate COVID-19. These include:

- Expansion of research portfolio to include studies on COVID-19 pathogenesis, transmission, phylogenetic analysis, immunology, natural history, clinical course, and outcomes into CAPRISA's research portfolio.
- New studies on COVID-19 vaccines for prevention of severe disease.
- Repurposed, customised clinical and laboratory facilities for COVID-19 research.
- Expanded scope of work of all staff to include COVID-19 projects.
- Evaluation for new drugs and diagnostics for COVID-19.
- Network-driven COVID-19 treatment and prevention research now included in CAPRISA's research portfolio.
- COVID-19 screening and testing for study participants, including those in non-COVID-19 protocols.
- Daily COVID-19 screening for all staff with additional PPE use for all frontline patient facing staff.



Prof. Naidoo Head of HIV & TB Treatment Research explaining anticipated side effects from interventional products at the CAPRISA eThekweni Research Clinic

Advancing research through collaborations and partnerships

- AHRI – Consequences of HIV and TB co-infection on COVID-19 Disease Dynamics, Severity, and Immune Responses, COMMIT-KZN consortium in Collaboration with Dr. Alex Sigal.
- CERI/KRISP – Collaborative Publications with Prof. S Karim and Prof. T de Oliveira.
- Sisonke:
 - (i) CAPRISA provided scientific leadership through contributions by CAPRISA scientists Dr. Nigel Garrett and Dr. Nonhlanhla Yende Zuma in the Sisonke study design, implementation oversight and analysis and publications.
 - (ii) Dr. Nonhlanhla Yende Zuma was the Protocol statistician on the Phase 3b Sisonke study.
 - (iii) The CAPRISA eThekweni and Vulindlela Research Sites contributed patients to both the Ensemble and Sisonke studies.
- Collaboration with KZN Epicentre in conducting the CAP 230 HALT study, sponsored by EDCTP and FIND.
- Global Virus Network added CAPRISA as a Centre of Excellence. The GVN represents 68 Centres of Excellence and 10 Affiliates in 36 countries comprising foremost experts in every class of virus causing disease in humans. Dr. Rubeshan Perumal conducted a webinar titled Long COVID-19 – The Tsunami After the Waves.

Capacity Development and Transformation

- Professor S Abdool Karim, previous chair of the Ministerial Advisory Committee (MAC) on COVID-19, provided leadership, guidance, epidemiologic and scientific updates to the SA cabinet, governments in several countries and the people of SA. Professor S Abdool Karim provides weekly epidemic intelligence reports that summarises the SA pandemic from the view of policy makers scientists and implementers.
- CAPRISA also had Masters and PhD students, some of which have completed their studies.

Impactful Research Translation

CAPRISA have been impacting science through policy, guideline development and practice to relevant stakeholders and the public community.

Science Citizenship and Stakeholder Engagement

- Professor Salim Abdool Karim: MAC Chair for COVID-19, UNAIDS Advisory Group (to the Executive Director of UNAIDS), International Science Council, WHO Science Council, WHO HIV, TB Task Force, Human Reproduction Programme Advisory Group, Global Solidarity COVID-19 Treatment and Vaccine Trial Executive Committee, Gates' Foundation Scientific Advisory Board for Global Health, PEPFAR Scientific Advisory Board, African CDC Consortium for COVID-19 Vaccine Clinical Trials (CONCVACT), Africa Union Commission on COVID-19, International Union against TB & Lung Disease Ethics Advisory Group, National TB Think Tank, South African National Drug Resistance TB Advisory Committee and KZN Clinical Governance and Pharmacovigilance Committee.
- Prof. Kogieleum Naidoo: Implementation for Impact Working Group and WHO guideline advisory committee, SA TB Recovery Plan Working Group, WHO HIV-TB 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 Kharituwe study, Data Safety Monitoring Board member of the Triage TB Study.
- Dr. Rubeshan Perumal serves as an advisor on: Hannover-Re Insurance (Implications of LC for the insurance industry), NIOH (Implications of LC for Compensation of Occupation Injury), SASOM (Impact of LC on the workforce) and MMPA (Impact of LC on the mining sector and lessons for mine medical practitioners)
- Dr. Nesri Padayatchi serves on the Ethics Advisory Group of the International Union Against TB and Lung Disease (IUATLD), South African National Drug Resistance TB Advisory Committee.
- Mr Patrick Mdletshe Head of CAPRISA's Community Programme chairs the SANAC Undetectable = Untransmittable National Dialogue Session, the KwaZulu-Natal Provincial Council on AIDS (KZN PCA) and the KZN Civil Society. Mr Mdletshe facilitates regular and rich engagements between scientists and relevant stakeholders, civil society and community leaders.

SAMRC/NHLS/UCT MOLECULAR MYCOBACTERIOLOGY RESEARCH UNIT



Prof Valerie Mizrahi Unit Director
valerie.mizrahi@uct.ac.za

OVERVIEW

The objective of the SAMRC/NHLS/UCT Molecular Mycobacteriology Research Unit is to study fundamental aspects of the physiology and metabolism of *Mycobacterium tuberculosis* of relevance to tuberculosis drug discovery, drug resistance, mycobacterial persistence and the aerobiology of tuberculosis (TB) transmission. Two areas of research and innovation stand out during the year under review. In arguably the most significant scientific advance from the MMRU in the past 10 years, MMRU researchers, working in close collaboration with clinicians and epidemiologists at the Desmond Tutu Health Foundation in Cape Town, used a combination of advanced engineering technology and single-cell microbiology to provide evidence demonstrating the importance of tidal breathing in the release of viable tubercle bacilli in the bioaerosol produced TB patients. This finding suggests that breathing may be an even more significant contributor to the spread of TB than coughing – the signature symptom of this disease. This discovery, which has been accepted for publication in a top international journal, was featured in a news report published on the front page of the New York Times on 21 October 2021. Secondly, in a major study that draws on the MMRU's specialist expertise in the biology of TB drug discovery on the one hand, and long-standing interest in mycobacterial DNA metabolism on the other, MMRU researchers applied a suite of biological assays to elucidate the mechanism of antimycobacterial action of a natural product, nargenicin, and demonstrated that this compound disrupts DNA replication by targeting the essential replicative DNA polymerase enzyme, DnaE1.

These results provided compelling pharmacological validation for DnaE1 as a vulnerable new TB drug target and has inspired early-stage drug discovery efforts focused on this enzyme with a team of international collaborators, under the auspices of the TB Drug Accelerator programme of the Bill & Melinda Gates Foundation.

COVID-19 related research and development

The COVID-19 pandemic presented a unique opportunity to study the importation of malaria from neighbouring countries. It has long been hypothesised that imported malaria plays a big role in the continued transmission of malaria in KwaZulu-Natal. The hard lockdown saw the closure of the border posts, effectively stopping the movement of people from outside the borders of the country into South Africa. In order to test our hypothesis, we used the 5-year data from 2015-2019 as our baseline for imported and local transmission. The hard lockdown and the movement to different levels of lockdown provided weekly data which was then compared to the corresponding month in our baseline period. Although the formal borders were closed, we still encountered movement between South Africa and Swaziland as well as between KwaZulu-Natal and southern Mozambique, and hence some imported cases. The restriction on movement of people did result in a significant difference between the imported cases pre-COVID-19 compared to the COVID-19 period. Also, the number of local cases decreased for the corresponding periods during lock down, presumably due to the decrease in secondary infections from imported

cases. This study demonstrated that stricter measures to control the movement of people across borders is necessary in curtailing imported malaria. However, border closures have huge financial implications and this study recommended that screening be conducted at border crossings to pick up the asymptomatic and gametocyte carrying individuals. To increase efficiency, alternate methods of screening should be investigated.

Bridging other research gaps

- Using previously described bioaerosol capture technology, MMRU researchers had demonstrated cough-independent release of viable *M. tuberculosis* in bioaerosol; this implied the contribution of alternative mechanisms for how and when *M. tuberculosis* is aerosolised. To compare the aerosolisation of *M. tuberculosis* and particulate matter from GeneXpert-positive patients during three separate respiratory manoeuvres: tidal breathing, forced vital capacity, and cough. Bioaerosol sampling and *M. tuberculosis* detection were combined with real-time assessments of CO₂ production and particle counts from 39 confirmed TB patients. Tidal breathing and forced vital capacity produced comparable numbers of particles, with cough producing >4-fold more. Notably, while cough produced more *M. tuberculosis* than tidal breathing, the relative infrequency of coughing compared to breathing implies that breathing likely contributes >90% of the daily aerosolised *M. tuberculosis*. Thus, while cough increases particle aerosolisation compared to breathing, this is not associated with increased *M. tuberculosis* aerosolisation. Instead, tidal breathing produces more *M. tuberculosis* per particle than cough. Assuming the number of viable *M. tuberculosis* organisms detected provides a proxy measure of patient infectiousness, these observations imply a significant contribution of breathing to TB transmission and have major implications for understanding the dynamics of TB transmission.
- In a study led by MMRU researchers and done in collaboration with colleagues in the Netherlands and the USA, the mechanism of antimycobacterial action of the natural product, nargenicin was elucidated. This compound was shown to be a bactericidal genotoxin that induces a DNA damage response in *M. tuberculosis* and inhibits growth by blocking the activity of the replicative DNA polymerase, DnaE1. Cryo-electron microscopy by MMRU collaborators revealed a remarkable mode of action: binding of nargenicin to *M. tuberculosis* DnaE1 requires the DNA substrate such that nargenicin is wedged between the terminal base pair and the polymerase and occupies the position of both the incoming nucleotide and templating base. This work has laid the foundation for major drug discovery efforts focused on DnaE1 and forms part of a broader research programme on targeting the DNA replication machinery of *M. tuberculosis* for drug discovery.

- As part of a collaboration with the Lewinsohn group (Oregon Health Sciences University), researchers in the MMRU have generated a library of mutants in the riboflavin (vitamin B2) biosynthesis pathway of *M. tuberculosis* to investigate the role of pathway intermediates in the function of mucosal associated T (MAIT) cells in protection against TB infection.

Capacity Development and Transformation

The MMRU has contributed to capacity development by using research as the vehicle to develop scientists who are able to work at an internationally competitive pace and standard, and who can hold their own as participants in, and contributors to, collaborative projects involving researchers at top international institutions. Over the past year, the MMRU has taken an intentional approach towards transformation by ensuring that all 8 students newly recruited to the MMRU (Honours to postdoc) are black South Africans. Furthermore, 4 PhD students graduated in 2021/22, the thesis of one PhD student is in revision and 3 others will submit their PhD theses in the next 2 months. One MSc student graduated with distinction and has registered for a PhD along with 2 others bringing the total number of PhD students in the MMRU to 13. Two postdocs completed their fellowships and were appointed to contract faculty positions at UCT.

Advancing research through collaborations and partnerships

All MMRU research projects conducted over the past year were done in collaboration with others. Some projects were led by researchers in the MMRU, whereas in others, MMRU researchers served as contributing investigators. In all cases, the MMRU's role was based on the Unit's expertise in mycobacterial physiology, metabolism and genetics, 'omics and single-cell technologies. Research on the aerobiology of TB transmission forms part of a long-standing collaboration with the team led by Robin Wood from the Desmond Tutu Health Foundation and Desmond Tutu HIV Centre at UCT. This collaboration, which took advantage of an imaging tool developed in the laboratory of collaborator Carolyn Bertozzi at Stanford University, inspired another collaboration with David Barr (University of Liverpool) and Graeme Meintjes (UCT) on the microscopic detection of *M. tuberculosis* in bloodstream TB infection in patients with advanced HIV co-infection. International collaboration also featured very prominently in the MMRU's programme of research on early-stage TB drug discovery, with some of the collaboration enabled by the MMRU and IDM director, Valerie Mizrahi's membership of the TB Drug Accelerator. Meindert Lamers (Leiden University Medical Centre), a leading structural biologist, used cryoelectron microscopy to solve the structure of DNA-dependent, nargenicin-bound DnaE1. His group and that of John McKinney (École Polytechnique Fédérale

de Lausanne) also collaborated with the MMRU to elucidate, using biochemistry and live-cell imaging, the functional dynamics of a complex DNA damage tolerance system discovered many years ago in the MMRU. MMRU researchers also collaborated with the groups of Umesh Varshney (IISC, India), David Lewinsohn (OHSU) and Karen Dobos (Colorado State University) on various projects, and with Kyu Rhee (Weill Cornell Medicine), D. Branch Moody (BWH, Harvard) and Jeremy Rock (Rockefeller University) as members of the newly created, NIH-funded TB Research Unit, Myco3V. All MMRU collaborations are grounded in complementarity interests and expertise.

Maintaining local and international footprint

During the reporting period, MMRU staff members served on many committees, and attended conference and workshops.

Impactful Research Translation

The MMRU has worked very closely with Eh!woza, an NPO that originated in the MMRU in 2013, and has grown into an organisation that operates at the intersection of public engagement, youth education, advocacy, and skills development. Led jointly by Anastasia Koch, a former PhD student and Junior Research Fellow in the MMRU and Digby Warner, deputy director of the MMRU, Eh!woza was particularly active over the past year in public engagement around COVID-19. One of these efforts involved producing a set of informational content on COVID-19 vaccines, in collaboration with artist, Mitchell Gilbert Messina. The work that started in 2020, continued through 2021, bringing the total number of animations produced to 14. These media are available as a free informational resource for any organisation or platform.

In 2021, Eh!woza began translating animations into IsiXhosa, IsiZulu, Setswana and Sesotho in a partnership with the Sunshine Cinema that will see animations disseminated widely throughout South Africa early in 2022 in the form of facilitated screenings. Finally, a subset of animations was converted into simplified banners that were published in Vukani News. Surveys administered by the Eh!woza team indicated that while social media is an important platform for the dissemination of information, local newspapers and radio are valued and trusted in terms of health information. Therefore, by publishing in Vukani, an audience who may not have access to, or trust, social media was targeted. This work was supported by an NRF Community Engagement Grant, a Wellcome Trust Discretionary Award and NRF COVID-19 Rapid Africa Grant.



SAMRC/NHLS/UCT Molecular Mycobacteriology research laboratory staff.

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



Prof Shabir A. Madhi Unit Director
madhis@rmpru.co.za

OVERVIEW

The Vaccine and Infectious Diseases Analytics Research Unit (VIDA) was established in 2019 and was a succession to the Pneumococcal Diseases Research Unit and subsequently rebranded Respiratory and Meningeal Pathogens Research Unit, which had been established in 1997. VIDA research is focused on clinical and molecular epidemiology of vaccine preventable disease, clinical development and evaluation of vaccines, study of the immunology of vaccines including in people living with HIV and basic science research aimed at discovery of potential vaccine epitopes. In the last few years, the Unit has also established a health and demographic surveillance (HDSS) platform to understand the context in which infections occur and how population dynamics are affected by disease trends, both in children and in pregnant women. This HDSS platform has provided an integral platform to understand COVID-19 epidemiology and the direct and indirect effects of disease across all age groups. The Unit has established itself to be a premier clinical trial facility for vaccine research and has undertaken pivotal studies on pneumococcal conjugate vaccine, rotavirus vaccine, as well as being an international leader in vaccine studies in pregnant women aimed at the protection of mother-newborn dyads. Over the past two years, VIDA has been at the forefront of COVID-19 vaccine research in Africa, having spearheaded the first two COVID-19 vaccine studies undertaken on the continent.

COVID-19 related research and development

- VIDA conducted the first two COVID-19 clinical trials in South Africa.
- Oxford COVID-19 Vaccine Trial, officially called the Ox1CoV-19 vaccine VIDA-trial, the 'Oxford trial' was announced on 23 June 2020. Researchers began vaccinating human volunteers with a new vaccine called ChAdOx1 nCoV-19 on 24 June 2020.
- Novavax COVID-19 Vaccine Trial, the published data provide additional detail of an initial analysis conducted in January, while more robust data from a complete analysis of the study was subsequently shared in March 2021. This is the first published study to show protection against mild COVID-19 caused by the B.1.351 variant circulating in South Africa at the time.
- VACSAFE – Vaccine Information Network project, in partnership with WITS US at Columbia University, is taking part in this social behavioural sciences initiative around the national vaccine implementation and COVID-19. This project aims to evaluate the motivations for, and barriers to vaccination, and use this information to develop a communication strategy that can support enhanced uptake of vaccines and completion of vaccination series at a local population level. This study is being conducted in South Africa and Zimbabwe with financial support from the Bill and Melinda Gates Foundation, Schmidt Futures and a donation by Aspen Pharmacare.

- Interferon: IFN-Beta for early COVID-19, A multi-centre, placebo-controlled study of interferon Beta-1a in high risk COVID-19 outpatients. The primary objective of this study is to see whether short-term intramuscular interferon Beta-1a, administered early in the disease course, reduces the composite risk of the need for hospitalisation or death in high-risk unvaccinated individuals with COVID-19. Secondary objectives include seeing whether interferon Beta leads to a quicker viral clearance, or faster symptom resolution.
- Impact of COVID-19 on maternal and neonatal health in South Africa, where this study investigated the effects of COVID-19 on mother and new-born outcomes in an established pregnancy cohort in South Africa.
- Transmission dynamics of SARS-CoV-2 at household level, nested within the HDSS, this study aimed to establish the extent of COVID-19 transmission within households by estimating infection rate for household contacts at an individual level, and factors associated with any variation in the infection risk.
- Surveillance of COVID-19 in healthcare workers, Surveillance among healthcare workers for SARS-CoV-2 infection – to investigate the epidemiology of SARS-CoV-2 infection among health care workers who triage patients and provide care to COVID-19 patients.
- Effectiveness of COVID-19 vaccination in eSwatini against SARS-CoV-2 associated hospitalisation and death. This study was divided into vaccine implementation and vaccine effectiveness. Wits VIDA supported the vaccination roll-out and passive monitoring of serious adverse events following immunisation in eSwatini in collaboration with the eSwatini Ministry of Health and the Luke Commission. VIDA further supported vaccination education through an awareness campaign in collaboration with an experienced marketing team, whilst consulting government role players, local traditional leaders and influential voices in the Kingdom of eSwatini. For the vaccine effectiveness component, VIDA further collaborated with the eSwatini Ministry of Health and the Luke Commission to determine the vaccine effectiveness of AZ1222 against severe disease due to the various SARS-CoV-2 variants.
- Population-based sero-epidemiological investigation of SARS-CoV-2 virus infection in the Kingdom of Eswatini. The aim for this study is to get an accurate estimate of the extent of COVID-19 infections in the Kingdom of eSwatini's population. Wits VIDA, in collaboration with the eSwatini Ministry of Health, conducted this SARS COV-2 Seroprevalence survey in all sub-regions of the country.
- COVID-19 RSV Dynamics in the context of COVID-19-South Africa – the purpose of this study is to generate epidemiological data on the dynamics of respiratory syncytial virus in the context of COVID-19 by magnitude, age, severity, timing, and season.
- CHAMPS – The CHAMPS (Child Health and Mortality Prevention) Project and its various sub-studies continue to generate valuable data in the COVID-19 era. Sub-studies evaluating the direct and indirect effects of COVID-19 at household and community level are underway.
- COVID-19: Sero-epidemiological investigation of SARS-CoV-2 in Gauteng and Northwest Province. Results from this study have been published and showed that South Africa had immunity against severe COVID-19 disease and death before Omicron due to prior infection and vaccination. An additional Serosurvey is underway ahead of the next wave of infections in Gauteng in 2022.
- Several COVID-19 clinical trials have also taken place during the reporting period. This includes PRO-CL-002 under the sponsorship of Providence therapeutics that evaluates a new mRNA vaccine, evaluation of the Pfizer vaccine in pregnant women, evaluation of different dosing schedules of the Astra Zeneca vaccine in older adults and a recent initiation of the vaccine trial from the sponsor called Gritstone which evaluates a novel self-replicating mRNA vaccine in COVID-19 naïve and convalescent subjects.

Bridging other research gaps

The studies done on pneumococcal conjugate vaccine and rotavirus vaccine in children contributed to South Africa being the first African country to include both vaccines in its public immunisation program; and underpinned the WHO recommendation for the inclusion of these vaccine into public immunisation programs of other low- and middle-income countries.

VIDA also performed the first placebo-controlled randomised trial of the influenza vaccine in pregnant women, that contributed to WHO recommending for the prioritisation of pregnant women to be vaccinated with seasonal influenza vaccines.

It has also undertaken the first studies of an investigational multi-component Group B Streptococcus (GBS) conjugate vaccine in pregnant women; a portfolio of research that is ongoing- including discovery research on other potential GBS vaccine epitopes. This is pertinent to Africa and South Africa, which has reported the highest incidence of invasive GBS disease globally.

A further important respiratory pathogen being investigated by VIDA over the past 25 years is Respiratory Syncytial Virus. VIDA has been intricately involved in the evaluation of a long-lasting monoclonal antibody that is more affordable than the currently available palivizumab and is also participating on RSV vaccine trials in pregnant women, including having led the first such study of a nano particle F protein vaccine in pregnant women.

Reimagining research in a time of COVID-19

The Unit has grown significantly in terms of research management and human resources during the COVID-19 pandemic to meet expanded research objectives and expectations. VIDA's laboratory and clinical services teams have adapted to effectively accommodate exponential increases in study participants and samples and maintain a professional and ethical standard. The unit's operations and facilities have been expanded to adapt accordingly, in turn increasing the unit's capabilities to serve future research endeavours. The unit has invested in its brand identity development and adapted leadership structures towards an innovative and dynamic future. VIDA has restructured the way household-based teams operate, providing different levels of personal protective equipment (PPE) to ensure safety of data collection teams.

Capacity Development and Transformation

VIDA's new organisational structure includes additional unit management functions which contribute to dynamic and sustainable growth of the organisation. The unit has employed managers as part of the company's transformation agenda and sought to provide leadership development and training opportunities within the organisation. Senior researcher's mentor and train post-graduate students with a focus on PhD and clinician scientists. VIDA has recently also embarked on vaccine discovery, with one of the PhD student's supervised by Professor Madhi using reverse vaccinology to identify at least three novel GBS putative protein epitopes as potential vaccine candidates.

The unit director, Prof. Shabir Madhi has grown Wits VIDA into five clusters, including epidemiology, clinical immunology, molecular studies, clinical trials, and data management. Each of these clusters are led by scientists who were mentored by the nominees as PhD students and/or as post-doctorate students. He continues to facilitate the growth of the Unit by championing programs that involve scientist from other African countries, hence establishing a new south-to-south network of collaborators. This initiative is already yielding dividends with grants to the value of \$5 million recently being secured under the nominee's leadership to establish a network of surveillance sites on COVID-19 vaccines across eight African countries.

The director also plays a mentorship role to the mid-level scientist leading the clusters by assisting them with grant writing and encouraging them to assume greater roles in initiating their own research beyond the interest of the unit. The research leadership team are integrally involved in the co-supervision of master's and PhD students, which

has contributed to the success of having completed supervision of 19 PhD's and 3 Masters students between 2014 and 2021, 3 PhD students who submitted their theses for examination in 2022, and a further 13 currently still under supervision.

Advancing research through collaborations and partnerships

VIDA collaborates extensively with local and international partners, research units and universities. The Ox1CoV-19 vaccine VIDA-trial saw the unit collaborating with seven research sites across South Africa, including Wits RHI, Perinatal HIV Research Unit, FAMCRU (Stellenbosch University), University of Cape Town lung institute, Soweto clinical trials centre and Setshaba research unit.

The African Leadership in Vaccinology expertise (Alive) is co-directed by Professors Shabir Madhi (Wits-VIDA) and Helen Rees (Wits RHI). Alive was awarded a grant by the Gavi Alliance to conduct COVID-19 vaccine active safety surveillance in eight AMC-92/Gavi-eligible countries in Africa. Alive coordinated the grant application, and together with GVDN, have developed study-related documentation and the database. Surveillance of hospital admissions for adverse events of special interest will be conducted in Mali, Ghana, Nigeria, Ethiopia, Kenya, Malawi, Mozambique and Eswatini. Surveillance will take place from March 2022 until June 2023. Wits VIDA collaborated with the Global Vaccine Data Network (GVDN) for a study undertaking the sentinel surveillance of adverse events of special interest (AESIs) after vaccination with COVID-19 vaccines in South Africa. eSwatini Studies – VIDA collaborated with the Ministry of Health and other stakeholders. These studies were led by Prof. Marta Nunes and Dr. Portia Mutevedzi respectively. Dr. Gaurav Kwatra collaborated with the Liverpool School of Tropical Medicine, the Biovac Institute, Boston Children Hospital, Leiden University medical centre, The Ragon Institute of MGH, MIT and Harvard, St Georges Hospital (University of London) Instituto Nacional de Saúde, Mozambique, Malawi-Liverpool-Wellcome Trust. Dr. Courtney Olwage collaborated with The Wellcome Trust, Wellcome Sanger Institute, Wits Developmental Pathways to Health Research Unit, The Murdoch Children's Research Institute, the University of Melbourne, The Chan Zuckerberg Biohub, Boston Medical Center, St George's University (London). Dr. Vicky Baillie collaborated with the Developmental Pathways to health research Unit, the CZ biohub, KwaZulu-Natal Research Innovation and Sequencing Platform, NIH-Mucosal Pathogens Research unit and the University of Oxford and Oracle's Global Pathogen Analysis System (GPAS). Prof. Marta Nunes collaborated with AstraZeneca, Sanofi, EDCTP, Yale University, Oxford University, Institute Pasteur, and Foundation de France. Dr. Portia Mutevedzi



MITS Team – they form part of the CHAMPS Program.

collaborated extensively with local government, including the Gauteng and North-West Departments of Health on seroprevalence studies. Collaboration through the CHAMPS projects continually include local clinics, communities, and Community advisory boards (CABs). Dr. Portia Mutevedzi collaborated with University of Cape Town to implement a national pregnancy registry and with WITS PRICELESS to assess impact of COVID-19 on health facilities. She also collaborated with WHO AFRO on COVID-19 sero-epidemiological studies. CHAMPS is a multi-site collaboration in 6 African countries and Bangladesh. The Bill and Melinda Gates Foundation continues to extensively support and collaborate with Wits VIDA on numerous projects.

Impactful Research Translation

Wits VIDA scientists continue to feature prominently in the media, educating the public on various public health issues with a focus on COVID-19 information during the reporting period. This includes radio, television, print media, and

social media. Prof. Shabir Madhi has become a leading voice of science in the media since the beginning of the COVID-19 pandemic, and often takes part in webinars, FAQs, seminars and lectures that educate the public as well as the scientific community and students. Between 1 March 2020 and 20 February 2022, he engaged in 1682 media interviews. The total monetary value of these engagements, which would be for the benefit of gaining publicity for the University he is employed at, is estimated to have been more than R110 million. Other researchers that have taken part in media interviews as Dr. Portia Mutevedzi, Prof. Marta Nunes and Dr. Vicky Baillie. Through the CHAMPS program, Wits VIDA has further developed robust public engagement strategies that has created forums of dialogue and information dissemination at various levels. This includes local community engagement, CABs and collaboration with local clinics and hospitals, local government, and schools. The Unit has capitalised on both mainstream and social media to disseminate research results and demystify COVID-19 and COVID-19 vaccines.

OFFICE OF AIDS AND TB RESEARCH UNIT

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



Dr Fareed Abdullah Unit Director

Fareed.Abdullah@mrc.ac.za

OVERVIEW

The Office of AIDS and TB Research provides a unique contribution to the five strategic pillars of the SAMRC by providing a platform for outcomes based contracting (OBC), called Invest4Health, which has established the SAMRC as the thought leader, developer/implementer and learning network provider for impact investing. The OATB works towards the alignment of interests of stakeholders around a focus on outcomes with the costs of public services being reduced through increased competition, freedom in service design, and private sector contribution; implementation of health research in an effective and efficient manner; generation of new knowledge in the field of impact investing and its translation into policy and practice.

The OATB facilitates innovation in service delivery, development of evidence informed service packages for enhanced outcomes, and sharing of information through the Invest4Health platform with greater reach for knowledge translation; supporting innovation and technology transfer to improve health through the use of innovative finance mechanisms that will increase private sector funding to address major health challenges and the development and transfer of innovative monitoring and evaluation systems that are used for OBC; building sustainable health research capacity in SA as the evidence base for programmes with a focus on health outcomes will need to be expanded to address existing gaps as well as the evaluations of the programmes implemented; and these will then optimise the knowledge available for knowledge translation into programme enhancement and scale up.

This means a focus on collaboration with existing SAMRC units, establishing new partnerships including private sector and international donors, raising funds to support the recruitment of the special skills required whilst creating opportunities for research at the SAMRC and the resultant knowledge generation and translation, raising outcomes funding from government and other donors to support the implementation and monitoring, evaluation and research of innovative service packages.

This reporting year has seen a specific focus on building the invest4health platform which will be launched with the launch of the first social impact bond focusing on health outcomes in SA (Imagine SIB) whilst working to enable the approval processes for this SIB and future outcomes-based contracts. This sets the scene for future growth and expansion of the unit allowing the unique contribution to the mandate of the SAMRC to be realised.

Hence the main outputs from the Office of AIDS and TB Research for this year include:

- Raised funds (R25 million) from a private investor for a social impact bond focusing on young women and girls (called Imagine SIB) over 2.5 years.
- Raised outcomes funds (R107,229,000) from the National Treasury through the Department of Science and Innovation over three years.
- Raised funds from ABSA (R 6,842,943) to support the development of a learning agenda and network and an economic evaluation of the Imagine social impact bond.

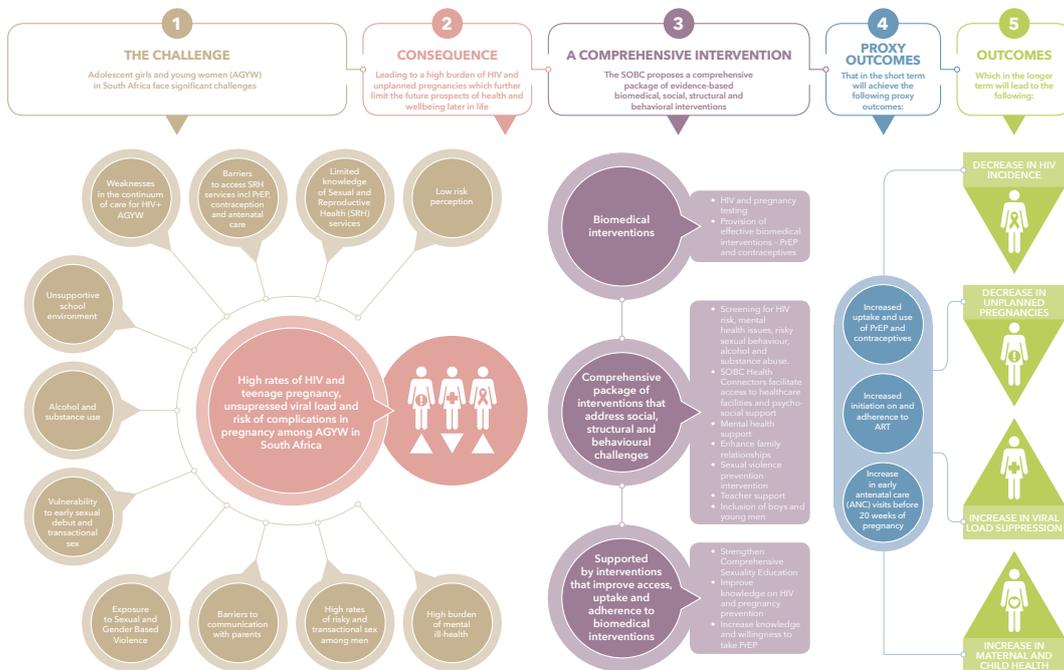
- Raised funds from the Global Fund to fight AIDS, TB and Malaria (USD 2,761,013) over 2.5 years to support the design of the Imagine social impact bond.
- A commitment of funding support from the National Department of Basic Education through the Conditional Grant to support HIV and TB.
- Raised funds from private investors to implement an innovative programme to advance the uptake of COVID-19 vaccination.
- Obtained the necessary approvals for a social impact bond/pay-for-performance contract from the Minister of Health and Minister of Finance.
- Appointment of a company to develop a practice note for National Treasury to guide the development of governance guidelines for future social impact bonds.
- Developed a detailed implementation plan for a social impact bond focusing on adolescent girls and young women with the implementer that has been appointed.
- Developed a monitoring and evaluation plan and information system that includes the outcome indicators with targets for the social impact bond which is approved by the private investor after an in-depth assessment.
- Developed a protocol for the impact evaluation of the Imagine social impact bond that has received ethics approval.

- Developed a protocol for an economic evaluation of the Imagine social impact bond that has received ethics approval.
- Initial design of a second social impact bond focusing on drug resistant TB, called TIME for advancing TB outcomes.
- Developed a platform called invest4health to advance impact investing in SA with the SAMRC as thought leader, intermediary and leading the learning network.
- Developed a strategy to advance the implementation of the invest4health platform.
- Developed and strengthened relationships with Social Finance (UK), the GO Lab (the global knowledge hub for those considering, designing and delivering new approaches to improve social outcomes) at Oxford University, Genesis Analytics, Bertha Centre for Social Innovation and Entrepreneurship.
- Participated in conferences.
- Developed a Learning Agenda to facilitate specific engagement with the learning network for impact investing through our invest4health platform.

The Office of AIDS and TB Research supports the President and CEO in areas of high strategic priority for the SAMRC and the NDOH in HIV, TB, COVID-19 and health systems strengthening.

SOBC THEORY OF CHANGE

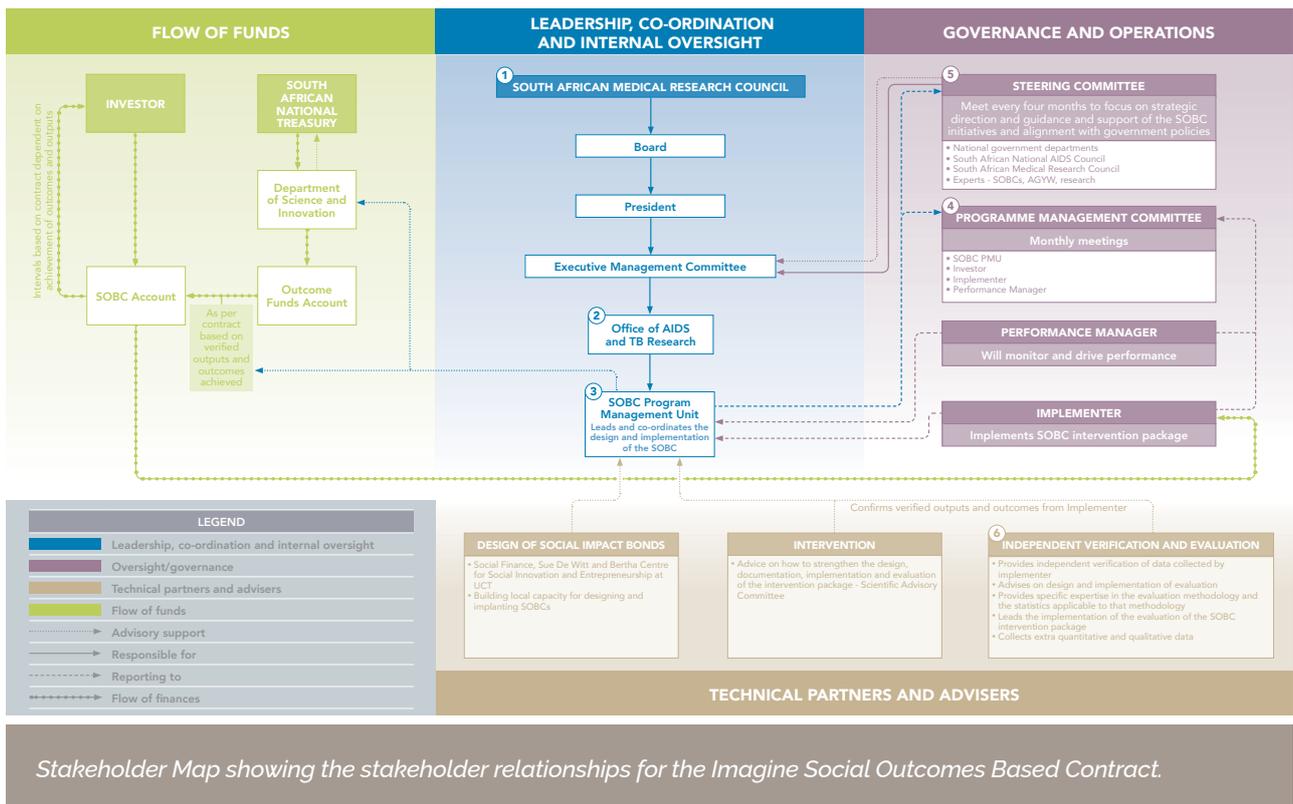
HOW THE SOBC AIMS TO ADDRESS THE CHALLENGES AGYW FACE IN SOUTH AFRICA



Stakeholder Map showing the stakeholder relationships for the Imagine Social Outcomes Based Contract.

STAKEHOLDER MAP

IMAGINE SOCIAL OUTCOMES-BASED CONTRACT FOR ADOLESCENT GIRLS AND YOUNG WOMEN (AGYW)



The Office of AIDS and TB Research is a component of the Office of the CEO and President of the SAMRC and conducts research and policy translation efforts in strategic areas for the SAMRC and the enhancement of the priorities in health care determined by the National Department of Health.

The work of the Office of AIDS and TB Research is to enhance research and policy translation in the following areas:

- HIV, TB and other infectious diseases.
- COVID-19.
- Strengthening health systems.
- Active citizenship.

The Objectives of the Office of AIDS and TB Research include:

- Establishment of a platform for impact investing that will serve as the platform for research and development in innovative financing mechanisms and health programmes to improve investment in and advance health outcomes.
- Develop and test innovative finance mechanisms, such as social impact bonds, to drive the establishment and growth of the impact investing platform.

- Develop a learning agenda and learning network to advance the impact investing platform and expand the inclusion of stakeholders (private sector, government, international donors, and non-government) willing to invest in the projects and research being done.
- Support research to design evidence informed interventions for the specific health challenges addressed by the social impact bonds and other forms of innovative finance mechanisms
- Design and conduct impact evaluations of programmes implemented using innovative financing mechanisms.
- Design and conduct economic evaluations of programmes implemented using innovative finance mechanisms.

COVID-19 related research and development

The OATB Research has been providing clinical, public health and fundraising and logistical support to the Steve Biko Academic Hospital and Gauteng Department of Health since the beginning of the pandemic. A portfolio of COVID-19 related clinical research has been established together with clinicians and academics at the Steve Biko

Academic Hospital and University of Pretoria. These include the following:

- COVID-19 and HIV Cohort Observational Study of Patients admitted to the Steve Biko Academic Hospital (first paper submitted for publication).
- COVID-19 infection in Pretoria: A retrospective descriptive analysis of patients and their outcomes (protocol accepted by UP Health Research Ethics Committee).
- Test-negative design to evaluate effectiveness of COVID-19 Vaccines against COVID-19 acute respiratory illness hospitalisation and infection in South Africa (Protocol Chair, Shabir Madhi).
- Prevalence of SARS CoV-2 IgG antibodies in pregnant women and their healthcare workers in Tshwane, South Africa (study commenced 2 December 2021).
- Co-investigator, Oxygen requirements and approaches to respiratory support in patients with COVID-19 in a hospital setting in South Africa: a WHO study (submitted for ethics approval).
- Study of in-hospital mortality at Steve Biko Hospital before, during and after the COVID-19 pandemic.
- FATE Trial, A phase 3, multi-centre, randomised, double-blinded trial of Favipiravir versus placebo for treatment of mild COVID-19 in outpatients in South Africa (trial on hold).
- Solidarity Trial (WHO COVID-19 Trial) (trial completed).

The highlight of the portfolio of COVID-19 research at Steve Biko Academic Hospital which was led by the Director of the OATB was the global first description of decreased severity due to the Omicron variant published in the International Journal of Infectious Diseases and received worldwide coverage. The preliminary report of this study was published on the SAMRC website and recorded 790 000 impressions on the SAMRC Twitter account.

Support to the Steve Biko Academic and other hospitals in Gauteng fundraising for PPE, critical COVID-19 equipment ranging from oxygen, face masks to ventilators and additional medical and nursing staff. Highlights include the following:

- R104 million was raised from the Solidarity Fund by the OATB Research on behalf of the Gauteng Department of Health and essential COVID-19 related equipment was procured and delivered to 16 Gauteng hospitals.
- R22,2 million was raised from the Solidarity Fund by the OATB Research to provide agency nurses for COVID-19 wards in 8 Gauteng hospitals during the third and fourth waves.

The Director of the OATB has recently been appointed to the Technical Working Groups on Long COVID-19 and Integrating COVID-19 into Essential Health Services of the COVID-19 Ministerial Advisory Committee.

At the request of the Health Ombud, the OATB conducted a clinical review of the quality of care afforded to a patient who succumbed to COVID-19 at a Gauteng public hospital.

This was a high-profile investigation conducted by the Health Ombud at the request of the Minister of Health and the family of the deceased patient.

The OATB represented the SAMRC at the hearings of the Moseneke Inquiry into the holding of national elections in November 2021. The recommendations of the OATB were accepted by the Inquiry but overturned in the Constitutional Court where the SAMRC submissions were entered into the formal court record.

Bridging other research gaps

TB Report:

The OATB's flagship project is TB RePORT (Regional Prospective Observational Research for Tuberculosis) which is an ambitious basic science and biomarker project linking more than 18 TB study sites in South Africa with research teams in the US, Brazil, India, China, Indonesia and the Philippines. The project is co-funded by the US National Institutes of Health, united by a common study protocol and a national biorepository in each country. The South African consortium is led by the University of Cape Town's SATVI Unit and will support the development of TB vaccines, diagnostics and drugs across the collaborating countries.

During the year under review, seven papers were published.

In addition, the RePORT budget supports a long neglected Clofazamine dosing study for MDR-TB. This is being led by Prof. Graeme Meintjies from the UCT Department of Infectious Diseases.

The main policy translation work of the OATB has to do with the National TB Think Tank which serves as a bridge between the TB research community and the National TB Programme. The Think Tank is funded and Co-chaired by the OATB Research.

The Director of the OATB serves as patron of TB Proof which is a civil society body that represents (mostly) health workers that have survived MDR TB and whose mission it is to improve the country and global response to MDR TB.

The OATB has developed relationships with French TB collaborators at multiple French agencies and is working at formalising partnerships in TB research between the two countries.

HIV:

The OATB oversees funding from Janssen Pharmaceuticals and GSK to support the provision of PrEP to trial participants in HIV vaccine trials. The funding also supports the piloting of PrEP in AGYW in multiple sites in the Tshwane District. This is done in partnership with the Sechaba Research Centre.

The main HIV research programme of the OATB is the production of knowledge related to the epidemiology, prevention, treatment and reproductive health of AGYW vulnerable to HIV infection. To date more than 50 peer

reviewed publications and reports have been produced. Seven articles on sex work and HIV have been published in the period under review.

The Director of the OATB represents the SAMRC on the French ANRS MIE Research Agency. This is the main research agency that funds HIV, TB Hepatitis and COVID-19 research in France. This opens up many opportunities for the OATB to facilitate research between scientists of the two countries.

As part of his social responsibility duties the Director of the OATB serves as the Chairperson of the Board of the Treatment Action Campaign, which is South Africa's biggest and most important HIV and health systems advocacy organisation.

Health Systems Strengthening:

- At the request of the President and CEO of the SAMRC, the OATB participates in a novel committee established by the Minister of Higher Education, Science and Innovation that is aimed at harnessing the National System of Innovation (NSI) for the Implementation of National Health Insurance (NHI). The committee is made up of health experts from universities and the science councils and health economists. It is currently finalising its first report to the National Advisory Council on Innovation (NACI). The committee works closely with the National Department of Health and Treasury in this work.
- Working with the Presidency and the National Department of Health and Treasury, the OATB is responsible for monitoring the implementation of Pillar 6 of the Presidential Health Compact which governs the health financing reform of the public sector. This work includes steps taken to reduce corruption and wasteful expenditure, improving procurement, reforming conditional grants and donor funding, analysing budget and expenditure trends and monitoring budgets of health entities. Currently, the committee is working with the Presidency in the preparation of the Second Presidential Health Summit.
- The OATB has partnered with the Steve Biko Academic Hospital and University of Pretoria Public HEALTH Department to look at hospital mortality before, during and after COVID-19 and is supporting fundraising for infrastructure projects at the hospital including the building of a new water treatment plant for renal dialysis and an ABT facility to expand the Emergency Department to better manage current and future pandemics.

Innovative Financing and Evaluation of Social Outcomes Contracts

This year sees the culmination of 14 research studies conducted in 2018 and 2019, supported by the OATB, into the development of a comprehensive programme addressing sexual and reproductive health challenges of adolescent girls and young women. The programme

design is based on findings from the 14 research studies and consultation with experts in the field of HIV, teenage pregnancy, adolescent health, and provision of health services.

Advancing research through collaborations and partnerships

The Office of AIDS and TB Research, in collaboration with the Wits Health Consortium and the Solidarity Fund, is currently developing a programme to pilot COVID-19 vaccine provision as part of the in-patient and out-patient services at the Steve Biko Academic Hospital in Tshwane. The hospital-based vaccination service aims to make it easier for in-patients and out-patients visiting hospitals in Gauteng to receive COVID-19 vaccinations and boosters during their scheduled visits to the hospital for in-patient or outpatient care. The pilot is planned to be implemented for a period of 6 months commencing in April or May 2022. This will then be expanded to include a pilot focusing on how to advance COVID-19 vaccination uptake in primary health care clinics.

The Office of AIDS and TB Research, in collaboration with the Health Systems Research Unit, designed an outcome and process evaluation for the Imagine Social Impact Bond. Imagine is a school-based combination HIV and pregnancy prevention and care intervention for school-going adolescent girls and young women (AGYW) aged 15 and older. Imagine was designed by the OATB and will start implementation in April 2022. The evaluation study will 1) assess the impact of the interventions on HIV and pregnancy – related outcomes and 2) assess whether the intervention is being implemented as planned and whether the implementers are on a trajectory to achieve the outcomes. In addition, examine the costs, cost-effectiveness and return on investment of the Imagine SIB intervention in order to assess whether the intervention represents good value for money. The evaluation study has received ethical approval and is currently preparing for implementation in April 2022.

In addition, the OATB, in collaboration with Genesis Analytics, designed an economic evaluation that will examine the costs, cost-effectiveness and return on investment of the Imagine SIB intervention in order to assess whether the intervention represents good value for money. The economic evaluation will also assess the affordability of scaling up the intervention nationwide. The economic evaluation will conduct the following analyses: costing and cost efficiency, cost effectiveness, cost benefit, return on investment, budget impact assessment. The economic evaluation has received ethical approval and is preparing for implementation in April 2022.

The OATB is currently drafting a study protocol to evaluate the TIME programme. TIME is an intensive treatment and support programme that aims to improve the cure rate of patients with DR.-TB through a combination of patient and family centred care management, a promising new short regimen called the BPAL regimen, and a comprehensive

socio-economic adherence support package for patients and their households. The TIME programme is a collaboration with the Wits Health Consortium and the National TB Programme and will be provided to 400 DR-TB patients in East London, Eastern Cape, and Botshabelo, Free State. A protocol for the evaluation study is currently being developed.

Reimagining research in a time of COVID-19

The office has had to find innovative ways of engaging with stakeholders but also put in extra work as building and maintaining relationships with stakeholders over Zoom and Teams is much more time intensive and difficult than doing this face to face. We have also noticed that stakeholders are not returning to the office, making this more difficult and time-consuming way of working a norm for the near future as well. This means that our projects which are innovative and new, requiring change, will be more difficult until this situation changes.

OATB programmes that are at risk of being affected by COVID-19 such as the Imagine programme which runs in schools have had to devise a risk management plan to specifically deal with the effects of COVID-19 on the programme.

All of our projects required working with different stakeholders and these include:

- National Departments of Health, Basic Education, Science and Innovation and Treasury to finalise approvals from all these departments for a social impact bond for adolescent girls and young women.
- The Global Fund to fight AIDS, TB and Malaria to advance engagement with private investors and advance funding for the development of innovative financing mechanisms.
- Bertha Centre for Social Innovation and Entrepreneurship to develop a platform for impact investing at the SAMRC and a strategy for this to be implemented.
- Bertha Centre for Social Innovation and Entrepreneurship to plan for the development of a practice manual for social impact bonds to inform national treasury.
- An implementer, NACOSA, to finalise programme description and targets for the social impact bond for adolescent girls and young women.
- A private investor to finalise the contract for their investment in the social impact bond.
- Health Systems Research Unit to develop a protocol for an impact evaluation of the social impact bond.
- Genesis Analytics to design a learning agenda and economic evaluation of the social impact bond for adolescent girls and young women.
- Social Finance to design a financial model for the social impact bond for adolescent girls and young women.

- ABSA to raise funds for the economic evaluation.
- Solidarity Fund, ABSA and Rand Merchant Bank to raise funds to support implementation of COVID-19 vaccination.
- National Department of Health TB Unit to design a social impact bond focusing on drug resistant TB.
- Wits Health Consortium to collaborate on the development of a social impact bond for drug resistant TB.

Capacity Development and Transformation

The OATB is supporting a student doing a Master's in Public Health (MPH) at the University of the Witwatersrand. The student is receiving active mentoring in conducting a study for her master thesis titled: Understanding the roles and experiences of key stakeholders involved in the design of the novel Imagine Social Impact Bond in South Africa. In addition, the OATB is supporting a member of the PMU in obtaining her doctoral degree in Health Sciences. Lieve Vanleeuw also teaches a module on social protection for TB patients in South Africa, part of the course "Global Health and Social Protection" which is a collaboration between the University of Zambia, the South African Medical Research Council, and Karolinska Institutet, and is attended by students across the globe.

Impactful Research Translation

The OATB has presented lessons learned from the Imagine Social Impact Bond at the Social Outcomes Conference and the Youth Technology and Health Conference. Gillian Moodley presented on the design process and challenges of Imagine, the first Social Impact Bond for Health in South Africa. Lieve Vanleeuw presented on "Determining outcomes and setting targets while balancing counterfactual risk in the Imagine Social Impact Bond". Tshogofatso Senne and Lieve Vanleeuw presented on "Digital Health co-learning with girls and young women".

A learning network has been established that is directed by a learning agenda, which is a set of questions addressing priority knowledge gaps, related activities to answer these questions, and products aimed at disseminating findings and promising practices to ultimately facilitate learning and application. The goal is to actively facilitate the uptake of promising and best practices and that organisations are able to pool their contextual expertise, experience, and talents to address the myriad complex problems related to health and social programmes. The novelty of outcomes-based financing for health, especially in the African context, provides opportunities to leverage the expertise and experience of others in the field to bolster organisational and country-level action. Peer learning in a network structure serves as a useful way to address key knowledge gaps and challenges around AGYW programming to improve key health outcomes.

TUBERCULOSIS PLATFORM



Prof Martie van der Walt Platform Director

Martie.VanderWalt@mrc.ac.za

OVERVIEW

The tuberculosis (TB) Platform conducts applied public health research along the cascade of care for TB and HIV/TB from diagnosis to treatment. Research findings are aimed to produce knowledge that improve current tools and practices for prevention of TB, its diagnosis and to increase access of patients to effective treatment and patient-centred care. Our current research focuses on understanding the challenges of initiation of isoniazid preventive therapy among people living with HIV and once therapy is initiated, which tools can be used to best monitor adherence to treatment. Adherence to a long-duration treatment, be it for preventive or curative purpose, poses particular problems from both the patient and health care provider's perspective. As part of our applied health research, we aim to understand the lived experiences of health care workers in their day-to-day delivery of care and gain insight into the challenges experienced in implementation policy, and in delivery of patient centered care.

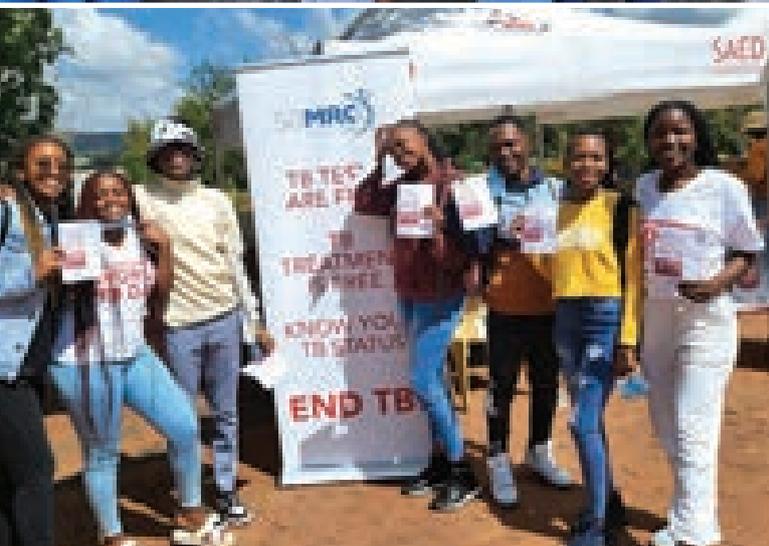
COVID-19 related research and development

- Since SARS-CoV-2 was declared a pandemic in March 2020, it became essential to introduce measures to prevent its spread, globally and in South Africa. In South Africa, this has resulted in limiting movements by individuals to reduce the burden on the healthcare system to the detriment of patients that would have accessed health care normally. The essential services and operations dealing with long standing

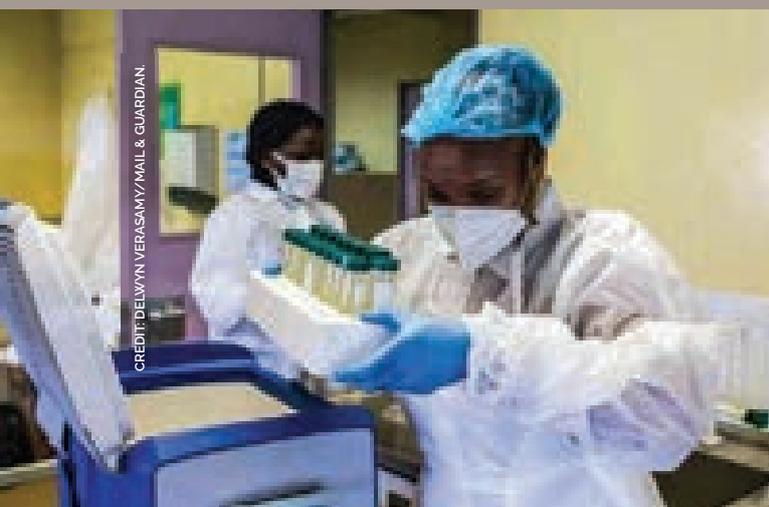
chronic conditions such as TB and HIV are vulnerable for disruption and redirecting of resources to the COVID-19 response. The impact of COVID-19 on TB control particularly in low- and middle-income countries (LMICs) where TB is endemic and health services poorly equipped, was strained. The COVID-19-on-TB study investigates the impact of the response to COVID-19 during 2020 on the performance of TB care and prevention in South Africa. The study compared TB programme performance indicators for case finding and treatment outcomes of 2019 with those of the second to the fourth quarter of 2020. The indicators for patients started on treatment showed that for the quarters before April 2020 an average 1,400 patients started per quarter, while the numbers for the last three quarters of 2020 were much lower and around 800 per quarter. The first quarter of 2020, being the quarter in 2020 before strict lock down measures in South African came into effect, had performance values similar to those of 2019, which showed that the lower values of the rest of 2020 were due to COVID-19 and not attributed to other changes in TB control that could possibly have caused the differences.

Reimagining research in a time of COVID-19

During the strict lock-down measures during 2020 – 2021 that prohibited travel across borders, TB Platform staff were not able to meet with provincial, district or facility level officials of the sites where we conduct our research. During periods of peak daily COVID-19 new cases, officials



"Invest to end TB" awareness campaign.



Researchers process waste water samples for testing at their Lab in Tshwane.

in local facilities had also requested that staff suspend their facilities as many of the facility staff and resources were directed towards COVID-19 care and as to limit the number of people in the facilities at a given time. While impediments of not to being able to have face to face meetings with facility staff may have negative impacts on study implementation and hence delay in study timelines, we innovated to overcome these. We requested to have on-line meetings with district staff, which allowed for building of rapport under exceptional circumstances and these meetings were as successful as face-to-face meetings. In the PEPFAR-TB/HIV priority districts where the TB Platform conducts research, we initiated research relationships the Siyenza-organisations, so-called PEPFAR district support partners. During the planning stages of our studies these stakeholders assisted us with data requests, liaised with provincial and district officials on our behalf and assisted with determining what other resources we would need once site-specific activities start. Even after our research activities started, we continue to work closely with these stakeholders on a daily basis, in identification of clinic clients that are potentially eligible for study participation and making appointments with specific individuals on our behalf. These partners have access to registries at the clinic level that we do not have real-time access to. Having the data in real-time meant that we could conduct research more efficiently and did not have to spend other resources to access the data through other means.

The COVID-19 pandemic showed early on that infected individual shed virus particles in their stools and which then can be found in sewage and wastewater. The TB Platform, as part of the SAMRC Wastewater Research Programme, participated and worked in the City of Tshwane Metropolitan Council. While our research in TB as a disease is patient-orientated and takes place in public health facilities, we are familiar with research processes around humans as research subjects and working with national, provincial and local authority departments of health.

For the COVID-19 work we had to approach the water and sanitation department of the City of Tshwane with the request to obtain samples of the wastewater as it flows into the several wastewater treatment plants of the metropolitan area. The City of Tshwane officials granted us approval to use wastewater samples for COVID-19 monitoring and allowed us to collect wastewater samples from any of their plants.

We also held feedback sessions to the officials and thereby had to broaden our focus on using environmental samples as a means to study health. We had also built relationships with City council officials at each of the treatment plants and thereby partner with stakeholders that are outside the realm of patient-centered health research and outside of the departments of health.

Capacity Development and Transformation

The Platform is part of the SAMRC Wastewater monitoring Programme, and the unit provided opportunity to undergraduate and post-graduate students to become involved in this SAMRC programme. Students were granted the opportunity to participate in collection of wastewater samples at the treatment plants and trained on how such samples needed to be processed, as to ensure that the samples could be tested for virus particles using molecular procedures. Through this initiative students gained an understanding of disease epidemiology other than tuberculosis, and about the public health impact of finding virus particulars in a wastewater sample. Four students participated in the programme, each Black South Africans, with three being females and one male.

Science Citizenship and Stakeholder Engagement

During this reporting period 2021/2022, members of the TB platform served on national and international committees.

Impactful Research Translation

In commemoration of World TB Day, the Tuberculosis Platform held an Awareness Campaign – an exciting initiative that focuses on Health Awareness, Health Promotion, Disease Prevention and Early Detection of disease. The event, at the Bloed Street Mall in Pretoria, used the 2022 theme of “Invest to End TB. Save Lives.” and was explained in layman’s terms to individuals in their community where their daily activities take place. Through this theme, individuals were encouraged to invest their time and energy to protect themselves against TB, complete their treatments and thereby to avoid a more severe disease or even death from TB. The message of “Invest to End TB. Save Lives” appeals to ordinary citizens to take care of their health through investing in the effort to visit clinics if they are not feeling well, and through limiting disease that could save lives of those around them. The event was strategically placed close to the taxi rank where taxi drivers, commuters, street vendors and Mall visitors can easily access the SAMRC stand and could actively take part through sharing their stories. This event is part of Reimaging Health, where we share with communities why the SAMRC does research on TB, and that through events like this we bring research to people as they go about their daily lives.



Sampling at SAMRC TB Platform Pretoria.

SAMRC/UCT CENTRE FOR THE STUDY OF ANTIMICROBIAL RESISTANCE



Prof Keertan Dheda Unit Director
keertan.dheda@uct.ac.za

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 national and international scientists and clinicians to conduct research into primarily TB MDR pathogens to study the relationship between pharmacokinetic (PK) mismatch and drug resistance development. This work encompasses several areas of innovative research that builds on previous work we have performed. Our overarching goal is to investigate the mechanisms of PK mismatch at the site of disease. Using surgically explanted lungs from DR.-TB treatment failures, we have previously shown that certain drugs exhibit poor penetration into thick-walled TB cavities thereby exposing bacterial population to sub-therapeutic drug concentrations creates an ideal environment for drug resistance evolution. We are currently investigating this for new and repurposed drugs such as bedaquiline and linezolid. Another finding was the poor performance of sputum-based conventional DST methods to predict the drug resistance profile present in TB lung cavities. We are working on next generation sequencing methods to improve the diagnostic sensitivity of sputum to enable more accurate DST readouts that reflect the drug resistance profile in the TB lung cavity. Finally, we are developing innovative methods of drug delivery to overcome PK mismatch. For example, we have already developed a levofloxacin dry powder inhalation formulation for pulmonary drug administration through

our collaborators at the University of Parma. The next step is GMP production of the formulation, packaging into an appropriate inhaler device (which we have already identified) and using in a phase I/IIa trial to assess safety, dose and lung specific drug levels. A long-term goal is also to develop a platform to study inhaled antibiotics at UCT and South Africa.

COVID-19 related research and development

- During the reporting period, the COVID-19 pandemic presented several challenges to the Unit's research activities. The second and third COVID-19 surges continued to hamper ongoing TB research. These restrictions presented a unique opportunity to conduct our own COVID-19 related research, including a phase II clinical trial to determine safety, immunogenicity and efficacy of the AstraZeneca/Oxford ChAdOx1 vaccine. Recruitment and follow-up of 367 participants was completed and led to publications.
- Completion of a phase 2a/b trial to determine the safety and efficacy of the Novavax NVX-CoV2373 vaccine. 160 participants were recruited, and data published.
- Initiation and ongoing recruitment in the Providence mRNA COVID-19 vaccine trial. Thus far 360 participants have been screened and 65 have been randomised into the trial.
- Completion of recruitment in the SAMRC-funded multicenter C3 trial to determine the impact on Nitazoxanide on reducing symptom severity in patients

with moderate to severe SARS CoV2 infection. 335 participants were recruited, and analysis of the primary outcome has been completed. Evaluation of secondary outcomes is ongoing (viral load and viral culturability).

- An SAMRC-funded multicenter study investigating the feasibility and performance of a point-of-care SARS CoV2 rapid antigen test. The study is now closed to recruitment; results were recently presented at the CORI conference, a technical report to SAHPRA is soon to be released and a manuscript of the findings will be imminently submitted for publication.
- Initiation of the XACT-19 trial – 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. Recruitment is currently ongoing.
- An SANRF-funded study to identify a urine-based biomarker signature for COVID-19 – preliminary analysis showed a 3-biomarker profile in the urine. Additional samples are currently being analysed.
- A study to evaluate the integrity of various models of respirator masks (N95, KN95) used by clinical staff during the COVID-19 pandemic. This data was published.
- Viral kinetics and pathology of COVID-19 using post-mortem samples – ~60 post-mortem tissue and NPS samples were collected and analysed for viral and host-related factors – Data analysis is currently ongoing.
- An ongoing study on the transmission dynamics of SARS CoV2 infected patients using cough aerosol sampling technology.

Bridging other research gaps

1. Completion of the NExT study, a RCT that evaluated an all-oral bedaquiline containing 6-month drug regimen for the treatment of MDR-TB patients. The study was published in the American Journal of Thoracic and Critical Care Medicine and is currently being evaluated by the WHO group to inform MDR-TB treatment shortening policy.
2. The XACT-3 and XACT-19 active TB case finding studies, which are both multi-country RCTs aimed to determine the impact of a combination of Xpert and CXR placed in a mobile lab and manned by minimally trained healthcare workers for the detection of undiagnosed minimally symptomatic TB cases in the community. The time for initiating these trials is optimal given the drastic reduction in TB case detection rates during the COVID-19 pandemic.
3. Completion of recruitment for the TARGT TB study, which aims to examine the diagnostic utility of Xpert ULTRA and IRISA-TB for pleural TB diagnosis as well as investigation of host immune responses at the site of disease. A total of 98 patients have been recruited and samples processed.
4. Extraction of Mtb DNA directly from sputum for targeted deep sequencing of samples to determine drug resistance profiles has been optimised and utilised on the Genoscreen Deeplex platform. A total of 49 sputum samples from the NExT study have been processed and analysed to show the feasibility of the platform and these data are being prepared for publication.



Biomedical Research & Training Institute Zimbabwe Mobile Lab setup.



Zambart Zambia mobile unit & lab consumables.

Reimagining research in a time of COVID-19

The COVID-19 pandemic led to a moratorium on non-COVID-19 research-related activities at UCT in 2020 and 2021. Patient recruitment for TB studies restarted in mid-2021 but at a much slower pace than pre-COVID-19. We therefore quickly pivoted our research focus, by diverting research staff and consumables, to COVID-19 activities to retain staff and prevent lab consumable wastage. Several staff underwent training in virus-related lab techniques and infrastructure was either upgraded or repurposed for viral work. However, while recruitment of TB patients

was suspended, we continued with TB work including analysis of collected data, experiment optimisation and manuscript writing.

Capacity Development and Transformation

Several capacity development activities have occurred over the last year. Firstly, two female students from previously disadvantaged backgrounds have submitted their theses – Dr. Phindile Gina is a clinician/scientist examining the role of autophagy in TB and Ms Rolanda Londt, who aims to identify potential targets for the development of an XDR-TB vaccine. Another PhD Candidate, Mr Richard Meldau is investigating different rapid approaches for the diagnosis of pleural TB will submit this year. The Unit is mentoring 2 young African scientists through the Health Sciences Research Council internship program which aims to provide relevant work experience for new BSc graduates interested in health sciences. Finally, through the XACT3 and XACT19 projects, clinical recruitment sites at BRTI in Zimbabwe and Chilenje Hospital in Zambia are being capacitated with a cough aerosol sampling system, which will allow researchers to measure the infectiousness of TB patients.

Advancing research through collaborations and partnerships

Many of the large COVID-19 vaccine trials, drug trials and diagnostic trials involved several national and international collaborators with academic institutions, research organisations, governmental agencies and international health policy bodies for both our COVID-19 and non-COVID-19 studies. The ChAdOx vaccine trial had collaborating sites in South Africa, Brazil and the UK and was led by University of Witwatersrand (Wits) in South Africa. The University of Oxford and Astra Zeneca were developers and key stakeholders in the project. This study contributed to emergency use authorisation of the ChAdOx/Astra Zeneca vaccine by the WHO, CDC and several regulatory agencies in the UK, Brazil and South Africa (SAHPRA). We were one of 10 clinical recruitment sites for the Novavax vaccine trial in South Africa led by Wits University and developed by Novavax Inc., in USA. Regular communication with WHO and national regulatory bodies was also necessary. The Providence COVID-19 vaccine trial involves collaborations with Wits University and the Providence pharmaceutical company based in Canada. The C3 Nitazoxanide trial was funded by the SAMRC and XyloMed pharmaceutical company and included 4 trial sites in South Africa including the PHRU in Klerksdorp, AHRI in KZN and the Aurum institute in Gauteng. SAMRC-led POC trial involved several recruitment sites in South Africa (UCTLI, Wits, Limpopo University). NHLS were also involved in testing. Developers and manufacturers

of the Ab/Ag tests under investigation were also heavily invested in the project with oversight from SAHPRA. The ongoing CHIPOLTLE study in collaboration with the University of California San Francisco to examines the host immune profile in sputum of COVID-19 patients. XACT-3 and -19 are EDCTP/UKMRC-funded multi-country active-case-finding trials with African collaborators in Zambia (ZAMBART), Zimbabwe (BRTI), Mozambique (INS) and European partners in Italy (OSR), UK (LSHTM), Netherlands (RUMC) and Switzerland (FIND).

Impactful 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 impact of COVID-19 pandemic on TB diagnosis. He has also been interviewed regarding the XACT active case finding studies for both TB and COVID-19 and the results of the NExT study which evaluated an all oral 6-month drug regimen for MDR-TB. A full list of media stories can be found at <https://lunginstitute.co.za/liuu-news/>. The NExT study results have also been reported to the SA Dept of Health and the WHO working group to inform new policies on treatment shortening strategies for DR.-TB. Similarly, we have provided the relevant findings of our studies to the SA Dept of Health and SAHPRA on SARS CoV2 Ag and Ab POC tests, the effect of NTZ on reducing diseases severity in COVID-19 patients and the integrity and level of protection offered by N95 and equivalent respirators being worn by healthcare workers during the pandemic. Finally, our human lung challenge model in the TB HART study was recently used as an exemplar in the WHO ethical guidelines for conducting controlled human infection studies. Additionally, there has also been several high impact publications following completion of the COVID-19 vaccine trials in journals such as the Lancet and NEJM. The NExT study investigating an all oral 6-month regimen for MDR-TB has been published in the AJRCCM. Finally, Prof. Dheda was commissioned by the Lancet Respiratory Medicine journal to write a review article on the intersecting pandemics of COVID-19 and TB, which will be imminently published.



Zambart Zambia mobile unit & lab consumables.

SAMRC/NICD ANTIBODY IMMUNITY RESEARCH UNIT



Prof Lynn Morris Unit Director
lynnm@nicd.ac.za

OVERVIEW

The Antibody Immunity Research Unit (AIRU), when founded, was largely focussed on characterising immunity to HIV infection and vaccination. This research leveraged a series of serological immunological and virological methodologies that had been established over many years in a multidisciplinary approach. We continue to utilise these tools to define correlates of protection from HIV acquisition, and to define the pathways to the development of broadly neutralising antibodies, still considered essential for a preventative HIV vaccine.

Since the emergence of COVID-19, the research focus of the unit has shifted to understanding the immunological consequences of SARS-CoV-2 infection and vaccination and the impact of viral variants. The unit was able to rapidly translate existing technologies towards COVID-19 research, and to develop a suite of new assays. We also leveraged our strong links to the genomics surveillance efforts in South Africa, to perform urgent and translational public health research in response to the pandemic.

In addition, we have expanded several of these methodologies to studies of the influenza virus. The availability of these virus-specific tools has also enabled the unit to focus on synergies between these different viruses. For example, we now study the intersection between HIV infection and influenza, and between HIV infection and COVID-19. Altogether the scope of activities of the unit has significantly expanded over the last year, placing the unit in an extremely strong position to make important contributions to future viral pandemics.

COVID-19 related research and development

Although we have continued our existing program on HIV and influenza, COVID-19 research has been the major focus of the AIRU during the 2021/2022 period. Pre-existing technology and know-how in the AIRU, that was largely developed for HIV vaccine research, was rapidly pivoted from HIV to SARS-CoV-2. The AIRU was able to quickly establish and validate assays to perform immunological studies, both in the context of SARS-CoV-2 infection and vaccination. This has enabled the AIRU to rapidly generate data of public importance as new variants emerged during the last year, including Beta, Delta and Omicron.

Systems are also now in place for the rapid assessment of new vaccine candidates as they come into South Africa, and for rapid phenotypic assessment of emerging variants. A total of 23 publications over the last year highlight the continued productivity of the lab.

Through existing infrastructure and expertise within the AIRU that were largely developed for HIV vaccine research, we were able to quickly and efficiently rework existing technology and generate SARS-CoV-2 specific reagents and assays. These reagents and techniques were shared with other laboratories, both nationally and internationally. The pace of our research has increased dramatically over the last year as we responded to the COVID-19 pandemic. This also resulted in many new collaborations, locally and internationally, that will benefit our overall research program. Just as COVID-19 research greatly benefited from pre-existing platforms and knowledge developed

over decades of HIV-related research, we will now be in a strong position to use these technologies for other pathogens of public health importance, and work of the intersection of these epidemics. For example, the AIRU is now focusing on addressing issues of COVID-19 in people living with HIV, and internationally understudied area.

Advancing research through collaborations and partnerships

The Unit established new links with various clinical teams conducting COVID-19 vaccine related trials in order to conduct serological and neutralisation immunogenicity studies. These included ImmunityBio in collaboration with the SAMRC to access the efficacy of their Ad5 based vaccine in the proVIVA-SA-1 and Sisonke–Boost trials; the ARCT-165-01 Phase 1 trial conducted by Arcturus; the Sisonke Sub-study to monitor effectiveness of the single shot Ad26.COv2.S vaccine that was rolled out to health care workers and the Phase II BaSiS study of two booster vaccinations (BNT162b2 half and BNT162b2 full dose after receiving a Ad26.CoV2.S prime vaccine) through the SISONKE Phase IIIB Implementation study.

Collaborations have also been established with pre-clinical developers of novel vaccines which include the WHO sponsored South African mRNA Vaccine Consortium (SAMVAC), Dyadic International Inc. and Greenlight Biosciences.

The awarding of the Gates funded Global Immunology and Immune Sequencing for Epidemic Response (GIISER) grant to Prof. Penny Moore within the Unit has established new links across Africa, India and South America. There was also the extension of the HVTN and Gates CAVD-VIMC grants (awarded to Prof. Lynn Morris) to include COVID-19.

Capacity Development and Transformation

The laboratory actively trains postgraduate students and there is on-going training of staff as new assays and techniques are implemented. The Unit also provided training to researchers from other laboratories within the NICD, external institutions and laboratories forming part of the GIISER collaborative grant. Over the last year the AIRU has hired 4 additional staff of who are black African females. In addition, we have contracted 2 former staff members to work after-hours shifts to assist with the additional workload of COVID-19. The AIRU has established new “cores” to create a niche for new emerging scientists (such as Dr. Thandeka-Moyo Gwete, Dr. Simone Richardson and Ms Tandile Modise) to lead their teams and to further their scientific careers. Two Post docs-Dr. Moyo-Gwete and Dr. Dale Kitchin have both graduated to Senior Scientist roles in the Unit as part of their career development. In addition, emerging scientists within the unit are now successfully sourcing their own research funding and establishing independent collaborations nationally and internationally.



Lab Group.



Nelia Manamela Medical Scientist, working in the flow cytometry lab.



Dr. Thandeka Moyo-Gwete, Senior Medical Scientist, working in the BSL2 facility.

Impactful 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 (a total of 60 presentations in the 2021-2022 period). There were 38 papers published during the reporting period. The AIRU receives funding from a number of agencies (SAMRC, NRF, NIH, Gates Foundation, IAVI, EDCTP and Horizon-Europe) and it is a requirement that we provide them with progress reports for the duration of the funding period. Prof. Penny Moore served as a member of the Ministerial Advisory Board on Vaccines in South Africa and serves as Director for the Global Virus Network (GVN), South Africa. Prof. Lynn Morris is a member of the of the World Health Organization (WHO) Technical Advisory Group for Emergency Use Listing (TAG-EUL) (COVID-19 Vaccines) that approves new COVID-19 vaccines.

The research conducted in the AIRU has also been shared in lay articles such as *The Conversation* by Dr. Simone Richardson and Prof. Penny Moore titled "Omicron doesn't need its own custom vaccine: here's why" (published 7 March 2022); an article by Moore in the *Southern African Journal of Infectious Diseases* titled "The wondrous world of biology" and an article by Drs Moyo-Gwete, Richardson and Scheepers titled "Pivoting from HIV vaccine research to COVID-19 – Lessons for the next pandemic" published in *Infectious Diseases Update*. Prof. Lynn Morris discussed how COVID-19 vaccines could impact HIV vaccine development in a News and Views article in *Nature Medicine* entitled: mRNA vaccines offer hope for HIV.

HEALTH SYSTEMS STRENGTHENING

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 (IRU) | 4 | Health Systems Research Unit (IRU) |
| 2 | Biostatistics Research Unit (IRU) | 5 | Health Services to Systems Research Unit (ERU) |
| 3 | South African Cochrane Centre (IRU) | | |

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

BURDEN OF DISEASE RESEARCH UNIT



Prof Richard Matzopoulos

Richard.Matzopoulos@mrc.ac.za



Dr Victoria Pillay-Van Wyk

Victoria.Pillay-vanwyk@mrc.ac.za

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 and strengthened population-based health information systems.

Most recently we have used the Rapid Mortality Surveillance (RMS) data to measure the impact of COVID-19 on mortality nationally, provincially and in major metros as well as the changing pattern of non-natural deaths associated with COVID-19 lockdown stages. We have tracked the weekly excess deaths as the pandemic unfolded and have also

described the cumulative impact in 2020. In collaboration with SAMRC's Gender and Health Research Unit (GHRU) BODRU completed the second nationally representative injury mortality survey for 2017 as well as fieldwork for the country's first ever nationally representative study of male homicide. Additional outputs from these projects will be finalised during the next financial year. We also completed analysis and write-up of multiple papers presenting the second comparative risk assessment study for major risk factors driving South Africa's burden of disease, which are in press and will be published as a special issue of the South African Medical Journal.

Several research projects are underway to support improvements to the health information system. A paper published in Health Policy and Planning observed only 15% of hospital records included coded diagnoses and highlighted that concerning data inaccuracies suggesting that the existing routine health information systems in public-sector hospitals are not yet able to sufficiently support reimbursements and resource management. Institutional capacity is needed for a national health insurance.

COVID-19 related research and development

South Africa has experienced a massive COVID-19 epidemic which led to rapid and large changes in mortality. In response, BODRU's RMS system set up to monitor HIV/AIDS mortality was adapted to provide near-real-time weekly estimates of excess deaths to monitor the impact of COVID-19 on natural and unnatural mortality. This internationally acclaimed system for reporting excess deaths provides weekly reports with just a two-week lag. Two technical reports and five journal articles have been published based on these data.

BODRU is also co-ordinating a new collaborative COVID-19 deaths linkage project funded by the SAMRC that will integrate multiple datasets from NICD, NDOH and WCDOH. These datasets will be linked with the RMS data to ascertain the vital status of individuals, identify COVID-19 related deaths, as well as deaths due to the indirect effects of COVID-19. Linkage processes have been developed and tested and to date this research has confirmed that COVID-19 deaths are under-reported. A third of excess deaths are accounted for by the NDOH, a further third can be identified through RMS linking and for the remaining third the cause is unknown although strong temporal and spatial correlation suggests that they are mostly likely to be directly related to COVID. UCT has been providing expert demographic and technical support to both the NICD and SAMRC for this project. In addition, the RMS data have been used to identify deaths in the Sisonke cohort and plans are under way to link the Electronic Vaccination Data System (EVDS) data with RMS data to investigate mortality in vaccinated and unvaccinated populations.

A pilot of telephonic verbal autopsy (VA), as opposed to face to face, was conducted in Cape Town metro for deaths that occurred at home. This project funded by the CDC aims to assess the technical feasibility and acceptability of teleVA and also test the COVID-19 questions recently added to the WHO2016 VA instrument.

Changes in the pattern of non-natural deaths during the COVID-19 period prompted BODRU to conduct a 3rd injury mortality survey for the period February 2020 to March 2021 in collaboration with GHRU and the SAMRC's Alcohol Tobacco and Other Drug Research Unit. These data will be collated and analysed during the next financial year to explore the differing impact of lockdowns, alcohol sales bans and other interventions on different types of injury.



SHeS'Cap Project.

Reimagining research in a time of COVID-19

As well as initiating and progressing these projects COVID-19 has brought about changes in the workplace in terms of our communication and working arrangements. We have all become adept at participating in and conducting online meetings, teaching and workshops. Researchers have had to become more flexible and adaptable to frequent demands for input into research collaborations as well as providing expert opinion and synthesised information on a range of COVID-19 related topics. This will have a sustained impact on the way that we work, collaborate and interact with one another in the years ahead.

Advancing research through collaborations and partnerships

- Our COVID-19 linkage project is a collaboration between NICD, NDOH, WCDoH, UCT. UCT's CARE are also our collaborators on the excess death research work that has arisen from the RMS project.
- The teleVA project was a collaboration with Swiss TPH and WCDoH. We also collaborate with Swiss TPH and Jembi on an online death registration scoping project for South Africa, which is funded by CDC.
- CDC also fund several Health Information Systems projects co-ordinated by BODRU including Enhancing linkage to and retention in care for HIV in South Africa (Linkage2Care) and Strengthening health systems capacity for Pre-Exposure Prophylaxis (PrEP) for AGYW and men (SHeS'Cap-PrEP).
- We have also extended collaboration with several other SAMRC units including GHRU and ATODRU on injury related projects, and the Health Systems Research Unit on various Health Information Systems projects.
- Furthermore, the 2nd South African Comparative Risk Assessment study has enlisted 50 collaborators for risk factors from multiple universities and research institutes across the country and internationally.

Capacity Development and Transformation

BODRU supports 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 and some have completed/graduated.

During the report period 21 short courses were attended by researchers within the unit as part of continued learning and personal development.

In addition, researchers from the unit are continuously involved in supervising postgraduate students at several institutions (both nationally and internationally). They are also involved in teaching both undergraduate and postgraduate students and have co-ordinated training workshops as part of their research projects.

Science Citizenship and Stakeholder Engagement

Members of the unit serve on many national and international committees and Boards.

Impactful Research Translation

The weekly mortality reports from the RMS which are available on the SAMRC's homepage are a key resource for monitoring COVID-19 mortality patterns and are widely used by researchers, policy makers and the general public. Numerous TV, radio and journalist interviews have been conducted to promote the reliable interpretation of these data. Information has been regularly shared with the NDOH and the Ministerial Advisory Committee. Our researchers provide monthly input to SAMRC-coordinated National Health Insurance/Universal Healthcare meetings that attract a range of stakeholders. We have also provided input into various government forums including the COVID-19 Medical Advisory Committee and NEDLAC and provided affidavits to the State Attorney to support the Government's response to litigation against its COVID-19 interventions.

BIostatISTICS UNIT



Dr. Tarylee Reddy Interim Unit Director

tarylee.reddy@mrc.ac.za

OVERVIEW

The SAMRC's Biostatistics Unit (BSU) aims to provide a source of biostatistics methodological and application expertise and support to the SAMRC's network of medical and health researchers as well as government departments and national and international research bodies. It is an interdisciplinary unit with expertise in Biostatistics, Geographical Information Systems (GIS), Data Management, and Food Science, and these different but related research entities contribute to the clinical and health research conducted by the SAMRC. By providing biostatistical support to investigators in the study design, conduct, and analysis of their research projects, the Biostatistics Research Unit ensures that 1) public health and medical studies are designed appropriately with sufficient sample size and statistical power to solve the public health and medical questions in the research projects, 2) analyses of the study data are conducted with appropriate and relevant statistical methods, 3) the study findings are interpreted correctly and 4) reporting and writing of abstracts and presentations for meetings and conferences, manuscripts for peer-reviewed publications; policy brief and technical reports are scientifically sound and valid.

The Biostatistics Unit has, over the years, emerged as an integral part in solving public health public and medical questions in South Africa and the region using innovative and quantitative statistical methods. These have been based on developing and applying relevant biostatistical techniques. Our current areas of methodological research include sample survey and analysis, mixture model and latent variable modelling; interim analysis and monitoring and analysis of individual and cluster randomised controlled trials; spatial statistics and statistical epidemiology; survival and longitudinal data analysis including joint modelling

and multiple and recurrent events data; handling of missing data, causal inference; and Bayesian statistics. The SAFOODS division is mandated to maintain and update the national food composition database of South Africa. Our area of research involves food composition determination and compilation of food items mostly consumed in the country and applying food composition data to develop innovative research tools for nutrition research and practice.

COVID-19 related research and development

- The BSU served as the data management and statistical analysis centre for the Sisonke 1 and Sisonke 2 phase 3 implementation trials of the single and booster dose, respectively, of the Ad26 (Janssen) vaccine in South African health care workers. The primary effectiveness analysis for the Sisonke cohort was performed using a matched cohort design and involved collaboration with medical schemes in the country (These findings were published in the Lancet in March 2022).
- The Unit also collaborated on the following multicentre COVID-19 studies: COVID-19 and resilience of healthcare systems in ten countries using routine surveillance data and the WHO COVID-19 Kids study which aims to examine predictors of severe SARS-CoV-2 infection in hospitalised children.
- The SAMRC BSU provided statistical support to the Wastewater Surveillance and Research Programme, which monitors the non-infectious SARS-CoV-2 RNA, the fragments of the virus that causes COVID-19 in wastewater, which can be used as an early indicator of COVID-19 case trends within a community.

- The unit co-developed spatial mathematical models (SEIR) considering vulnerability indices, mobility matrices using Facebook and mobile network data in order to model the spread of COVID-19 in South Africa, resulting in two publications accepted.
- Hospitalisation data from the Gauteng Department of Health is being used to model the impact of vaccinations in reducing hospitalisations for upcoming COVID-19 waves and doing wave detection to assist efforts in management of COVID-19 in the province. This work was presented to the Gauteng Premier COVID-19 Advisory Committee at their meeting.
- Three staff from the Unit are co-investigators on a project funded by the Department of Social Development, which was undertaken to explore the effects of COVID-19 in those aged 50 years and older, by looking at health outcomes, socioeconomic, demographic and psychosocial factors as well as COVID-19 surveillance outcomes. This was achieved by means of data triangulation of various surveys as well as modelling progression of COVID-19 to assist with recommendations for this particularly vulnerable group.
- The Health GIS Centre has participated collaboratively with various research groups within the SAMRC as well as with the CSIR and NDoH in ward level spatio-temporal mapping and cluster and hotspot detection during the early stages of the COVID-19 outbreak, as well as high resolution mapping of communities targeted for the vaccine hesitancy study and extensive outlet mapping to aid site planning for vaccine rollout.
- The Unit provided statistical support to the first randomised trial comparing NET-EN and DMPA-IM, investigating hormonal, behavioural and menstrual effects of these injectable contraceptives over a follow-up period of six months. The SAFOODS subdivision has focused on the development of a new web based mobile application called the Dietary Intake Assessment tool for South Africa (DIASA), which aims to assist nutrition researchers in dietary intake assessment by reducing the research burden through automated coding and quantification. In addition, the nutritional composition of maize products was determined by means of chemical analyses. This study was done using the proposed new fortification which will become mandatory once the new fortification regulation is promulgated.

Reimagining research in a time of COVID-19

In view of the rapid increase in the volume of data and research projects, statisticians in the Unit have had to enhance their skills in the areas of big data and infectious disease modelling. The Unit also frequently engages in capacity development activities such as statistics training, which has transitioned to an online platform. To ensure that staff can juggle the demands of numerous projects as well as their own research, the BSU launched weekly writing sessions dedicated to PhD work for those registered as well as focused time for project work. These sessions have allowed staff to be accountable to each other in terms of setting tasks for the session and reporting thereafter whether those tasks have been completed.

Capacity Development and Transformation

Biostatistics continues to remain a scarce skill in the country and region. There are currently ten PhD and Masters students in Statistics supervised by BSU Unit staff in the country in the key areas of Bayesian statistics, longitudinal data analysis, spatial statistics and clinical trials. Dr. Tarylee Reddy served as a member of the SUSAN-IBS (Sub-Saharan Network of the International Biometrics Society) Conference Local Organising Committee in 2021 as well as on the committee of the SUSAN-IBS Mentor-Mentee program, which focuses on the mentorship of young biostatisticians in the country and region. A PhD and an MSc student have been mentored in the application of geospatial methods to public health research. Ten research staff have been trained in the use of GPS technology for data collection during field surveys. Eighteen field survey staff have been trained in the use of tablet devices and hard copy reference maps to acquire household level sampling during field surveys.



*Medscheme makes history with vaccine research
Article in staff magazine.*

Advancing research through collaborations and partnerships

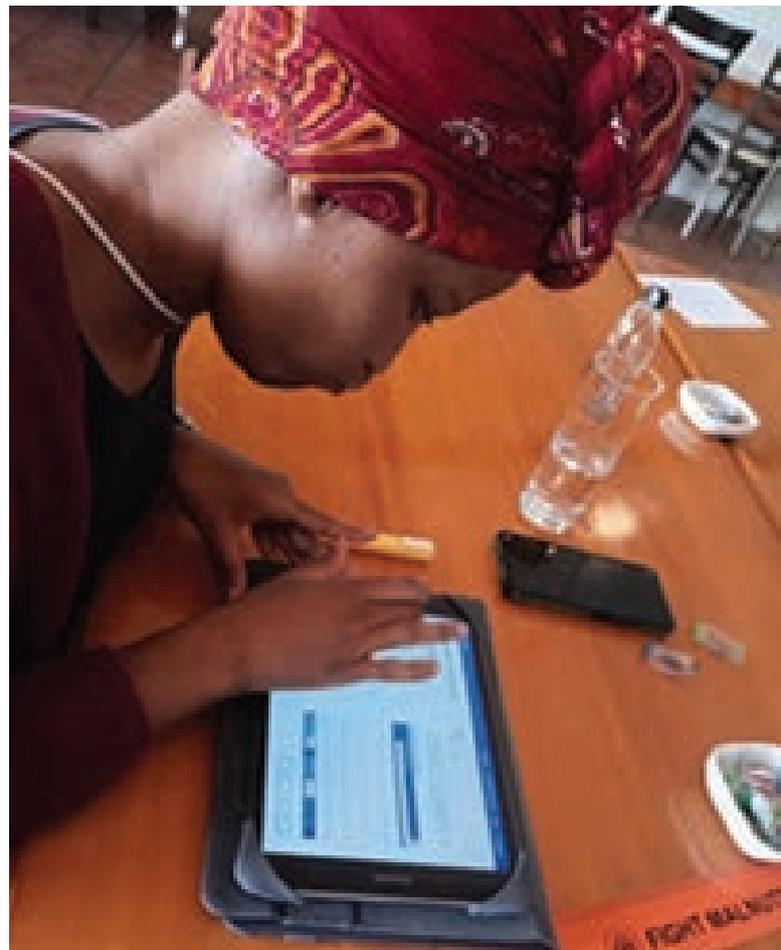
The national Sisonke trial was a collaborative study involving the SAMRC, National Institute for Communicable Disease (NICD), The Desmond Tutu HIV Centre, Western Cape Provincial Government, Discovery Health, MedScheme and the National Department of Health. This extensive collaboration led to the unit strengthening its existing data sharing, data storage and clinical trial analysis capacity. The multicountry Health System resilience study, which was led by the Quest Centre at Harvard University, involved the collaboration of scientists and institutions from ten low to middle income countries. The spatial mathematical modelling of COVID-19 has brought together BSU and various institutions such as University of Pretoria, University of Witwatersrand, Nelson Mandela University, CSIR and IBM through funding from the IDRC. Collaboration with members of the Gauteng Premier COVID-19 Advisory Committee was critical to assist with modelling the effects of vaccination in reducing hospitalisations. BSU was a co-investigator together with HSRC and University of KwaZulu-Natal to understand how those 50 years and older might have been more impacted by COVID-19.

Science Citizenship and Stakeholder Engagement

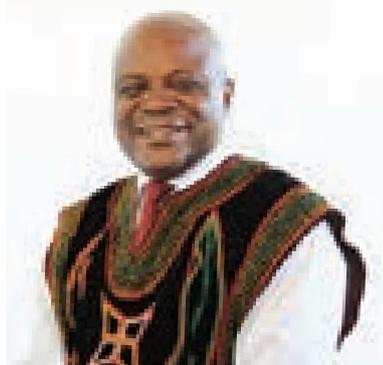
BSU staff members served on many committees.

Impactful Research Translation

The development of the DIASA mobile application by the SAFOODS division has led to a relative validation study where the application will be used to determine the dietary intake of a subsample of the study population of a national dietary intake study involving key nutrition researchers within the country. The intervention assessment conducted by the BSU Health GIS Centre in collaboration with the SAMRC Malaria Research Group and the NICD in 2021 investigated the impact of the mobile surveillance units established at key border transit corridors between South Africa, Mozambique and Eswatini on levels of imported malaria in low transmission border communities and amongst mobile and migrant populations transiting through these areas. Part of an eight country SADC level intervention, the results of the study were released as a country level report in association with the Malaria Elimination 8 initiative in January 2022. The findings of this study will play a significant role in the future deployment of these surveillance units as part of the national strategy to eliminate malaria.



SAFOODS User Acceptability Testing DIASA The new Dietary Intake Assessment tool for South Africa.



Prof Charles Shey Wiysonge Unit Director

Charles.wiysonge@mrc.ac.za

OVERVIEW

The objectives of Cochrane South Africa are to produce trusted and timely systematic reviews and other high-quality evidence addressing the most important questions for healthcare decision-making; and to inform healthcare decisions by making our evidence accessible, usable, and available in South Africa and beyond our borders.

Cochrane SA has built a multi-disciplinary vaccine implementation research programme over the last five 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 other stakeholders on vaccine hesitancy in South Africa) and to expand our portfolio of projects to include COVID-19 vaccination in South Africa.

COVID-19 related research and development

These COVID-19 research projects are either underway or were completed in 2021/22:

- A Cochrane review of the effects of interventions aimed at increasing vaccination uptake among adults
- Three Cochrane qualitative evidence syntheses on COVID-19, human papillomavirus (HPV), and childhood vaccination acceptance and hesitancy.
- 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 a comprehensive understanding of vaccine hesitancy and opportunities to support the promotion COVID-19 health seeking behaviours.
- A qualitative study in collaboration with the University of Cape Town (UCT), to understand the drivers of COVID-19 vaccination acceptance, hesitancy and refusal amongst primary health care workers and people with type-2 diabetes and hypertension in the Cape Metro.
- Two surveys to assess COVID-19 vaccine confidence and hesitancy among healthcare workers in Cape Town, one in collaboration with UCT and the another with Stellenbosch University.
- 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.
- Multiple rapid reviews on COVID-19 preventive and therapeutic interventions for various ministerial advisory committees at national level.
- A review of data sharing practices during public health emergencies among prospective clinical trial registries of the World Health Organization (WHO) International Clinical Trial Registry Platform during public health emergencies.
- Our Cochrane review on chloroquine or hydroxychloroquine for prevention and treatment of COVID-19 won the inaugural Harding Prize for Useful and Trustworthy Communication. The Harding Prize was launched in early 2022 to celebrate individuals or teams who had communicated information in a trustworthy and useful way; that genuinely helped people decide what to do or help them judge a decision made by others. The prize is awarded by the Winton Centre for Risk and Evidence Communication, based at the Centre for Mathematical Sciences in the University of Cambridge, UK, in association with Sense About Science and the Science Media Centre.

Reimagining research in a time of COVID-19

Beyond producing systematic reviews and other types of synthesised evidence, we conducted primary studies (most of them using online data collection methods) assessing barriers and facilitators of uptake of COVID-19 vaccines and other COVID-19 preventive interventions. Working with the National Department of Health (NDoH), we contributed to methods development for health technology assessment and guideline development to inform National Health Insurance processes, including a publication about health economic use in South African guideline development.

In addition, we also prepared policy briefs for WHO and edited a Special Issue on Vaccines “Applying an implementation science lens to vaccines” in the journal *Current Opinion in Immunology*. Furthermore, having received EDCTP funding for a multi-country project, the Global Evidence Local Adaptation (GELA), aims to increase decision makers’ and researchers’ capacity in South Africa, Malawi and Nigeria to use global and local research and guidelines to develop locally relevant guidelines for newborn and child health; thereby minimising waste and increasing the value of available resources. The project is a multi-faceted multidisciplinary research and capacity strengthening programme using primary and secondary research, guideline adaptation methodology, and digital platforms to support authoring delivery and dynamic adaptation.

Capacity Development and Transformation

We collaborated with universities in the Western Cape to develop and implement short course modules on evidence syntheses and knowledge translation. We also offered training courses on systematic reviews to students from various historically disadvantaged universities in South Africa. In addition, we graduated 3 postgraduate students and are currently supervising 12 postgraduate students, 7 Masters and 5 PhD’s. Of these 66% are women and 40% were Black South African’s.

Advancing research through collaborations and partnerships

Most of our work is collaborative and involves multiple partners. For example, Cochrane South Africa staff have collaborated and continue to collaborate with the COVID-19 Vaccine Ministerial Advisory Committee (MAC) to conduct rapid reviews on the safety and efficacy of COVID-19 vaccines and these reviews form the basis of MAC advisories to the Minister of Health.

Cochrane SA was a founding member of the COVID-19 Evidence Network to support Decision-making (COVID-END), which is a time-limited network of 58 global evidence synthesis, guidance and decision support partner organisations established to better coordinate the evidence synthesis response to the COVID-19 pandemic and reduce research waste. This year, COVID-END was awarded first Cochrane-REWARD prize for having worked to reduce waste in all five stages of research. A major achievement of COVID-END was providing the foundation for the Global Commission on Evidence to Address Societal Challenges, a report which aims to seize on the once-in-a-generation focus on evidence presented by the pandemic, calling for sustained efforts to systematise the successful aspects of using evidence and to address the shortfalls.

The Unit has also collaborated with WHO to produce multiple systematic reviews on priority topics to support evidence-informed national decision making in African countries. Another collaborative project between Cochrane SA, WHO, and the Human Science Research Council aimed to assess the barriers to uptake of cervical cancer screening in low-and-middle-income countries.

In another project, under the auspices of WHO, Cochrane SA staff collaborated with scientists based at multiple universities around the world to develop new tools and indicators to assess the behavioural and social drivers of vaccine uptake for childhood and COVID-19 vaccination, enabling programmes to address under-vaccination through an enhanced understanding of the causes.



Protocol Development Course.



Cochrane National Symposium.



Cochrane CSA Symposium.

Science Citizenship and Stakeholder Engagement

During the reporting period, staff members of Cochrane served on many committees and attended conference, webinars and workshops – both local and internal.

Impactful Research Translation

Through our leadership of the South African GRADE Network, we continue to be responsive and conduct evidence syntheses that informed national guidelines, for example reviews of COVID-19 medicines and vaccines to inform national guidelines; reviews of medicines to inform the national essential medicines list standard treatment guidelines.

We have supported more than 20 rapid reviews or evidence summaries over the past year. We have also conducted systematic reviews commissioned by WHO, which have informed global guidelines and decision making at national levels. Topics of these reviews included COVID-19, nutrition, and vaccination.

We worked with decision-makers in identifying COVID-19 related priorities, conducting multiple rapid reviews that informed national guidelines, and we are currently planning strategic engagement with key stakeholders to increase uptake along with development of infographics to support dissemination to broad audiences, including the public.

We have also done community engagement by developing and sharing COVID-19 relevant information in the form of short-films and animations in collaboration with a non-profit organisation Eh! Woza. Finally, Cochrane South Africa staff had substantial media engagement through interviews with TV, radio, and print media.

HEALTH SYSTEMS RESEARCH UNIT



Prof Catherine Mathews Unit Director
catherine.mathews@mrc.ac.za

OVERVIEW

The Health Systems Research Unit (HSRU) conducts research 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 achieve Universal Health Coverage (UHC) and to improve health throughout the life-course.

The members of the HSRU:

1. Evaluate the effectiveness and efficiency of health care delivery, including routine and novel models, in communities, schools, and health facilities.
2. Evaluate the impact of social protection interventions and policies on health and well-being.
3. Apply implementation science frameworks and approaches, 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.
4. 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).
5. Conduct policy-relevant evidence synthesis, and advance methods and develops capacity in this field.
6. Contribute to capacity building in the field of health systems research through teaching and supervision.

COVID-19 related research and development

Social protection and child health:

In 2021, scientists in the Unit partnered with the Black Sash, an advocacy organisation, and ran a research project on the topic of “Children, social assistance and food security”. The project sought to gain a fine-grain understanding of food insecurity in the context of COVID-19 for children receiving the Child Support Grant (CSG) across 7 sites in the Western Cape.

The findings showed that children are surviving on low quality, low quantity diets, and that their primary caregivers are forced to make difficult trade-offs between food and other essential needs on a daily basis. The recommendations emanating from this work emphasise the need for the CSG value to be increased to at least the Food Poverty Line of R624 per month, and for the adoption of an integrated Cash Plus Care approach to childhood poverty and wellbeing. The findings have been published in

Children Social Assistance and Food Security Research Report.pdf (samrc.ac.za). The report has been shared directly with the Government as part of an advocacy campaign to influence current policy deliberations on the Child Support Grant, the Basic Income Grant, and the Maternity Support Grant. The Department of Social Development and SASSA also attended the research report launch.

During the pandemic and lockdowns, there were declines in overall primary health care facility attendance. The Cape Town Public Health Department implemented home delivery of medication by community health workers to decongest primary health care facilities, mitigate the spread of infection, and ensure patient access to care and medication. Health economists in the Unit evaluated this initiative to assess whether it was sustainable and whether it could be integrated with national strategies including the Central Chronic Medicines Dispensing and Distribution (CCMDD) program launched in 2014 to provide expanded access to medication for stable chronic patients in differentiated access points within the community.

Through Cochrane Effective Practice and Organisation of Care (EPOC) – the Cochrane review group focused on health systems questions – we continue to provide support for a number of high priority health systems reviews for COVID-19. These include qualitative evidence syntheses on factors that influence the provision of home-based rehabilitation and on adults' views and experiences of vaccines developed in response to the COVID-19 pandemic; and a scoping review on interventions to increase COVID-19 vaccine uptake. We also produced new user-friendly summaries for health service managers of EPOC reviews relevant to COVID-19, including reviews on vaccination communication between healthcare workers and older adults and on factors influencing parents' views and practices around routine childhood vaccines. Simon Lewin also participated in the Scientific Advisory Committee for the WHO Evidence-to-Policy (E2P) Summit 2021 in November 2021. Key focus areas of the Summit included leveraging evidence in health emergencies and strengthening knowledge translation and country resilience.

The COVID-19 pandemic has had severe impacts on caregivers of adolescents living with HIV. The Youth Health Economics Focal Area co-developed an innovative economic incentive package (R350 cash over 3 months + motivational SMS) for improving mental health and wellbeing with caregivers of adolescents living with HIV. This was evaluated through a rigorous pilot individual-randomised controlled trial with 100 caregivers of adolescent living with HIV from the South of Durban. Preliminary qualitative interviews indicate that the economic incentive package helped carers' purchasing of essentials items for their family (e.g., food, school items) and motivated them to practice positive coping strategies.

Reimagining research in a time of COVID-19

The emergence of the COVID-19 had a rapid, and major impact on research in the HSRU. Initially, many of our ongoing studies were paused, and our efforts were redirected to health systems research directly related to

COVID-19. We conducted a range of innovative studies to guide health systems interventions to prevent or manage COVID-19. For example, the SARS-CoV-2 transmission risk in school Study is a pilot epidemiological and feasibility study that aims to document the proportion of close contacts (learners or staff) that go on to be diagnosed with SARS-CoV-2 after being exposed to an index case (secondary infection risk) and to identify barriers and facilitators to identification and monitoring of secondary cases in the school environment. After the few months of lockdown, we modified the protocols of ongoing non-COVID-19 studies to, for example, enable phone-based data collection to minimise participant risk of COVID-19 infection, to avoid disruption at health care facilities where we had previously been based and where health workers were bearing the brunt of COVID-19 infections, and to add COVID-19-related sub-studies.

The HERStory 2 study (<https://www.samrc.ac.za/sites/default/files/attachments/2021-07-27/HERStory2%20Process%20Evaluation%20Report%20Overview.pdf>), data collection was conducted entirely remotely. Given that this study was taking place during a time when there was a surge in COVID-19 infections, we adapted the intended data collection procedures to enable the use of "remote" approaches including a telephone survey, telephone interviews and an online survey. There were several advantages to our approach of "remote" interviewing over the phone and using an online survey including the potential for increased disclosure of sensitive or socially undesirable behaviour (reduced social desirability bias), and reduced costs and budget expenditure, and reduced risk of COVID-19 for study team members. There were also disadvantages to the remote interviewing approach including possible barriers to building rapport with research participants, circumstances in the participant's home affecting their participation, and technological problems. The SAMRC team did their best to overcome these barriers, using the expertise they had from previous studies in which they had successfully conducted phone interviews and phone counselling on sensitive topics.

Advancing research through collaborations and partnerships

The mental health and socioeconomic impacts of global infectious epidemics are likely to be longer-lasting than their physiological repercussions, with the COVID-19 epidemic resulting in an increased burden of post-traumatic stress, anxiety and mood disorders, exacerbating the mental health treatment gap in the country. A Mental Health Investment Case for South Africa, commissioned by the National Department of Health in November 2019, and undertaken by scientists in the Health Systems Research Unit in collaboration with the University of Cape Town's Alan J Flisher Centre for Public Mental Health,



Health systems Contraception Study 23rd – 26th November 2021.

represents the result of three years of sustained dialogue and collaboration with the National Department of Health, involving key provincial partners, clinicians, financing experts, patient rights and community advocacy groups and prominent academics. Building on global guidance, the investment case builds consensus and explores implementation experiences and challenges through methodological innovations including the facilitation of provincial multi-sectoral workshops and engagement with a broad panel of multi-disciplinary experts through a Delphi study.

In support of the South Africa's commitment towards universal health coverage, the investment case aimed to identify key priorities and support capacity building efforts to ensure the country's future health system under the NHI is inclusive and responsive to its mental health care needs. The Investment Case provides the country with a critical opportunity to prioritise mental health as an integral part of its COVID-19 recovery efforts and provides the impetus for cross-sectoral collaboration and partnerships. The Mental Health Investment Case was presented and endorsed during the 2021 World Mental Health Day commemoration webinar, chaired by the Director General of Health. Findings of the report were published.

The WHO Global Strategy on Human Resources for Health: Workforce 2030, articulates the linkage between investments in the health workforce and "improvements in health outcomes, social welfare, employment creation and economic growth", arguing that the investment in human resources for health can deliver a triple return on investment through improved health outcomes. Despite human resources for health constituting the largest share of provincial health budgets, estimated at 63%, the South African health workforce faces significant challenges including absolute shortages, inequitable distributions, and inappropriate skill mixes of key personnel. Limited increases in public health expenditure, further compounded by the COVID-19 epidemic and its resulting impact on revenue generation as well as the demand for care, will likely exacerbate these challenges. Following participation in the development of the National 2030 HRH Strategy: Investing in the Health Workforce for UHC and 5-year HRH Strategic Plan: 2020/21 to 2024/25, health economists in the Health Systems Research Unit, through close collaboration with the National Department of Health (NDOH) and the World Health Organization, undertook a detailed costing of the plan in an effort to support its successful implementation. This work required close and ongoing engagement with the Human Resources for Health National Directorate, the National Treasury, and several non-governmental organisations, including PERCEPT, Quantum, and the Health Information Systems Project (HISP), for the provision of key data inputs and buy-in. While the report has been submitted to the Department of Health, the estimated gap between the projected health budget and those required to meet health workforce targets for increased equity, necessitates further workshopping of findings to both clarify the potential resource envelope expected through the NHI, and to develop an incremental approach to improved staffing. As such, the Department of Health and WHO has requested the participation of HSRU health economists in a workshop to initiate this process.

Capacity Development and Transformation

In the Health Systems Research Unit, we prioritise developing the capacity of Unit staff through journal clubs, writing workshops and encouraging them to pursue post-graduate 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. For example, we support “seed” studies led by early- and mid-career scientists. We encourage scientists in the Unit to supervise post-graduate studies of other South African students.

Science Citizenship and Stakeholder Engagement

Scientists in the HSRU are involved at national, regional and international levels in approaches and methods for processing or packaging evidence for decision making and in direct participation in decision forums. They serve in many National and international Advisory Committees and Boards.

Impactful Research Translation

The second phase of our research on the multi-million dollar South African combination HIV prevention intervention for adolescent girls and young women (AGYW) has generated findings which have been disseminated to stakeholders including policy makers, programme managers and funders of AGYW prevention and treatment programmes through the website (<https://www.samrc.ac.za/intramural-research-units/HealthSystems-HERStory>), and through presentations and publications. This research has informed the country's grant applications for the next Global Fund grant period, and in this way our research contributes to the design of programmes 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. The following articles disseminated aspects of the findings to the general population:

- Kim Jonas, Teenage pregnancy during COVID-19 in South Africa: a double pandemic
- The Conversation, September 6, 2021; Kim Jonas, In-depth: What contraceptives are available in SA and which ones are most popular? Spotlight, December 6, 2021.
- Kim Jonas, Make love, not babies: Surprising discoveries about South Africans' popular choice of contraceptives. Daily Maverick, December 7, 2021.

The South African government is in the process of implementing National Health Insurance (NHI) as the reform of the health care system to deliver Universal Health Care (UHC) within the country. The COVID-19 epidemic highlighted the extent to which the current, highly fragmented health care system is ill equipped to meet the health care needs of the entire population and the need for major structural reform of the South African health system. At the same time the epidemic highlighted the challenges that would need to be addressed in order to implement the NHI and if NHI is to deliver UHC as intended. We provided support to NDoH and Treasury in developing models for contracting with the private sectors for COVID-19 related critical care and in developing models for funding COVID-19 immunisation and served on the COVID-19 Vaccine costing reference group of Ministerial Advisory Committee. We also produced publications in academic journals and the popular press (in the form of Op-Eds) examining the lessons and implications of the COVID-19 epidemic for the proposed NHI.

Over the period from 18 May 2021 to 23 February 2022 The Portfolio Committee on Health has held public hearings on the NHI Bill. Scientists in the Health Systems Research Unit developed a database to capture and analyse the inputs of respondents with a view to provide an overview of the concerns tabled by respondents at the hearings and the options for dealing with them. We made this work available in academic journals.

Our research in the field of social protection, a key policy goal of the Sustainable Development Goals (SDGs) linked to health, has been translated into a teaching module. The University Partnership for International Development (UNIPID) online course: Social Protection and Health (<https://www.unipid.fi/virtual-studies/social-protection-and-health/>) is an interdisciplinary course that draws on expertise on social protection from four institutes and universities, two from the Global North and two from the Global South, highlighting its role in protecting and promoting health. The course is produced in collaboration with the University of Zambia, the South African Medical Research Council, and Karolinska Institutet, and is attended by students across the globe. Lieve Vanleeuw and Wanga Zembe-Mkabile from the Health Systems Research Unit helped design the course with Assoc Prof. Salla Atkins from Tampere University and both teach a module each on the course. Dr. Zembe-Mkabile teaches a module on social protection for children in South Africa, while Ms Lieve Vanleeuw teaches a module on social protection for patients with TB in South Africa. Assoc Prof. Yanga Zembe also teaches a module on the course focusing on social policy and gender.

SAMRC/UWC HEALTH SERVICES TO SYSTEMS RESEARCH UNIT



Prof Helen Schneider Unit Director
hschneider@uwc.ac.za

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. Located within a School of Public Health with a large postgraduate (approximately 200 students) programme, the HSSU places particular emphasis on capacity building through doctoral and post-doctoral training.

Several areas of research, innovation and development relate centrally to themes of health system pandemic responses, recovery and resilience. They include: 1) documenting the elements and processes of enabling environments at the meso-level (district and sub-district) of the health system in fostering health care quality and outcomes at the frontline. This is based on research in a national partnership referred to as Mphatlalatsane being implemented in three provinces – Mpumalanga, Limpopo, Eastern Cape. 2) The structures, processes and governance of intersectoral collaboration for health

and wellbeing before and during COVID-19, conducted collaboratively with the Western Cape's provincial health department. 3) Inclusive, socially accountable, and resilient community health systems, an international collaboration with Universities of Umeå (Sweden), Makerere (Uganda), Muhimbili (Tanzania) and Zambia.

COVID-19 related research and development

- The Chair steered a review of intersectoral action during the COVID-19 pandemic in the Western Cape Province, co-written with provincial policy makers, and which will shortly appear as a chapter in the influential annual South African Health review produced by the Health Systems Trust. https://www.hst.org.za/media/Documents/SAHR2021_Chapters_at_a_glance_8Dec_UPDATED.pdf
- Steven Ssendagire is in the early stages of doctoral research in Uganda on the intersectoral responses to infectious disease emergencies, most notably Ebola, and the implications of these for the response to COVID-19. Drawing on collaborative governance and organisational coordination theories, he is developing tools for the measurement of collaborative functioning that can be applied across settings and pandemics.

- Many van Ryneveld is conducting doctoral research documenting the community and social responses to COVID-19 in the highly successful community mobilisation initiative called Community Action Networks (CMAs) in an initiative called Cape Town Together. She published a commentary entitled: What Is COVID-19 Teaching Us About Community Health Systems? A Reflection from a Rapid Community-Led Mutual Aid Response in Cape Town, South Africa. The commentary formed part of a special issue of IJHPM on Community Health Systems (CHS), in a collaboration between the Universities of Western Cape, Zambia and Umeå, for which the Chair was the lead co-editor. The special issue was curated over the course of the unfolding COVID-19 pandemic and the editorial and several papers reflect on the implications of the pandemic for the CHS.

Reimagining research in a time of COVID-19

We are adopting increasingly hybrid data collection methods. We have come to realise that qualitative, elite interviewing, for example, can be conducted relatively easily online, and is often the preferred mechanism (especially where prior relationships have been forged). Researchers and health system players have become adept at online engagement, and remote convening of research team meetings, especially where these span cities or countries, which has become the norm. Over the course of 2021/22 we were, however, able to resume normal field work activities in the health system and advance key areas of research that had stalled in 2020/21.

Capacity Development and Transformation

In 2021/22 the HSSU Director graduated four PhDs (three as primary supervisor) and enrolled two new PhDs (total of five currently). One post-doctoral fellow completed a two-year fellowship, and a new fellow recruited to advance the theme of Intersectoral Collaborative Governance. The HSSU Director continues to convene the doctoral programme in the School of Public Health, and in this regard, ran a virtual writing course for doctoral students in the Community and Health Sciences Faculty over

the course of May 2021, focused on the writing of peer-reviewed articles (25 participants), and a PhD induction programme in February 2022 (total 15 candidates). The HSSU in collaboration with the SARChI programme, hosted two health policy and systems writing retreats at the Mont Fleur retreat centre: 3-7 May 2021 and 18-22 October 2021.

Advancing research through collaborations and partnerships

Mphatlalatsane Initiative, which is an evaluation of a national partnership to improve maternal and neonatal health outcomes in three provinces. Evaluation is jointly conducted with intra-mural Health Systems Research Unit. CHS Connect aims to continue building on our collaborative work to date on community health systems. In August 2021 we co-founded a network of researchers, policymakers, and practitioners in several institutions across the world referred to as CHS Connect. The purpose of this network is to enhance research capacity and competence for designing and conducting “embedded” health policy and systems research to build inclusive, socially accountable, and resilient community health systems (CHS). This network will be meeting face-to-face in Arusha, Tanzania in May 2022. 2021/22 was the final year of a 5-year collaboration with Antwerp Institute of Tropical Medicine (ITM), supported by grants from the Belgian Cooperation, on capacity building in the areas of doctoral training and Pharmaceutical Public Health.

Impactful Research Translation

We have engaged provincial (e.g., Intersectoral Collaboration in the Western Cape) and national health decision-makers (e.g., Mphatlalatsane) in our various projects; and have been part of global conferences, webinars and consultatory processes. For example, the HSSU Director: 1) moderated a virtual international webinar on 29 July 2021 entitled: Organisation and Management of Service Delivery in Urban Primary Health, in a series jointly hosted by Johns Hopkins University and The International Institute for Primary Health Care, Ethiopia 2) Was a member of an expert group for the Development of a Primary Health Care Strategy for WHO’s South East Asia Region (SEAR) between October and December 2021.

PUBLIC HEALTH INNOVATION

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 | Drug Discovery and Development Research Unit (ERU) | 4 | Herbal Drugs Research Unit (ERU) |
| 2 | Primate Unit and Delft Animal Centre (IRU) | 5 | Genomics Center (IRU) |
| 3 | The Biomedical Research and Innovation Platform (IRU) | 6 | Pan African Center for Epidemics Research Unit (ERU) |

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

SAMRC/UCT DRUG DISCOVERY & DEVELOPMENT RESEARCH UNIT



Prof Kelly Chibale Unit Director
Kelly.Chibale@uct.ac.za

OVERVIEW

The Drug Discovery and Development Research Unit is specifically focused on translating basic scientific knowledge into potential innovative new medicines for the treatment of malaria, tuberculosis, COVID-19 and includes efforts to combat antimicrobial resistance (AMR). The interdisciplinary drug discovery research undertaken in the Unit involves the integration of multiple disciplines, from basic to clinical sciences, and is positioned to contribute directly to health innovation, defined as the delivery of tangible outcomes useful to the improvement of health. The research undertaken advances the mission of the SAMRC to improve the health of South Africans and contributes to the development of the South African bioeconomy, while also at the same time further developing the established drug discovery infrastructure, technology platforms and capacity.

COVID-19 related research and development

A research project titled 'Multidisciplinary Platform Based on Artificial Intelligence for Accelerating Drug Discovery and Repurposing for COVID-19' has been initiated and which is funded through a grant received under a BRICS (Brazil, Russia, India, China, South Africa) response to

COVID-19 pandemic. The overall aim of the project is to develop an integrated, cross-disciplinary, collaborative platform using both drug repurposing (use of drugs developed for use in other diseases against COVID-19) and artificial intelligence (AI) technologies to accelerate drug discovery for the treatment of COVID-19 through the rapid identification of suitable drug leads for optimisation and/or selection as clinical development candidates.

The studies are being conducted through a multidisciplinary computer-aided (in silico) approaches consisting of experienced teams from Brazil, South Africa, and Russia, as well as an additional partner from the USA. To identify suitable chemical matter for the hit-to-lead and lead optimisation studies, in silico screening of approved drugs and compound libraries is being carried out by the Brazilian team with the consultant USA partner who are carrying out the development of AI tools and Computer-Assisted Drug Design (CADD) approaches.

The focus of the South African team is to initiate and execute a COVID-19 drug discovery programme on selected quality hit compounds identified from virtual screening of chemical libraries against two protein targets of SARS-CoV-2, viz. the Mpro and PLpro proteases. The South African team is designing and synthesising new compounds based on the results of machine learning to optimise activity against the targets and SARS-CoV-2.

Reimagining research in a time of COVID-19

From the start of the pandemic the Unit developed and adopted a laboratory shift system under strict COVID-19 protocols. This meant that all laboratory-based researchers, including students, staff have been able to return to work. This way of working in shifts has brought greater emphasis and need for forward thinking and planning. The Unit's researchers have impressively developed these skills and have become even more productive by working smarter. The Unit's researchers have effectively used the time outside their laboratory shift to contribute to writing grant applications, publication writing, strengthening data management systems and training through webinars and online workshops.

Capacity Development and Transformation

A South African Historically Disadvantaged Institution Initiative was established, and which was initially funded by the SAMRC as a pilot project with Water Sisulu University (WSU). The aim of this programme is to build capacity at selected Historically Disadvantaged Institutions (HDIs) in modern integrated drug discovery. After the pilot with WSU ended in 2020, University of Limpopo was included from 2021 in a drug discovery collaboration grant (NIH R01 -2020-2025) involving partners in the USA. The Unit is currently working with Strategic Health Innovation Partnerships (SHIP) unit of the SAMRC to expand the HDI capacity building project to include University of Limpopo and University of Venda.

Additionally, unit members attended 4 training sessions centred around leadership training, which covered the following topics: Communication, Employee Engagement, Management, Conflict and Leadership.



Chemistry team in H3D Medicinal Chemistry Lab.



The Enzymology team in H3D biology lab.



OpenTrons liquid handling robot used for malaria assays.

Advancing research through collaborations and partnerships

The malaria drug discovery projects required partnering with a product development partner in Medicines for Malaria Venture (MMV) and a large pharmaceutical company in Merck, as well as with an international consortium, the Malaria Drug Accelerator (MaDA) funded by the Bill and Melinda Gates Foundation. The MaDA Consortium is an innovative target-guided discovery platform and collaboration between sixteen international groups, including two pharmaceutical companies in GlaxoSmithKline and Novartis. On the other hand, the tuberculosis (TB) drug discovery projects required partnering with the TB Drug Accelerator (TBDA), a groundbreaking partnership between eight pharmaceutical and 1 biotech company, fourteen research institutions, and a product development partnership that seeks to develop a new TB drug regimen through collaboration in early-stage drug discovery research, with support from the Bill and Melinda Gates Foundation.

Impactful Research Translation

The Unit Director regularly engaged with the public through various media. In this regard, the following Op-eds and publications are noteworthy:

- 28 Sept 2021: African research foundation partners with international pharmaceutical industry to strengthen capacity for health innovation in Africa <https://h3dfoundation.org/partnershiplaunch/>.
- 21 Nov 2021: The Conversation: Supplying COVID-19 pills at lower cost is only part of what poorer countries need <https://theconversation.com/supplying-covid-19-pills-at-lower-cost-is-only-part-of-what-poorer-countries-need-171974>.



Mr Virgil Verhoog, H3D Research Scientist in parasitology, setting up malaria biology assays.



H3D medicinal chemist training MSc student, Lebogang Mabatamela, visiting from University of Limpopo.



H3D Research Scientist setting up assays for pharmacokinetic experiments

- 18 Jan 2022: PharmaBoardroom article: Africa's Renewed Hope for Drug Discovery and Health Innovation" <https://pharmaboardroom.com/articles/africas-renewed-hope-for-drug-discovery-and-health-innovation/>.
- 18 Feb 2022: The Conversation: How trying to copy a COVID vaccine changes the outlook for African countries <https://theconversation.com/how-trying-to-copy-a-covid-vaccine-changes-the-outlook-for-african-countries-177172>.
- 22 Feb 2022: UCT News: Capacity building and skills development for health innovation in Africa <https://www.news.uct.ac.za/article/-2022-02-22-capacity-building-and-skills-development-for-health-innovation-in-africa>.
- 24 Feb 2022: All Africa: Africa: EU-Africa Business Forum to Foster Partnership for Health Innovation and Skills Development in Africa <https://allafrica.com/stories/202202240407.html>.

The Unit Director was also named as one of the 22 black biotech leaders in honour of Juneteenth in the USA, 17 June 2021. (<https://timmermanreport.com/2021/06/on-juneteenth-honoring-22-black-biotech-leaders/>). The list, published by the Timmerman Report, celebrates innovative black leaders who are change-makers in their respective fields.

Towards combating misinformation around African science and research and promote health innovation on the continent, Unit Director has been active on twitter (@Kelly_Chibale).

PRIMATE UNIT AND DELFT ANIMAL CENTRE



Dr Chesa Chauke Unit Director
chesa.chauke@mrc.ac.za

OVERVIEW

Primate Unit and Delft Animal Centre (PUDAC) is a research platform with an overarching goal of supporting biomedical research. Key objectives of the platform include the provision of animal models and research infrastructure as well as the utilisation of laboratory animal models (nonhuman primates: NHPs and rodents) in research to curb the burden of human diseases in South Africa. Current efforts are aimed at developing biomarkers for non-communicable diseases (NCDs) and bridging the gap in HIV vaccine research in the country. The platform continues 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. Furthermore, PUDAC is committed to continue building and enhancing human capacity through skills development and training of employees (animal technicians, technologists) and postgraduate students. Apart from research, PUDAC's senior staff members have been actively involved in reviewing current policies concerning the use of laboratory animals for biomedical research.

COVID-19 related research and development

As a research support entity, PUDAC has not been involved directly with COVID-19 research. However, the platform is a partner-member of the South African mRNA Vaccine Consortium (SAMVAC), which is selected to become the first COVID-19 mRNA vaccine technology transfer hub in

Africa. The platform is currently in the planning stages of renovating the existing infrastructure at Delft to include animal biosafety level 2/3 facilities. These will be utilised for pre-clinical testing and vaccine development of various infectious related diseases (COVID-19, HIV, TB, etc). In this endeavour, the platform has further partnered with University of Free State (UFS) and secured funding from Technology Innovation Agency (TIA) through UFS with the aim of accommodating more innovative research projects to transform the research work in South Africa.

Bridging other research gaps

The current projects were aimed at using NHP models (vervet and rhesus) to combat the burden of NCDs (hypertension, obesity and cardiovascular) and to test the efficacy of candidate HIV vaccines in the background of ongoing schistosomiasis to support HIV vaccine using the SHIV/Chinese rhesus monkey model.

Other research conducted in this reporting period included one continuing international research contract with Pomona (Italy) aimed at assessing potential HIV vaccine immunogens as proof of concept in the vervet monkey model; and the evaluation of candidate HIV vaccines in SHIV/rhesus monkey model as well as in the vervet monkey in collaboration with UCT and WITS/NICD, respectively.

In addition to collaborations with other research institutions, these research projects contributed to human capacity development by accommodating postgraduate students (PhD candidates) and offering training in NCD, and infectious diseases.

Reimagining research in a time of COVID-19

PUDAC had to devise a number of strategies to ensure that the operations of the platform are not hugely affected by COVID-19 and lockdown regulations. As the results of the effectiveness of the strategies, research activities at PUDAC were not greatly affected by the pandemic as all technical staff were on duty during the reporting period. One of the strategies that were implemented to complement the nature of PUDAC's working environment was to prioritise the care for animals and personnel's safety. Animal personnel were divided into two rotating teams consisting of one supervising technologist and two technicians per team.

Advancing research through collaborations and partnerships

The inclusion of PUDAC in the SAMVAC Consortium came at the right time when PUDAC was in the mission to develop and revitalise its Delft facility to accommodate preclinical and vaccine development programmes. Through this initiative, an infrastructural funding commitment was secured from a German company (KfW). During this reporting period, PUDAC also established a partnership/collaboration with an African Traditional Medicine initiative of HIV vaccine development (Nkabinde project).

Furthermore, the establishment of the SHIV/Rhesus monkey model at PUDAC provided augmented research opportunities and created collaborations with other researchers in the field of vaccine development, both local and international e.g., NICD/WITS, UCT, Institute of Primate Research (Kenya) and Pomona, (Italy).

As part of the capacity development initiative, PUDAC also collaborated with several academic institutions such as UWC (cardiovascular), UKZN (Hypertension) and UCT (HIV).

Capacity Development and Transformation

One of PUDAC's mandates is to build research capacity within the area of biomedical research and its use of appropriate animal models. Through this, the platform has contributed towards developing and empowering young scientists and technologists with specialised and scarce skills to be well-trained within their respective fields. PUDAC's capacity development program has equipped students/interns and staff members with a wide range 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 including HDIs. Within this reporting period, the platform has supported PhDs, MScs and technicians. Moreover, some staff members were awarded financial support by SAMRC to complete New Managers Development



Virology Lab SAMRC PUDAC.

Programme course which is offered by the University of Stellenbosch. This shows the commitment of PUDAC on ensuring SAMRC goals relating to nurturing young talent.

Science Citizenship and Stakeholder Engagement

PUDAC staff member(s) serve on many committees and attended several conferences, workshops and courses.

Impactful Research Translation

PUDAC continued to engage with relevant local and international stakeholders through virtual meetings/workshops and conferences to share research ideas and forge collaborations. As part of the capacity development initiative, which is in line with SAMRC strategic goals; students participated in webinars and local conferences, thereby sharing their laboratory findings with relevant stakeholders. Additionally, three research papers were published in peer-reviewed journals and three are currently in press.

BIOMEDICAL RESEARCH AND INNOVATION PLATFORM



Prof Christo Muller Unit Director
Christo.Muller@mrc.ac.za

OVERVIEW

The vision of the Biomedical Research and Innovation Platform (BRIP) is “To advance health through scientific excellence, generation of new knowledge, capacity development and innovation”. The Platform’s strategic objectives are aligned with 4 of the 5 objectives of the SAMRC and are 1) to administer health research ensuring good governance, 2) to be pioneering and lead the generation of new knowledge through research excellence, 3) to perform cutting edge innovative research and 4) to build capacity to generate the next generation of scientists.

Research at 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, pre-eclampsia, hypertension, cardiovascular diseases, psychological stress, cancer, non-alcoholic fatty liver disease and gut microbiota in health and disease. With the advent of the COVID-19 pandemic, BRIP has diversified its research portfolio to include wastewater-based epidemiology (WBE) and was instrumental in the SAMRC’s COVID-19 wastewater program where it was able to detect, quantify and identify variants of concern (VOC) circulating within communities. This knowledge base and technical expertise in WBE was used to capacitate several researchers in six different provinces (Eastern Cape, Free State, Gauteng, Limpopo, Kwa Zulu Natal, Western Cape).

BRIP is also tapping into African biodiversity by establishing an African Traditional Medicine Platform where various African traditional medicines will be screened for their

health-promoting properties. In the innovative space, BRIP is establishing a corneal cell-based therapy that will facilitate future corneal epithelial transplants at Groote Schuur hospital. In addition, BRIP is involved in preclinical research to develop novel anti-diabetic and cardioprotective therapeutics.

BRIP continues to build strategic and collaborative partnerships with under-resourced and other tertiary institutions. Through their capacity building program, BRIP has trained, mentored and graduated the next generation of young black scientists that can compete with their national and international peers.

COVID-19 related research and development

Globally, wastewater testing is recommended as a reliable, evidence-based public health decision-making tool to track and trace SARS-CoV-2 in environmental samples. In South Africa, current national regulations have implemented a prioritised COVID-19 strategy focusing on symptomatic individuals only, thereby negatively impacting the detection of a COVID-19 resurgence. As such, BRIP’s established surveillance methodology to quantify and detect SARS-CoV-2 in wastewater has come under the spotlight as a possible method to accurately quantify and monitor viral loads.

Furthermore, BRIP has also established a novel method to detect circulating variants using single nucleotide polymorphism (SNP) genotyping.



In the lab: BRIP's Deputy Director, Prof Rabia Johnson who is also one of the scientists involved in the SAMRC Wastewater Surveillance and Research Programme.



Prof Johan Louw from BRIP (left) and Mr Vincent Nowaseb, COO of the Namibia Institute of Pathology (right).

The Platform continues to advance knowledge through the expansion and implementation of its variant detection methodology across six provinces including Eastern Cape, Free State, Gauteng, Limpopo, Kwa Zulu Natal and Western Cape. This essential skills transfer has capacitated 12 black African, one Indian and two White scientists across the six provinces.

Reimagining research in a time of COVID-19

Due to travel restrictions and to adhere to social distancing, BRIP has had to find alternative means to transfer skills and train scientists across different provinces. To respond to this challenge BRIP has developed and implemented virtual training programs for SNP genotyping for VOC detection. In addition, BRIP staff continued to present online lectures, attend national and international conferences virtually, and interact with students and staff using a hybrid platform consisting of virtual and face-to-face meetings.

The Platform has an international and national footprint, with productive and strategic collaborations and partnerships across various institutions. During this reporting period, BRIP had international collaborations with the Namibia University of Science and Technology, Vall d'Hebron Research Institute (VHIR), Spain, Universidad Autónoma, Spain, and the Polytechnic University of Marche, Italy. Nationally, BRIP collaborates with 11 institutions across South Africa including the University of Pretoria, North-West University, University of the Western Cape, University of Cape Town, University of Limpopo, Stellenbosch University, University of Zululand, Cape Peninsula University of Technology, Agricultural Research Council, Kwa-Zulu Natal and Durban University of Technology.

Within the Wastewater program, BRIP has formed collaborative partnerships with various intramural research units including, Environment & Health Research Unit, Genomics Centre and TB platform and this partnership has been extended to include various institutes including Nelson Mandela University, Sefako Makgatho Health Sciences University, University of Fort Hare, University of Venda, the University of Zululand and the University of Free State.

Capacity Development and Transformation

The Platform has an excellent postgraduate program that comprises students from various universities across South Africa, including three under-resourced institutions, namely University of Zululand, University of Limpopo and University of the Western Cape. During this year, the Platform's postgraduate capacity development programme excelled again, graduating PhD and MSc students, of whom majority were females. In addition, many PhD and MSc students are currently being trained and supervised, of whom majority are also females. The Platform values



From left to right: Prof Johan Louw (BRIP), Gerhard Van Rooyen (NIP), Melvin April (NIP), Ms Rebecca Haiping (NIP), Prof Rabia Johnson (BRIP), Dr Carmen Pheiffer (BRIP), Mr Vincent Nowaseb (NIP) and Prof Christo Muller (BRIP).

diversity as reflected by our student demographics, with many females compared to males, of whom majority are Black African.

In addition, the Platform continues to train students and scientists in Wastewater-based epidemiology across the six provinces including Eastern Cape, Free State, Gauteng, Limpopo, Kwa Zulu Natal and Western Cape. This essential skills transfer has capacitated many Black Africans.

Science Citizenship and Stakeholder Engagement

BRIP members continue to serve on various local and international editorial boards, committees and fora. Work emanating from BRIP’s research was also presented at several international and national conferences

Impactful Research Translation

- BRIP’s research has been converted into many peer-reviewed publications.
- BRIP held its annual Symposium on the 18th and 19th of October 2021, as a hybrid event that was attended by approximately 100 attendees. Renowned guest speakers from Spain, USA and South Africa were invited as keynote speakers. A total of 25 emerging scientists from various institutions including the Agricultural Research Council, the SAMRC and the Universities of Cape Town, Limpopo, Western Cape, Stellenbosch and Zululand presented their research in the form of oral and poster presentations.
- BRIP co-hosted a hike and diabetes awareness campaign at Meerendal farm on World Diabetes.
- On an ongoing basis, BRIP undertakes media engagement as a tool to reach the wider general public to inform and educate them about new discoveries and explaining poorly understood issues. This is on a local and national level (print, broadcast and online).



BRIP Diabetes Day.



Prof. Craig Kinnear Center Manager

Craig.Kinnear@mrc.ac.za

OVERVIEW

Additionally, our research into inborn errors of immunity as part of the Primary Immunodeficiency Disorders Genetics Network (PIDGEN) has had direct translational impact to our research participants. By identifying disease-associated mutations in patients with inborn errors of immunity, our research has had a direct impact on their management and treatment.

The Genomics Centre is a next generation sequencing (NGS) facility that provides services. We aim to drive Precision Medicine in South Africa by providing cost-effective sequencing. In the past reporting year, we have sequenced 328 SARS-CoV-2 genomes, 327 whole genomes, 493 transcriptomes and 36 whole exomes.

Additionally, the Genomics Centre conducts independent research using NGS to identify genetic factors that contribute to human disease.

- (i) Inborn errors of immunity: Prof. Craig Kinnear and Dr. Brigitte Glanzmann are co-investigators on a multi-centre study investigating the genetic determinants of inborn errors of immunity (IEI). The Genomics Centre has sequenced the genomes of several children with severe, persistent, unusual, and recurrent infections and have identified disease-associated mutations. The identification of such mutations has a significant impact on the clinical management of these patients.
- (ii) Deciphering Developmental Delay in Africa (DDD-Africa): Dr. Nadia Carstens is a co-investigator on the DDD-Africa programme. Developmental disorders (DD) are severe, chronic disabilities, and are increasing in prevalence in low-and middle-income countries. The aim of DDD-Africa is to develop NGS-based testing strategies to add precision to the diagnosis and clinical management of DD.

- (iii) Evaluating the utility of clinical sequencing to improve diagnostic services for critically ill infants in SA: Dr. Nadia Carstens is a principal investigator for this study. Mendelian disorders collectively account for ~20% of infant mortality. Diagnosing these disorders remains a challenge. The aim of this pilot study is to investigate whether NGS-based diagnostic testing could improve diagnostic yields and clinical decision making for children with Mendelian disorders.
- (iv) Genetic Susceptibility to Infectious Diseases: Prof. Craig Kinnear is the Co-Principal investigator of the Stellenbosch University Tuberculosis Host Genetics Research Team. Using whole genome and transcriptome sequencing, we aim to understand the role host genetics in susceptibility and infectious diseases including tuberculosis and more recently, COVID-19.

COVID-19 related research and development

- Detection of SARS-CoV-2 lineages in Wastewater: The Genomics Centre forms part SAMRC Wastewater programme that tracks SARS-CoV-2 in wastewater samples collected from wastewater treatment plants (WWTP). While the surveillance of wastewater provides information about the levels of virus in wastewater (as an early warning surveillance tool for community spread), it cannot to give information about the viral variants. Sequencing of the genomes of the virus from the wastewater allows for investigating the evolution of the pandemic within the communities, providing information about the dominant strain present at any site over a period. More importantly,



Ms. Samira Ghor and Mr. McDonald Shiri, a Research Technologist from the Victoria Falls Wildlife Trust loading DNA libraries on the sequencer for Whole Genome Sequencing.

the early identification of viral strains with enhanced abilities to spread within communities will provide important public health information to allow for the implementation of additional measures to curb its spread. Over the reporting period, the Genomics Centre has sequenced 328 SARS-CoV-2 genomes and have confirmed the presence of different variants circulating within our communities. The sequencing data was used to identify any new emerging SARS-CoV-2 strains and mutations, and to confirm the presence of variants of concern (VOC) at the various WWTPs. VOC testing, conducted by the Biomedical Research and Innovation Platform using genotyping assays identified the Alpha, Beta, Delta, and Omicron at WWTPs from around South Africa. Whole genome sequencing (WGS) confirmed the presence of each of these variants. Interestingly, WGS confirmed the presence of Omicron in a sample collected at the Cape Town International Airport WWTP before Omicron was first announced.

- **Human Genetics of COVID-19 susceptibility:** There is significant inter-individual variability of responses to SARS-CoV-2 among infected individuals ranging from asymptomatic carriers to individuals who develop severe and even lethal COVID-19 disease. Individuals older than 55 years and patients who have existing underlying health conditions are at high risk of severe disease, however, a small percentage of individuals who are young and relatively healthy also appear unable to control the SARS-CoV-2. Recent reports highlighted a rare (2 in 100,000 persons younger than 21 years) and 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 used WGS to identify genetic causes of severe COVID-19 (including children with MIS-C) disease. We have sequenced the genomes of 76 individuals with severe COVID-19/MIS-C and have identified variants in genes involved in both adaptive and innate immune systems and genes involved in cytokine signalling pathways being plausible disease-causing variants.



Ms. Victoria Cole training Mr. Enrico Roode and Mr. McDonald Shiri from the Victoria Falls Wildlife Trust RNA Extraction training.



Mr. Martin Naicker, an MSc student from the University of Zululand and Mr. McDonald Shiri from the Victoria Falls Wildlife Trust analyzing gel images for Quality Control of DNA libraries.

Reimagining research in a time of COVID-19

Given that we provide a service, we continued to perform sequencing projects for all our clients, but there were some challenges. The biggest challenge was dealing with supply chain issues because of limited flights into the country during the height of the pandemic. Our approach for importing crucial reagents had to change and unfortunately this had a negative impact on our turn-around-time to complete sequencing projects as well as increasing the cost of the services we provide. We also had to change our laboratory practices to be in line with COVID-19 protocols which meant limiting access to the laboratory space.

The Genomics Centre forms part of the SAMRC wastewater programme. This large, multi-unit programme provides weekly updates to key stakeholders in local government about the SARS-CoV-2 concentration in wastewater samples collected from wastewater treatment plants (WWTP) across the country. By doing surveillance of SARS-CoV-2 concentrations at these WWTP provides our stakeholders with crucial information about the emergence of new waves of infection within local communities. This programme also required new bioinformatics pipelines which we developed in collaboration with the Francis Crick Institute. Moreover, the GC is a member of the South Africa COVID-19 Host Genetic Consortium that has contributed data to the international COVID-19 Host genetics database.

Next generation sequencing generates large amounts of data that needs to be processed, analysed, and sent to our clients/collaborators. At present, the infrastructure at the SAMRC can store the data but is insufficient to do the data processing and analysis. Infrastructure capable of processing large datasets is currently being investigated by the SAMRC. In the interim, the Genomics Centre is collaborating with the Centre for High Performance Computing (CHPC) to process and distribute our data at no cost to us. During the reporting period we have logged 474,572 CPU hours which would have cost R213,537.15 if this collaboration did not exist.

The Genomics Centre is constantly investigating new additional technologies and sequencing strategies to offer our partners and clients. To that end, we have entered collaborations with a few companies to increase our offerings. We have partnered with PacBio to investigate providing Long Read sequencing as a service at the Genomics Centre. We are currently in the piloting phase of this initiative. Looking forward, we have also initiated talks with Diagnostech South Africa to investigate placing of a 10X Chromium Controller at the Genomics Centre for single cell sequencing.



Dr Brigitte Glanzmann analysing whole genome sequencing data.

Advancing research through collaborations and partnerships

The Genomics Centre forms part of the SAMRC wastewater programme. This large, multi-unit programme provides weekly updates to key stakeholders in local government about the SARS-CoV-2 concentration in wastewater samples collected from wastewater treatment plants (WWTP) across the country. By doing surveillance of SARS-CoV-2 concentrations at these WWTP provides our stakeholders with crucial information about the emergence of new waves of infection within local communities. This programme also required new bioinformatics pipelines, which we developed in collaboration with the Francis Crick Institute. Moreover, the GC is a member of the South Africa COVID-19 Host Genetic Consortium that has contributed data to the international COVID-19 Host genetics database.

Next generation sequencing generates large amounts of data that needs to be processed, analysed, and sent to our clients/collaborators. At present, the infrastructure at the SAMRC can store the data but is insufficient to do the data processing and analysis. Infrastructure capable of processing large datasets is currently being investigated by the SAMRC. In the interim, the Genomics Centre

is collaborating with the Centre for High Performance Computing (CHPC) to process and distribute our data at no cost to us. During the reporting period we have logged 474,572 CPU hours which would have cost R213,537.15 if this collaboration did not exist. The Genomics Centre is constantly investigating new additional technologies and sequencing strategies to offer our partners and clients. To that end, we have entered collaborations with a few companies to increase our offerings.

We have partnered with PacBio to investigate providing Long Read sequencing as a service at the Genomics Centre. We are currently in the piloting phase of this initiative. Looking forward, we have also initiated talks with Diagnostech South Africa to investigate placing of a 10X Chromium Controller at the GC for single cell sequencing.

Science Citizenship and Stakeholder Engagement

During the reporting period, staff members of GC served on several committees and attended workshops. In addition, the GC hosted its first DNA Library Construction and Whole Genome Sequencing to researchers from the Victoria Falls Wildlife Trust.

Capacity Development and Transformation

The Genomics Centre recruited postgraduate students from under-resourced institutions. We have one MSc student and one postdoctoral fellow from the University of Zululand, one postdoctoral fellow from Stellenbosch University, one PhD student from the University of Cape Town, and one PhD student from the University of Limpopo. These students/postdoctoral fellows have been trained in NGS sample preparation and data analysis and are working towards higher degrees under the supervision of our scientists. In addition to this, through our partnership with DIPLOMICS, the Genomics Centre staff attended NGS data analysis workshops and statistics workshops.

In February 2022, the Genomics Centre hosted its first DNA Library Construction and Whole Genome Sequencing to researchers from the Victoria Falls Wildlife Trust. This workshop was presented by Samira Ghoor from the Genomics Centre and was designed to empower researchers from remote and under-resourced laboratories to prepare sequencing libraries that can be shipped to sequencing facilities for sequencing.

Research Translation

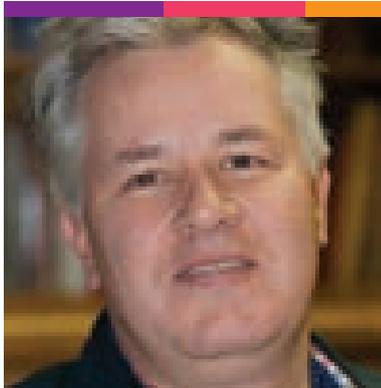
We have engaged with various media outlets to provide the public with information about our research. Members of our team had given radio and print media interviews detailing the work done at the Genomics Centre in response to the COVID-19 pandemic. In these interviews, we describe the role of the Genomics Centre in providing information about SARS-CoV-2 variants detected in Wastewater as well as our contributions to the South African and global COVID-19 host genetics initiatives.



Dr Amsha Viraragavan loading the BNDSEQ-G50 sequencer to sequence SARS-CoV-2 genomes from wastewater samples.

Moreover, our research into inborn errors of immunity as part of the Primary Immunodeficiency Disorders Genetics Network (PIDGEN) has had direct translational impact to our research participants. By identifying disease-associated mutations in patients with inborn errors of immunity, our research has had a direct impact on their management and treatment. Additionally, our work as part of the COVID-19 Host Genetic Consortium has generated the first African genomic data of severe COVID-19 cases that can be used by the international effort to identify genetic factors contributing to COVID-19 susceptibility.

SAMRC/TUT HERBAL DRUGS RESEARCH UNIT



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. Through extensive field work and in situ sampling, the chemotypic variation for important medicinal plants in South Africa are documented. Using a modern metabolomics approach chemical biomarkers are identified for isolation to encourage further research on South African botanicals.

Through this approach, efficient and robust quality control protocols of botanical raw material which could be used in product formulation are developed. The data generated will produce critical information to produce a set of extended monographs for the most important South African medicinal plants. Using an evidence-based ethnopharmacological approach the Unit aims to provide a scientific basis for the pharmacological properties of selected traditional medicines. The focus is not only on the preventative and curative properties of traditional medicines but also on the potential toxicity and biopharmaceutical aspects, including herb-drug interactions.

COVID-19 related research and development

The COVID-19 pandemic had a negative impact on the progress of laboratory-based research within the Unit, however, it provided an opportunity to collate and publish important research findings. During this reporting period, completed books.

Our Unit produced many scientific publications in international peer-reviewed journals and in addition, initiated the following three research projects:

- Phytochemical variation, anxiolytic activity and toxicity profiling of selected South African *Cissampelos* species.
- Phytochemical analysis and biological evaluation of the wound healing properties of *Lobostemon fruticosus* (L.) H.Buek.
- Chemical profiling and anti-inflammatory properties of three *Oncosiphon* species indigenous to South Africa.



Katlego preparing extract of traditional medicine.

Reimagining research in a time of COVID-19

A collaborative project was a second book bench-mark publication of monographs, where industry and academics were invited to co-author monograph chapters, based on their research expertise on the various plants used in traditional medicines. The various monographs in the book (which was edited by Unit members) is authored by different co-authors.

Capacity Development and Transformation

- The Unit is active in the staff development programme at a University which is still developing its research capacity and uses this opportunity to train staff members in the Department of Pharmaceutical Sciences, to achieve their PhD qualifications. Staff member graduated with a PhD in 2021, while two staff members are continuing with their PhD research projects within the Unit – all of them are black South African females.
- Several postgraduate students completed research projects within the Unit and graduated in 2021 under the supervision of the Unit Director, Prof. Alvaro Viljoen.
- The Unit had a total number of 33 researchers under training, of which the majority are from previously disadvantaged groups.

Impactful Research Translation

The Unit has collated its research findings and outputs into quality control protocols to produce a chromatographic atlas. The book is a compilation of high-level chromatographic fingerprints for 25 South African indigenous botanicals, developed using succinctly summarised analytical methods. It serves as a reference for setting quality parameters for botanical raw materials and products.

This project was achieved in line with the objective of the Unit to develop a chromatographic database for all commercially important indigenous plants to be used by industry and regulatory authorities for the quality control of raw materials used in traditional medicines and herbal formulations. The targeted readership includes academics and researchers in the field of pharmacognosy, pharmacy, botany and analytical chemistry, as well as manufacturers of herbal medicinal products and supplements, nutraceutical and cosmetics, and national and international policy makers and regulators.



Zebrafish facility.



Exploring the chemistry of indigenous marula.

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 Bioinformatics Capacity Development Research Unit (ERU) | 6 Precision Oncology Research Unit (ERU) |
| 2 Precision and Genomic Medicine Research Units (ERU) | 7 Wound and Keloid Scarring Translational Research Unit (ERU) |
| 3 Stem Cell Research and Therapy Unit (ERU) | 8 Cardiometabolic Health Research Unit (ERU) |
| 4 Antiviral Gene Therapy Research Unit (ERU) | 9 Precision and Genomic Medicine Research Unit (ERU) |
| 5 Genomics of Brain Disorders Research Unit (ERU) | 10 Platform for Pharmacogenomics Research and Translation Research Unit (ERU) |

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



Prof Alan Christoffels Unit Director
alan@sanbi.ac.za

OVERVIEW

The SAMRC Bioinformatics Unit has a set of objectives that maps to the SAMRC strategic plan as follows:

- **Objective 1:** Development of Open-source analytical methods (SAMRC Goal 3): We are leading technology development through an MRC-funded project. This 5-year computer engineering work alongside bacteriologists has now matured to an easily deployable set of reproducible analytics tools for limited resource settings.
- **Objective 2:** Lead knowledge production in the computational biology space (SAMRC Goal 2): Bioinformatics is an interdisciplinary field and evidenced by our collaborative publication outputs. Nevertheless, SAMRC Bioinformatics Unit 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 investigator and working group chairs demonstrate our leadership role.

Impact: We have led the development of a framework that promotes ethical benefit sharing in health genomics research.

Data management has become a central theme for universities and researchers.

Impact: The SAMRC Bioinformatics Unit has led a pan-African data science project (for the past 18 months) on behalf of the Africa CDC to develop a specification document for a data archive for pathogen data in Africa with a pilot focused on SARS-CoV-2. The specification document has been completed and used by the Africa CDC for its resource mobilisation.

- **Objective 3:** Contribute to human capital development (SAMRC Goal 4): A total of 30 postgraduate students (13 PhD and 17 MSc) are supervised by SAMRC Bioinformatics Unit academic staff. 50% (15 students) of the postgraduate students are female and 14 of the 15 are from historically disadvantaged communities.

Impact: One of our PhD graduates (Catherine Rossouw)'s PhD manuscripts was selected as one of 11 papers in 2021 to have impacted the field of pathology.

- **Objective 4:** Translating research into Policy (SAMRC Goal 5.1.3): Half of the SAMRC Bioinformatics Unit academic staff serve on national and international committees and panels that develop research frameworks to accelerate data science and biomedical research.

COVID-19 related research and development

A range of international collaborations matured during 2021 with a direct or indirect focus on COVID-19.

SARS-CoV-2 evolutionary dynamics:

COVID-19 outbreak in Uruguay: One of our staff, Dr. Gordon Harkins, was part of a team characterising SARS-CoV-2 sequences from Uruguay and analysing the clinical impact of COVID-19 outbreak in the country.

Evolution of SARS-CoV-2 N501Y lineages:

Dr. Gordon Harkins contributed to the phylogenetic analysis that contributed to the understanding of the convergent evolution of the SARS-CoV-2 N501Y lineages.

Drug repurposing for COVID-19:

At UWC, we have been using a computational approach to predicted peptide-based drugs that can potentially inhibit the interaction of SARS-CoV-2 spike protein with its target (humanACE2).

PHA4GE SARS-CoV-2 contextual data specification:

Dr. Dominique Anderson and Prof. Alan Christoffels were part of the PHA4GE working group who developed a data specification for maximising the use of meta data associated with SARS-CoV-2 biological specimens. The work defined the key meta data that should be captured when collecting SARS-CoV-2 biospecimens.

Ethical benefit sharing:

The COVID-19 pandemic has highlighted yet again the challenges faced when sharing genomic data. The SAMRC Bioinformatics Unit staff (Anja Bedeker, Peter van Heusden and Prof. Nicki Tiffin) developed a framework to promote ethical benefit sharing in health research with implications for sharing data during a pandemic.

Reimagining research in a time of COVID-19

Globally scientists have had to rely more and more on a virtual environment for their work. However, this space has highlighted the inequalities that exist in terms of resources to facilitate remote working. The SAMRC Bioinformatics Unit had to accommodate postgraduate students with data/internet bundles for remote work. As part of our teaching commitments at UWC, we have had to provide online lectures and recorded material for students to access. The need for extended online access has meant that Zoom licences were essential because of the limitation of 45min free Zoom sessions.

Advancing research through collaborations and partnerships

Ethical Benefit Sharing Framework Development:

The team is led by Prof. Nicki Tiffin including biomedical researchers, social scientists and bioinformaticians. This multi-disciplinary team formulated a framework that could be adopted and/or adapted to specific collaborative projects.

Meta data standard for collecting SARS-CoV-2 biospecimens:

This multi-national project required the input from a range of scientists and public health practitioners as we unpacked the data types that are essential during a biospecimen and clinical collection phase of a project.

Data platform for archiving and sharing pathogen data in Africa:

For about 18 months we led a project to engage national public health laboratories on the African continent to define the specifications and requirements of a pan-African data archive for pathogens. This work required a collaboration among data scientists, laboratory technicians, national public health policy makers and funding agencies. The conceptual framework led by the SAMRC Bioinformatics Unit's director, Prof. Alan Christoffels, is now used by the Africa CDC for its resource mobilisation phase.

Capacity Development and Transformation

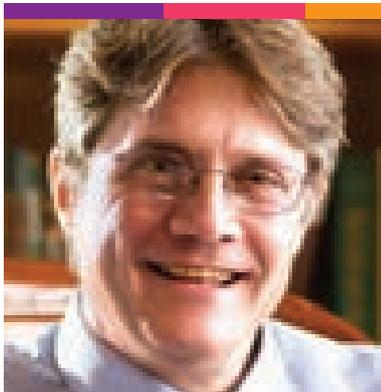
Many PhD and MSc students are supervised by SAMRC Bioinformatics Unit academic staff. About half of our postgraduate students are female and mostly from historically disadvantaged communities. Close to half of these students are registered either with Prof. Alan Christoffels as a primary supervisor or co-supervisor.

Impactful Research Translation

We have used a range of platforms to communicate our research to relevant stakeholders. Dr. Ruben Cloete arranged a public seminar on COVID-19 vaccine myths in partnership with a local church in the Silversands area. Prof. Nicki Tiffin was featured on a podcast discussing key skills for successful grant funding in health research, and the impact of funding opportunities on her career.

Prof. Alan Christoffels was appointed as a senior advisor to the Africa CDC at the African Union, where he uses the platform to inform a range of public health stakeholders on the current genomics landscape and areas of impact for future public health applications.

SAMRC/UP STEM CELL RESEARCH AND THERAPY RESEARCH UNIT



Prof Michael Pepper Unit Director
michael.pepper@up.ac.za

OVERVIEW

Active research projects in the Stem Cell EMU can broadly be grouped into 5 areas. The first involves hematopoietic stem/progenitor cells (HSPC) and hematopoiesis. The group is studying the effect of HIV on hematopoiesis from several angles given the high prevalence of HIV in our country and the well-documented cytopenias in HIV patients. From a therapeutic perspective, in a separate project we are working towards improving outcomes with HSPC transplantation particularly in the context of umbilical cord blood cells as well as donor/recipient compatibility (including HLA).

The second involves mesenchymal stromal/stem cells (MSCs). Here we are studying the differentiation (adipogenesis (see below), osteogenesis and myogenesis) and immunomodulatory properties of these cells. We are examining heterogeneity in these cells since this may affect both their differentiation and therapeutic properties. We are also developing a high throughput system for screening compound libraries for their pro- or anti-differentiation properties. From a therapeutic perspective, the group is studying the effect on several cellular parameters including differentiation when culturing the cells in human alternatives to fetal bovine serum.

The third area is focused on several aspects of obesity and adipogenesis, including in vitro adipogenesis, the identification of novel genes involved in these processes and the consequences of obesity on tissue/organ morphology and function.

The fourth area is cancer. Here we are examining the influence of MSCs and 2-methoxyestradiol in a murine model of spontaneous mammary carcinoma. We are

also studying isolation parameters of CD34+ HSPCs and their contribution to the treatment of hematological malignancies.

The fifth and final area is gene therapy. We are looking at ways to improve cell transduction with a view to treating cancer and HIV. We are also involved in a project that examines the ethical, legal, and social implications of gene therapy in a South African context.

COVID-19 related research and development

It has been recognised that individual response to SARS-CoV-2 infection vary greatly. Clinical phenotypes are heterogeneous both in terms of presentation of symptoms in the host and response to therapy. This is dependent in part on age, sex, and co-morbidities. It has further been recognised that heterogeneity may be dependent on host genetic factors, and several studies and initiatives have been established to analyse and review host genetic epidemiology associated with COVID-19. Our research group curated these articles into a web-based database using the python application-server framework Django. The database termed COHG-SA (Covid Host Genetics- South Africa) provides a searchable research tool describing current literature surrounding COVID-19 host genetic factors associated with disease outcome. A manuscript describing the database has been published in the European Journal of Human Genetics and provides an overview of the analyses that can be derived from these data. It also highlights that of all the genomes analysed to date, none are from the African continent. We are in the process of finalising a project which we hope will be able to address this problem (along with other groups in the country).

Social media has influenced public perception during the pandemic. In a recently published manuscript, we have analysed the capacity for social media to influence the utilisation of re-purposed medicines to manage COVID-19, despite limited availability of safety and efficacy data. This study sought to ascertain links between social media reports and utilisation for hydroxychloroquine (HCQ), ivermectin and colchicine. A combined retrospective analysis of social media posts was undertaken, along with utilisation and clinical trials data, in South Africa, between January 2020 and June 2021. In total, 77,257 posts were collected across key social media platforms, of which 6884 were relevant. Ivermectin had the highest number of posts (55%) followed by HCQ (44%). The spike in ivermectin use was closely correlated to social media posts. Similarly, regarding chloroquine (as HCQ is not available in South Africa), social media interest was enhanced by local politicians. Sentiment analysis revealed that posts regarding the effectiveness of these repurposed medicines were positive. This was different for colchicine, which contributed only a small number of mentions (1%). Of concern is that most reporters in social media (85%) were unidentifiable. This study provides evidence of social media as a driver of re-purposed medicines.

In addition to the above, the group, composed mainly of post-graduate students, has been very active in publishing syntheses of critical elements of COVID-19 and responses thereto including 15 articles in peer-reviewed journals, 3 articles in the *Conversation*, several publications in other fora, and several interactions with the media. Topics covered include contact tracing in South Africa, research in COVID-19 times, the COVID-19 infodemic, resource allocation during COVID-19, COVID-19 in children, protecting asthmatics from COVID-19, the pathogenesis of COVID-19, access to novel therapies for COVID-19, the impact of obesity on the cellular and molecular pathophysiology of COVID-19, COVID-19 vaccines, the COVID-19 treatment landscape, and SARS-CoV-2 variants, vaccines, and host immunity.

Reimagining research in a time of COVID-19

At the start of lockdown, we decided to meet regularly online and did so every week as a group. In addition, I contacted all the group members on a regular basis (Zoom, WhatsApp, phone) to ensure that they were safe and coping with the changes. A great deal of enthusiasm emerged to continue working on individual and collective projects, and also to contribute to an understanding of the COVID-19 pandemic and its consequences. As time progressed, more people moved to computational projects as access to and working in the lab was difficult and resulted in significant disruption and delays.

The two projects mentioned in section 2 above resulted from work with new partners in the country, while our published review articles included collaborators from abroad. Perhaps the greatest shift occurred as mentioned in section 3a towards an increased focus on computational



StemCell Lab Group.

biology (including bioinformatics). Not only does this require less or no hands-on laboratory work (which became problematic during lockdown), but without these skills one's competitiveness is limited as is access to the vast amount of data available for meaningful analysis in repositories and the public domain. Consequently, we have initiated in-house training programs in the relevant areas together with colleagues locally and abroad.

Capacity Development and Transformation

Our Unit remains committed to training post-graduate students (Hons, MSc, PhD) and to disseminating information in the public domain. Our work is transdisciplinary and translational in nature, and the focus is primarily on the disease burden in South Africa. Through our national and international collaborations, we increase the scope of our work as well as its visibility, and now that travel is opening up again, we will begin to visit our collaborators both locally and abroad. Opportunities are provided for post-graduate training as needed (e.g., computational techniques, molecular cell biology, flow cytometry, tissue culture). The majority of our students are women, and we focus on the inclusion of individuals from previously disadvantaged groups.

Impactful Research Translation

In addition to our scientific publications, we are active in the media and lay press. This includes radio and television interviews, and interactions with scientific writers in major newspapers and other printed media. We have also written several articles in the *Conversation* and *Alternate Horizons*.

We have also attempted to contribute to countering the vast infodemic that has flourished during pandemic. This has been through our published articles (scientific and lay press) as well as personal interactions with people in our professional and personal circles.

SAMRC/WITS ANTIVIRAL GENE THERAPY RESEARCH UNIT



Patrick Arbuthnot Unit Director
Patrick.Arbuthnot@wits.ac.za

OVERVIEW

The Wits/SAMRC Antiviral Gene Therapy Research Unit (AGTRU) works on developing the use of nucleic acids (gene therapy) to treat and prevent serious viral infections of public health importance. 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.

Following 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 has been applied by leading international vaccine manufacturers such as AstraZeneca, Moderna, Johnson & Johnson and Pfizer/BioNTech. These major COVID-19 global vaccine manufacturers essentially apply two main types of technology: formulation of mRNA in lipid nanoparticles and engineering of recombinant adenoviral vectors expressing the Spike protein of SARS-CoV-2. These technologies were initially developed for use in gene therapy and the AGTRU previously built this know-how to treat and vaccinate against viral infections. Although the focus has been on countering chronic infection with hepatitis B virus (HBV), the methodology has been repurposed for vaccine development. An important goal

of AGTRU is to build capacity that enables South African participation in gene therapy-based technologies that are required to treat and prevent serious infections. The scope has been broadened to tackle non-viral infections such as Mycobacterium tuberculosis (MTB) which is important in sub-Saharan Africa.

COVID-19 related research and development

AGTRU has traditionally focused its research efforts on advancing gene therapy to treat viral pathogens of particular importance to sub-Saharan Africa. Over the period of several years, many technologies were developed to counter serious infections, such as are caused by hepatitis B virus (HBV) and HIV-1. Importantly, the methods are applicable to a range of diseases and have recently been applied to advance vaccines to counter SARS-CoV-2 infection.

Established technologies in the SAMRC/Wits AGTRU include design and production of recombinant viral vectors (adenoviruses, adeno-associated viruses and lentiviruses), production of mRNA in vitro and formulation of synthetic lipid nanoparticle vectors (LNPs). Our laboratory is one of the few, if not the only, to apply this technology in Africa. As a result, our input has been sought to build capacity in South Africa and thereby develop vaccine preparedness.

Reimagining research in a time of COVID-19

For several years, the AGTRU focused on gene therapy to treat diseases of importance to South Africa. Initially the priority was to advance gene therapy to cure infection with hepatitis B virus (HBV). This serious, and underappreciated, viral infection is hyperendemic to sub-Saharan Africa, where it is the leading cause of cirrhosis and liver cancer. To advance HBV cure, work of the Unit utilised recombinant adenoviruses and in vitro synthesised messenger RNA. Application of these technologies is effective against HBV and has potential to cure individuals from the virus. In addition, the design principles are rational and essentially based on application of molecular biology using sequence information about pathogens. With evolution of the COVID-19 pandemic, value of mRNA and adenoviruses for vaccine technology to prevent infection with SARS-CoV-2 became clear. Research in the SAMRC/Wits AGTRU has thus logically pivoted to focus on application of its established technologies to prevent SARS-CoV-2 infection.

Capacity Development and Transformation

If not the only one, the SAMRC/Wits AGTRU is one of the few laboratories in Africa that has capacity for mRNA synthesis and recombinant adenoviral engineering. Training of young scientists is a fundamental activity of the unit and many postgraduate students have been taught to completion of their degrees. During 2021, there were three PhD graduates from the SAMRC/Wits AGTRU. With emergence of the COVID-19 pandemic, the importance of capacity building for vaccine development has become clearly apparent. The AGTRU team rapidly responded to the need for local vaccine capacity development. The unit engaged with the WHO in response to their call for resources that may be used to advance mRNA vaccine manufacturing in LMICs. The initiative is particularly important to ensure vaccine preparedness, mitigate threats of the current and future pandemics. In addition, the project aims to advance use of mRNA to counter other infections such as are caused by *Mycobacterium tuberculosis* (MTB). The SAMRC/WITS AGTRU has partnered with Afrigen Biologicals and Vaccines to develop the South African mRNA hub. Our contribution has been to assist Afrigen with establishment of mRNA synthesis capability. We have hosted scientists from their team and have also visited their facilities to assist with establishing necessary infrastructure. Similarly, our team has been involved with Biovac, as reported in the 2020/1 report, to advance use of engineered recombinant adenoviral vectors as vaccines. Overall, the AGTRU has contributed to capacity development through its local leadership position in mRNA and adenovirus technology.



Weighing out of chemical compound for making a solution.



Team member working with flasks containing cultured cells in a biosafety hood.

Advancing research through collaborations and partnerships

Partnership with industry and academia has been particularly important to ensure translation of research to intended clinical application. The mRNA vaccine hub is being hosted by Afrigen Biologicals and Vaccines (Cape Town), and engagement with this team has been vital to the collaborative efforts of the Unit. The mRNA vaccine hub is the vehicle for capacity development in low- and middle-income countries (LMICs). Our unit has trained scientists from Afrigen to develop their capacity in mRNA synthesis, which is fundamental to vaccine manufacture.



Shonisani (Wendy) Limani discussing results of an agarose gel resolving DNA specimens with Prof Patrick Arbuthnot. Shonisani was a PhD candidate at the time of the photo and has now graduated.



*Prashika Singh (PhD candidate) inspecting cells, which express the green fluorescent protein, under a microscope. Green fluorescent protein is a commonly used so-called reporter which fluoresces green when illuminated at a certain wavelength. The protein was originally identified in a jellyfish (*Aequorea Victoria*).*

In addition, members of our team have visited Afrigen to assist with establishing infrastructure in their Cape Town facilities. Another significant partnership has been with the so-called spokes of the hub. These are teams from other LMICs that are keen to develop mRNA vaccine capacity. Recently, members of AGTRU have engaged with scientists from Brazil (Bio-Manguinhos, Rio de Janeiro) and Argentina (Sinergium Biotech, Buenos Aires) to advance training in mRNA synthesis in those countries. Next steps will involve training of scientists from spokes based in other African countries. Work of the hub is facilitated by international partners such as PATH (product development consultants) and the Medicines Patent Pool (MPP). Our team continues to collaborate with Biovac (Cape Town) to advance adenovirus and mRNA manufacture. In addition to industry partnerships, AGTRU continues to collaborate with academics based in South Africa and elsewhere. Our team is part of the South African mRNA Vaccination Consortium (SAMVAC), which partners with South African research teams from throughout the country. Examples are the groups of Prof. Charles de Koning (Wits), Penny Moore (NHLS/Wits), Alex Segal (UKZN) and Tulio de Oliveira (UKZN and Stellenbosch University).

Impactful Research Translation

Stakeholders are primarily the South African public, but also the international community. Given the importance of limiting infection with SARS-CoV-2 in LMICs, capacity development for vaccine manufacture in these parts of the world is vital. During the past year, our work has been heavily involved with enabling mRNA vaccine production in South Africa as part of the WHO-initiated mRNA vaccine hub. To promote the initiative, numerous interviews were given for local and international news agencies. These pertained mainly to advancing the mRNA vaccination hub located in South Africa. The news agencies included the following: BBC, Blumberg, eNCA, Voice of the Cape, Medicines patent pool, 91.3 FM, TV5 (French), The World (a national radio program in the United States from PRX and GBH), Nature (<https://www.nature.com/articles/d41586-022-00293-2>) and Liberation (a French newspaper).

SAMRC/CPUT CARDIOMETABOLIC HEALTH RESEARCH UNIT



Prof Tandi Matsha Unit Director
matshat@cput.ac.za

OVERVIEW

The Cardiometabolic Health Research Unit 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.

COVID-19 related research and development

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) and also involves Limpopo University and Stellenbosch University Tygerberg Hospital, South Africa. 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.

Reimagining research in a time of 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 took place in 2021. The pandemic allowed the unit to self-reflect, strategise for its development. More importantly, it allowed time for extensive engagement with the students and mentoring.



Postdoctoral fellow working in one of the unit lab.



Some of the staff, postdoctoral fellows and students at the unit during 2021/2.

Capacity Development and Transformation

The unit has successfully graduated doctoral candidates. All these doctoral candidates are from diverse communities and have also gender parity. The unit has made a significant contribution to staff development in that some of these candidates are now staff within the institution. The 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.

Advancing research through collaborations and partnerships

Our research on novel biomarkers (glycated albumin) has resulted in an external collaboration with researchers from National Institute of Health (NIH). This collaboration has resulted in an accepted abstract by the American Diabetes Association's 82nd Scientific Sessions and a manuscript that has been provisionally accepted. 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 3 publications in high impact factor journals such as the Lancet.

Impactful 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 holding informal discussions. We also have a presence on social media, which includes Instagram, Facebook, Twitter and LinkedIn.

SAMRC/SU GENOMICS OF BRAIN DISORDERS RESEARCH UNIT



Prof Soraya Seedat Unit Director
sseedat@sun.ac.za

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. We aim to think beyond current clinical classification of BDs, to analyse cross-disorder subgroups that have biological validity and may be able to better predict disease development or treatment response. This is achieved by addressing cross-cutting, translational neuroscience questions. 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 collaborations, produce scholarly outputs and establish community partnerships. A focus of the Unit in 2022 will be improving collaboration between African neuroscientists and capacitating African neuroscientists. This will be initiated with an African collaboration workshop in May 2022. Profs Seedat and Hemmings are also members of a Psychiatric Genomics Consortium Africa Initiative, which aims to bring African researchers in the field of psychiatric genetics together, to develop genomics methods that are appropriate for the various populations on our continent. We have also initiated a new research degree, MSc (Neuroscience), which will be the first of its kind in South Africa. This application is currently under review and will also be launched in 2023.

COVID-19 related research and development

- Prof. Hemmings initiated a collaboration with researchers at Stellenbosch University (SU), Department of Physiology (Prof. Resia Pretorius) to investigate the role of host genetics in the association between long-COVID and neuropsychiatric symptoms. This research has been funded by the SAMRC SIR mechanism (2022-2024).
- Prof. Soraya Seedat and Dr. Georgina Spies have participated in the Collaborative Outcomes study on Health and Functioning during Infection Times (COH-FIT), which aims to identify risk factors that will inform prevention/intervention programs, to improve health outcomes in the general population and vulnerable subgroups during and after COVID-19. There have been publications reporting on the study methods, with data-driven publications that will follow.
- Dr. Leigh van den Heuvel, Dr. Katherine Kirokywicz and Prof. Seedat have completed a pilot randomised controlled trial on the feasibility, acceptability and efficacy of a mental health self-management app in clinicians working during the COVID-19 pandemic. The data is currently being written up for publication as part of Dr. Kirokywicz's MMED Psychiatry dissertation. A larger randomised controlled trial is in progress that widens participation to all healthcare workers, not only clinicians.

- Prof. Seedat is an investigator on a multi-country study, the COVID-19 Mental Health Study (or COMET) that was undertaken in 13 countries of which 4 waves of data collection have been completed, with a 5th wave starting shortly. The South African dataset of the first 4 waves is currently being drafted.

Reimagining research in a time of COVID-19

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 group participation. Whilst many researchers worked from home in 2021, those who worked in the lab were able to return for much of 2021, and although this was still at a limited capacity, it enabled the laboratory work and participant recruitment to slowly gain traction again.

However, the pandemic has continued to have an effect on laboratory work – some basic laboratory consumables continue to have longer lead times, and the students have also indicated that certain support services (such as IT) are sub-optimal as the response time has been longer since COVID-19. This is largely due to many of the support service staff working from home on a rotational basis.



Library Prep Training.

Given the effects of COVID-19 on mental health, many of the studies have included items regarding these effects in the questionnaires. This has necessitated the submission of project amendments to the Ethics Committees.

Capacity Development and Transformation

Successful training and completion of a PhD student, contributing to the cohort of women in South Africa with skills in human molecular genetics and bioinformatics. This student also underwent on-line training in bioinformatics in a workshop facilitated by GP2. Few MSc students (1 white male, 1 Indian female) graduated in, and additional Black female students are expected to graduate soon.

The unit has welcomed more MSc students and PhD students. In addition, the Unit currently hosts postdoctoral fellows.

Much of our microbiome and genomics research contributes to the development of the scientific capabilities of young postgraduate students and early-career scientists.

Next-generation sequencing data analysis and bioinformatic computation has become a sought-after skill within the international research landscape. Due to the enormous amount of data that has been and is yet to be produced, a foundation in data science and bioinformatics in R and command line as well as associated skills (e.g., critical thinking and problem-solving skills) is in the process of being established and refined.

Advancing research through collaborations and partnerships

In 2021 Prof. Bardien's Parkinson's Disease group started a collaboration with the Global Parkinson's Genetics Program (GP2). GP2 aims to understand the genetic architecture of Parkinson's disease (PD) through genotyping and studying diverse patient groups and studying rare familial forms of PD. Prof. Bardien is a member of the GP2 Underrepresented Populations Working Group which focuses on increasing representation of non-European populations in Parkinson's disease genetic studies.

The SANeuroGut project necessitated partnering with Aramex, a courier company, to facilitate the efficient distribution and return of sample collection kits. Through this collaboration, participants receive their sample collection within 24-hours of the kit leaving our research laboratory, and we have received positive feedback from our participants regarding the Aramex service. One of the Unit's microbiome projects forms part of a proof-of-concept Illumina-sponsored pilot study that aims to assess the feasibility of the short-read sequencing and assembly of the full-length 16S rRNA gene on the Illumina iSeq100. Thus, certain reagents have been supplied by Illumina and

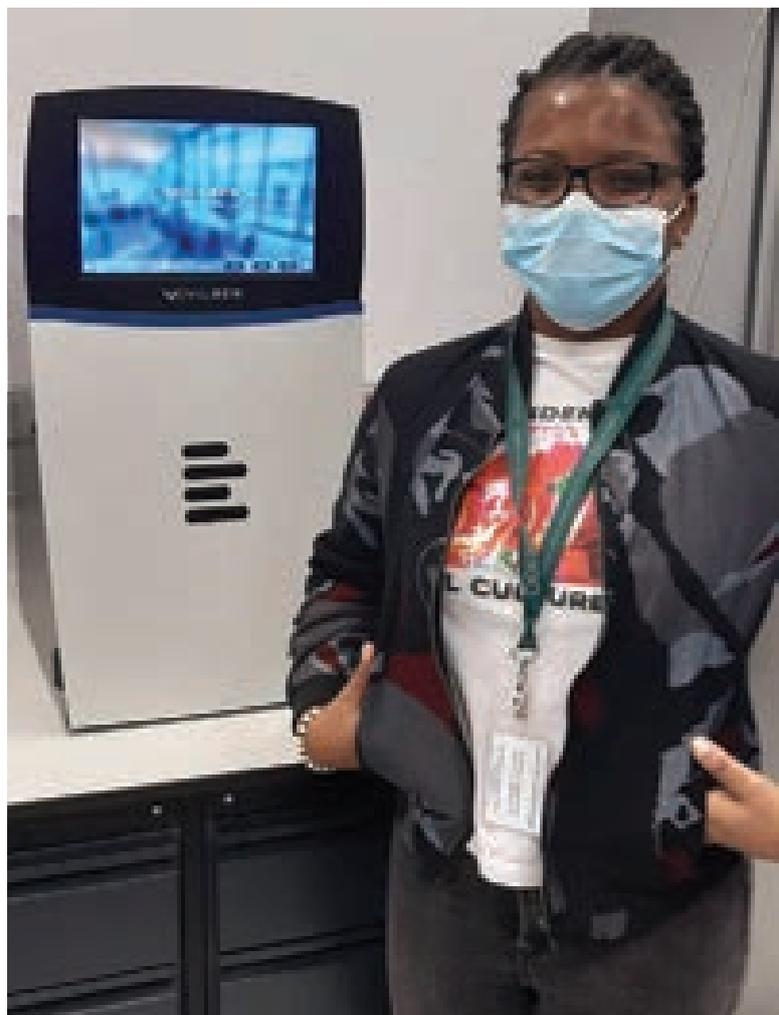
we have developed a strong relationship with Separations, the sole Illumina supplier in South Africa, as a result of their assistance with the project. Additionally, the assembly of the 16S rRNA amplicon from different bacterial taxa, has proven to be particularly complicated. We have since acquired the assistance of bioinformaticians from the Division of Computational Biology (CBIO) at UCT to help us complete this objective.

Impactful Research Translation

Prof. Seedat was invited to write a paper for the British Medical Journal highlighting how gender inequities in the time allocated to unpaid work, exacerbated by COVID-19, are affecting women's mental health. She was also invited to write an editorial for a special issue on disproportionate exposure to trauma for the Journal of Traumatic Stress. Her paper was titled 'Trauma, stress, and adversities and health disparities among disenfranchised groups globally during the COVID pandemic'.

Prof. Seedat was invited to give a plenary lecture at the European Society of Traumatic Stress Studies 2021 Conference (17-18 June 2021) titled 'Mental Health Outcomes of COVID-19 and Resilience: Moving beyond the volume of data to best practice approaches'. Prof. Seedat was also invited to give a plenary address at the International Society of Traumatic Stress Annual Meeting in 2021 (2-5 November 2021) on 'Past Severe Epidemics and Pandemics: COVID-19, PTSD and Other Sequelae: Quo Vadis?' Prof. Hemmings was invited to give a presentation (Epigenetics and PTSD in gender-based violence) to North-West University Staff in their 16 Days of Activism against GBV lecture series.

Results from Unit-supported research projects have also been presented at several academic forums and conferences, including 2nd Postdoctoral Research Conference of Southern Africa (10 -12 November 2021), the World Congress of Biological Psychiatry (June 2021), World Congress on Psychiatric Genetics (October 2021), Oxford University Child and Adolescent Mental Health Webinar Series (May 2021), Hamburg Medical School "The Epigenetics of Stress and Trauma: From Research to Practice" series (March 2022). Project presentations and progress updates are presented at all our monthly Unit meetings. In addition, project updates have been communicated to a broader audience via social media platforms (mainly Facebook).



Vilber Gel imager.



2021 student group.

SAMRC/UP PRECISION ONCOLOGY RESEARCH UNIT



Prof Zodwa Dlamini Unit Director
zodwa.dlamini@up.ac.za

OVERVIEW

The Precision Oncology Research Unit (PORU) seeks to map the cervical and oesophageal cancers' landscape to understand the underlying causes of these cancers and to discover targets for the development of novel and more effective targeted therapeutics. PORU is dedicated to pushing the boundaries of precision oncology, cancer prevention and bringing new approaches for cervical and oesophageal cancers early diagnosis, novel therapeutic agents to improve health outcomes, reduce health inequalities and strengthen health systems in underserved and socio-economically disadvantaged communities. Both cervical and oesophageal cancers demonstrate cancer health and genomic disparities, placing the underserved and socio-economically disadvantaged populations in an unfavourable position. The key objectives of PORU are to characterise country specific underlying risk factors in South Africa, Tanzania and other BRICS countries; to define RNA and splicing landscape and the effect on expression alteration among populations from Low-Middle-Income-Countries (LMICs) and developed countries; to investigate the therapeutic potential of micro-RNAs (miRNAs), including the associated pathway targets in HIV-associated cervical and oesophageal cancers and finally, to conduct pre-clinical and clinical trials of natural products to investigate the anti-tumour and anti-metastasis efficacy using patient derived organoids (PDOs) or patient derived xenografts (PDXs) grown in mice.

Bridging other research gaps

PORU laid a solid foundation for the establishment of the Pan African Cancer Research Institute (PACRI), University of Pretoria (UP). Various research activities, innovations and developments have been conducted in the 2021/2022 reporting period. These include our peer-reviewed publications, conference proceedings, monthly journal clubs and research progress reports, partnerships with research, biotechnology and pharmaceutical industries and other prominent stakeholders. Furthermore, research outputs principally addressing the role of alternative splicing in cervical and oesophageal cancers were produced in this 2021/2022 period. There are currently clinician/ scientists PhD candidates undertaking research projects in alternative splicing mechanisms in cervical and oesophageal cancers. An additional PhD candidate (young black woman from a Historically Disadvantaged Institution) who is yet to join PORU has been awarded an NRF PhD scholarship in novel synthetic compounds' effects on cervical cancer splicing mechanisms.

Notably, the Pan African Cancer Research Institute (PACRI), an integral part of PORU, was launched on the 24-25 February 2022. This was a leading world class event where great minds of scientist, physicians, political leaders, national and international oncology experts, biotechnological, pharmaceutical and other industry partners converged to forge a way forward in 'defeating

cancer together'. Furthermore, PACRI/PORU has formed a partnership with DATAR Cancer Genetics innovation projects for breast tumours, with the aim of developing, testing and implementing new or improved health solutions, augmenting cancer research expertise and technological skills. This event was endorsed by The American Society of Clinical Oncology (ASCO). In addition, PACRI/ PORU has various industry partnerships including the Centre for Proteomic and Genomic Research (CPGR), TissueGnostics and NantOmics.

Additionally, PACRI/ PORU has various formal signed beneficial partnership agreements with 4 beneficial partnerships: 1. University of Nottingham Cancer Sciences, Nottingham, United Kingdom (UK). 2. DKFZ German Cancer Research Centre, Heidelberg, Germany (EU). 3. Cancer Association of South Africa (CANSA). 4. Inqaba Biotechnical Industries (Pty) Ltd.

Also, an HPV vaccination and screening promotion steering committee has been established.

In addition, curriculum development of MSc in Cancer Science in collaboration with University of Nottingham Cancer Sciences is underway. This program is the first of its kind in Africa, which will collectively equip candidates with advanced cancer biology topics and cutting-edge research projects.

Reimagining research in a time of COVID-19

The Unit has endured setbacks due to COVID-19. PACRI/PORU research laboratories' construction was delayed by 24 months due to COVID-19. This has resulted in the delay in laboratory-based work. Staff members within the Unit also continued to work from home for a significant part of 2021. Although the construction of this state-of-the art facility has been approved by the UP-Executive Committee and Council and has commenced, prompt measures have thus been taken to alleviate the burden of this setback. These include requesting to share laboratory space with colleagues, Department of Surgery Steve Biko Academic Hospital, University of Pretoria. This has expanded our collaborative network with other health care professionals. Furthermore, we could meet with our postgraduate students, national and international collaborators at least on Saturdays, during our research progress meetings. Cancer Genomics 101 course particularly aimed at the clinician/scientists to advance their knowledge in cancer genomics, also continued in 2021/2022.

Capacity Development and Transformation

PORU has PhD and MSc registered students. Most of the PhD students are clinician/scientists. Majority of our PG students are Black African and Indian, bringing diversity and transformation of underrepresented groups in cancer research. Additionally, one Black female PhD student from an HDI, who is yet to join PORU has been awarded an NRF PhD scholarship. Some of our clinician/scientist PhD students have also been awarded NRF Thuthuka, Black Academic Advancement Programme (BAAP), and Discovery Health PhD Scholarship. The Director 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. Furthermore, I took it upon myself to train my team to lead publications as first authors to publish high quality papers in Q1 cancer research journals. This has significantly contributed and lead to Dr. Rahaba Marima's (Senior Research Officer) 2022 NRF-Y rating application. Most of my staff and PhD candidates have now improved capacities and have been trained and developed in grant writing skills, both nationally and internationally to the benefit of their research and in the future. Furthermore, UD has completed a 6-month postgraduate program certificate in Foundations of Clinical Research with Harvard Medical School

Advancing research through collaborations and partnerships

Having had to reimagine our work approaches due to COVID-19, the PACRI/PORU building project has been delayed, but our network collaboration capacity has significantly expanded. The UP clinician/ scientist cohort has been expanded by Wits, SMU and UL clinicians now pursuing clinician/scientist path in oncology research. In addition, various programmes/projects/ initiatives with various stakeholders have been established. These include:

- DATAR Cancer Genetics innovation projects for breast tumours.
- CPGR for our High throughput NGS and Proteomics work.
- TissueGnostics for Biomedical and pathology imaging in advancing precision oncology.
- NantOmics for molecular diagnostic products for personalised cancer treatment.



Prof F Nelwamondo (NRF) Honorable Deputy Minister of Health Dr S Dhlomo, Prof G Gray (CEO & President of SAMRC), Prof T Kupe, Vice Chancellor & Principal of University of Pretoria and Prof Zodwa Dlamini (UD).

Furthermore, partnership agreements during the launch of PACRI have been signed with University of Nottingham Cancer Sciences, Nottingham, United Kingdom (UK), DKFZ German Cancer Research Centre, Heidelberg, Germany (EU), Cancer Association of South Africa (CANSAs) and Inqaba Biotechnical Industries (Pty) Ltd.

Impactful Research Translation

This was particularly observed during the PACRI launch, where national and international oncology experts, academics, industry partners, politicians/ Department of Health (DoH), Cancer Association of South Africa (CANSAs), SAMRC, NRF and students gathered to advance the call to cancer health and genomic disparities. For instance, an ongoing hot debate around HPV vaccinations, in young boys as well, was discussed on this platform. In conjunction

with current studies PORU calls for the equal opportunity of HPV vaccination in young boys in the community. Early cancer diagnosis in underserved and socio-economically disadvantaged communities, decent and non-delayed access to cancer treatment to vulnerable communities is also discussed and how this can be improved. It was also highlighted that 'Defeating cancer together' is a collaborative task, involving oncology experts, industry, community, cultural and religious leaders, to educate, manage and defeat cancer together. Collaborative efforts between PORU and the Faculty of Theology UP are also underway. Furthermore, for the public engagement, education, and inquiries, a dedicated PACRI/PORU website has been designed with social media links such as Facebook, Instagram, twitter.

SAMRC/UCT WOUND HEALING AND KELOID SCARRING RESEARCH UNIT



Prof Nonhlanhla Khumalo Unit Director
n.khumalo@uct.ac.za

OVERVIEW

The Wound and Keloid Scarring (WAKS) Translational Research Unit is an extramural unit based at the University of Cape Town. The unit seeks to optimise tissue culture models for dermal wound healing after injury. Its main objectives are to create a centre of excellence for research in skin repair (healing, scarring, dermal fibrosis) and skin regeneration. Clinically translational subject areas of this unit's research will concentrate on abnormal skin scarring in the form of hypertrophic and keloid scars as well as understanding cutaneous wound healing and skin regeneration.

The main objective of the centre would be to elucidate fundamental mechanisms in skin healing and scarring with focus on hypertrophic and keloid scar formation and to use this knowledge of new therapeutic targets and biomarkers to develop novel targets particularly for detection, prevention and treatment of abnormal wound healing with a focus on fibrosis in pigmented human skin. Additional objectives would include education, training, and clinical management of abnormal wound healing, skin regeneration and skin scarring.

COVID-19 related research and development

The Wound and Keloid Scarring (WAKS) Translational Research Unit has not conducted any COVID-19 related research – this is because the skin manifestations of COVID-19 have not been severe and/or common enough to warrant incorporation in our research program.

During this reporting period, we have completed the development of the first cell line in keloid disease (patent filing in progress).

Reimagining research in a time of COVID-19

The biggest challenge has been the shutdowns and inability to access the lab and hospital for research. This has caused significant delays to completion of multiple projects especially post PhD candidates.

Capacity Development and Transformation

This unit is part of the Hair and Skin Research (HSR) Lab, the first research lab in Dermatology in the country. Since the launch in May 2015 the Lab has grown into a multidisciplinary hive of activity. Currently we have about 30 scientists including Masters, PhDs, Post-docs fellows and technicians who work on site throughout the year. Since inception we have also had 56 Advanced Diploma in Cosmetic Formulation Science and about 12 Honours students (6 from engineering) who spend 2-3 months at the HSR.

The HSR is attracting an overwhelming majority of young black and mixed-race Africans. It has been a pleasure to see how so many lives mature into independent scientists. Our diploma, the first in the country, is filling a gap in the cosmetic market and we use it to upskill unemployed science graduates. This year we had companies lining up to interview students, in the end we had more company positions than students needing placement.

Impactful Research Translation

Our research on hair and skin is generally of great interest to the public, however, during the pandemic things were slower. Our Cosmetic Diploma students are generally very active on social media, sharing the work that we do with the general public.

We are in the process of setting up a website and social media platforms but very cognisant of the care that is required in managing the messages that are sent out. We are also in the process of setting up an annual Skin & Hair Update to target cosmetic industry R&D scientist on latest health and safety as well as new innovations that are coming out.

PRECISION AND GENOMIC RESEARCH UNIT



Prof. Raj Ramesar Unit Director
raj.ramesar@uct.ac.za

OVERVIEW

The major effort of the Unit has been in the consolidation of our genomics research particularly focussed on our indigenous African populations. This has fallen into 4 objectives: (i) examining the genetic anthropology of populations of Southern Africa, and to quantify the extent of genetic variation in them, (ii) genetic disabilities: Determining the genetic basis of inherited retinal disease in SA; (iii) cancer genetics: genomic resolution of familial colorectal cancers, and (iv) evaluation of whole exome sequencing for detection of health risks.

In the recent past we have made a special effort at translating our understanding of genomic variation in our communities, to applications such as diagnostic and predictive genetic testing. This in turn reveals a need for additional skilled professionals e.g., genetic counsellors. Our development of a training programme (MSc Genetic Counselling) already operational for several years, shows our commitment to using research for translation for public/community benefit.

COVID-19 related research and development

The two major drives during the COVID-19 period of strictures were devoted to enhancing the translation and implement-ability of our research, notably:

- A major effort in this past year has been the development of an implementation research programme to optimally ascertain familial colorectal cancers (CRC) (from amongst the larger burden of sporadic CRC) and provide appropriate investigations and follow-up of patients and their at-risk relatives. This has involved revisiting our multidisciplinary team (at Groote Schuur Hospital) and processes using a gap analysis methodology, as well as a Modified Ascertainment and follow-up Programme (MAP), which has also brought on board institutions in Gauteng (Wits) and KwaZulu-Natal (UKZN). This relationship is meant to provide the building of capacity (training, with MMeds/PhDs) being worked on across the three institutions, to provide Standard Operating Protocols, together with staff/training and sustainability of a well proven intervention (i.e., shown to reduce mortality/morbidity due to heritable cancers).
- The unit has established a research programme, with our collaborators in the Netherlands, to optimise the identification of genomic pathogenic variants underlying our large bank of inherited retinal degenerative diseases (IRD), using novel methodologies which involve screening for deep-intronic (non-coding, but disease-causing) variants. This work has produced a remarkable resolution/yield of 75.5% of our patients with Stargardt Disease form of IRD. Stargardt disease is the most common form of IRD encountered in South Africa.

Reimagining research in a time of COVID-19

The Unit had assisted two postdoctoral colleagues develop project proposals aimed at understanding the human genomic contribution to the COVID-19-disease phenotype (specifically at the range of severity and outcomes of disease). These project proposals were submitted as applications to the Wellcome Trust (UK). Importantly, the National Department of Health 'Guidelines for Clinical Genetic Services' which the PI was driving as Chair of the Technical working Group was finalised in 2021, (<https://www.knowledgehub.org.za/elibrary/national-clinical-guidelines-genetic-services>), signed off by the minister of Health in October of 2021. This involved a high level of engagement with the Medical Genetics Community nationally, as well as different entities within the National Department of Health, as well as community stakeholders (e.g., Rare Diseases Alliance, Operation Smile SA, Campaigning 4 Cancer, Retina South Africa, CANSA, amongst others).

As outlined in the previous section, the Unit has made good on our recognition of the need for larger collaborative groups to make any impact on healthcare. The partnership with the National Cancer Register (Dr. Elvira Singh), Wits (Dr. Brendan Bebbington; Prof. A Krause) and UKZN (Dr. Yoshin Moodley; Dr. Shakiel Kader) to establish programmes for the ascertainment and management of familial colorectal cancers in two of the most populous provinces nationally is very positive for expanding our nucleus of precision medicine.

Equally the partnership with international colleagues (the Netherlands) has assisted in genetically resolving previously unresolved genetic underpinning to a sizable cohort of individuals (from across South Africa) with inherited retinal diseases. Perhaps more importantly, these individuals, especially with the Stargardt Disease form of IRD, may be able to engage in the clinical trials that we have attracted to South Africa, based on individuals who know their exact disease-causing mutations.

Capacity Development and Transformation

The unit has made effort to ensure that the earliest intake of postgrads i.e., at BSc Hons level, is well advertised across the country. We also make sure that at least 50% of our students are from the designated groups (mainly focussing on indigenous South Africans). The majority

of the students complete with no less than an upper second pass, reflecting the nurturing environment. Hons is focussed on since this group is a major feeder to the higher postgrad degrees, and our students are literally headhunted in this regard, eventually producing excellent PhDs wherever they go.

Beyond this, Unit leadership drives the development of good relationships with e.g., UKZN and Limpopo University, and attract their graduates into our postgraduate programmes; this also includes our MSc (Genetic Counselling) programme. We have already had several successful graduates with whom we are working in establishing a Genetic Counselling training/service programme in Limpopo. This is all on the back of successful research programmes, showing community need, that are now being translated for community application e.g., the hereditary cancer as well as inherited blindness projects.

Impactful Research Translation

Our focus, research-wise, is understanding the extent of genetic variation in our communities in South Africa. From a translational perspective, we have worked extensively in identifying the genetic basis of hereditary diseases in South Africa. Much of the research has already been translated to Standard Operating Procedures, being implemented for diagnostic testing/confirmation to the extent that these are formally handed over to the NHLS for formal implementation. Most notably amongst these are: (i) a genetic 14 gene panel test (using next generation sequencing) for familial colorectal cancers, and (ii) and Inherited Retinal Diseases panel (comprising more than 120 genes).

Currently, and as a PhD project, we have been investigating the 'Genomics of Paediatric Epilepsies', and concurrently developing technologies for implementation of diagnostic testing, to be offered nationally. All of this work is developed with our collaborating specialists nationally, who express a deep need for having these diagnostic tests available; this is also in conjunction to community support groups (e.g., Rare Diseases, CANSA, Retina SA, amongst others). We have, similarly, introduced microarray-based genomic testing for childhood developmental disorders, following on the successful completion of a Masters project in this important area.



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.



TUBERCULOSIS COLLABORATING CENTRE FOR CHILD HEALTH (TB-CHILD)

Contact: Prof Mark Nicol mark.nicol@uct.ac.za



ADVANCING CARE AND TREATMENT (ACT) FOR TB/HIV

Contact: Prof Gavin Churchyard GChurchyard@auruminstitute.org



SOWETO MATLOSANA SAMRC COLLABORATING CENTRE FOR HIV/AIDS AND TB

Contact: Dr Neil Martinson Martinson@phru.co.za



CENTRE FOR TUBERCULOSIS BIOMARKER-TARGETED INTERVENTION

Contact: Ass Prof Mark Hatherill mark.hatherill@uct.ac.za



CLINICAL AND COMMUNITY HIV-TUBERCULOSIS RESEARCH COLLABORATING CENTRE

Contact: Prof Graeme Meintjes graeme.meintjes@uct.ac.za



WITS CLINICAL HIV/TB RESEARCH UNIT

Contact: Ass Prof Ian Sanne isanne@witshealth.co.za



WITS RHI COLLABORATING CENTRE FOR HIV/AIDS

Contact: Prof Helen Rees hrees@wrhi.ac.za



TB FREE THROUGH RESEARCH AND INNOVATION

Contact: Prof Keertan Dheda keertan.dheda@uct.ac.za



CENTRE FOR BASIC AND TRANSLATIONAL HUMAN TB RESEARCH

Contact: Prof Adrie Steyn steyn@k-rith.org



TYGERBERG SAMRC COLLABORATING CENTRE FOR HIV LABORATORY RESEARCH

Contact: Prof Wolfgang Preiser preiser@sun.ac.za

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

SAMRC-JEMBI COLLABORATING CENTRE FOR DIGITAL HEALTH INNOVATION

The SAMRC-Jembi Collaborating Centre for Digital Health Innovation is hosted by Jembi Health Systems NPC, a South African non-profit company specialising in digital health in low resource settings. The main objectives of the Collaborating Centre are to:

- Strengthen the SAMRC's participation in the national digital health research and innovation agenda as an active partner and affiliate in addition to its role as a funder
- Provide a vehicle for facilitating technical knowledge to support effective digital health research and implementation in South Africa and other low resource countries
- Build a collaborative network of digital health implementers and researchers in the public and private sector in South Africa and other low resource countries
- Reposition the SAMRC as a local as well as an international research leader in digital health solutions.





COMMUNICATIONS AND STAKEHOLDER ENGAGEMENTS

COMMUNICATIONS AND STAKEHOLDER ENGAGEMENTS

The SAMRC's Division of Corporate and Marketing Communications (CMC), strives to continuously keep abreast of communication strategies, to an ever-changing world by adapting to new challenges and processes to effectively share the Scientific value of the organisation.

As leaders in Science, the SAMRC is committed to supporting public engagement, through demonstrating active citizenship and partnering with organisations that share the same values.

With the COVID-19 pandemic still one of the greatest public health threats, it has called on the collective efforts

of public health experts, health workers, governments, funders, research participants, communities, and other key stakeholders, to find solutions in navigating new paths.

The pandemic has compelled humanity to reimagine how we navigate the world of work, social spaces, interactions with each other, the environment and climate change issues

During the reporting period 2021/22, the SAMRC initiated and participated in a host of stakeholder engagements encouraging a social responsibility mentality of its employees. These are detailed below.

HEALTH AWARENESS CAMPAIGNS



World Immunisation Week

World Immunisation Week aims to highlight the collective action needed and to promote the use of vaccines to protect people of all ages against disease. To highlight this period, the CMC team had taken to the streets to raise awareness around the importance of immunisations while sharing the work of the SAMRC and its commitment to the people of South Africa.



Youth Month

In commemoration of this year's 45th Youth Month, the CMC hosted a SAMRC YOUTH ENGAGEMENT WEBINAR series – a series of webinars aimed at creating an online platform through which our scientists can engage with the South African youth between the ages of 18 and 35. Webinar topics included the following:

1. The impact of Lockdown on GBV | GBV within institutions of higher learning
 - In conversation with Dr Pinky Mahlangu and Dr Mercilene Machisa from the SAMRC Gender and Health Research Unit.
2. Using TB technology in the fight against COVID-19.
 - In conversation with TB Genomics Research Group and TB Host Genetics research Group.
3. Using wastewater to detect the presence of COVID-19
 - In conversation with Prof Angela Mathee and Dr Sizwe Nkambule from the SAMRC Environment & Health Research Unit.
4. Alcohol abuse and COVID-19: The two colliding epidemics
 - In conversation with: Dr Nadine Harker Burnhams | Specialist Scientist from the SAMRC Alcohol Tobacco and Other Drug Research Unit, SAMRC and Dr Warren Lucas, an NRF Research Scientist Intern at the SAMRC Alcohol Tobacco and Other Drug Research Unit.
5. Youth and Vaccination: Understanding COVID-19 Vaccines
 - In conversation with Prof Glenda Gray, the SAMRC President and CEO, and Jane Simmonds, a Research Manager: Health Promotion and Communication Research Desk.





world diabetes day

World Diabetes Day

A day to raise awareness about this chronic disease, CMC in partnership with the Biomedical Research and Innovation Platform (BRIP) and Non-Communicable Diseases Research Unit (NCDRU) embarked on a family-friendly walk, at Meerendal Wine Estate. The event included diabetes screening opportunities on site. This was particularly important as more people are unknowingly living with diabetes.



Women's Month

A month-long campaign, Champion Women, was held to celebrate women from different SAMRC Research Units and Support Divisions who were nominated as embodying the SAMRC values. These women were applauded and acknowledged throughout the Women's Month (August).

CMC engaged with SAMRC Research Units and Support Divisions to participate in this Women's Month initiative by hosting a virtual Women's Day tea aimed at celebrating all our female colleagues, creating an opportunity for teams to connect in a supportive and positive way.

World TB Day

On the 24th of March 2022, in commemoration of World TB Day, under the theme "Invest to End TB. Save Lives", CMC supported the TB platform to raise awareness about this important epidemic and reiterate the message that TB can be defeated.

An exciting initiative focused on Health Awareness, Health Promotion, Disease Prevention and Early Detection, was held at the corner of van der Walt/Lillian Ngoyi and Boom Street in Pretoria. The aim was to engage with the community and sharing the important message that TB can be prevented and treated, and that it is up to us as individuals to shoulder the responsibility.



OUR WORLD NEEDS YOU

The “Our World Needs”, is an ongoing campaign aimed to call to action the need for Environmental Awareness and participation. Below are campaigns that fall under this umbrella brand:



International Coastal Clean-up Day (ICCD)

In South Africa, ICCD is observed on the Saturday following Clean-up and Recycle South Africa Week, which is an annual initiative by the local plastics industry.

Heeding to the call of President Ramaphosa calling on all citizens to start taking pride in their neighbourhoods and open spaces. This began the initiative that calls on citizens to lend a hand in responsible environmental protection, management and beneficiation.

The SAMRC in partnership with Save a Fishie, teamed up to clean-up our coasts, on International Coastal Clean-up Day, 18th of September.

The event took place at Lagoon Beach in Milnerton, with a total of 82 bags, totalling 567kg of debris being collected.

World Environment Day

The SAMRC invited staff, together with their families to participate in various activities identified for World Environment Day. Some of the activities that ran simultaneously, in the various regions were:

- Beach Clean-up at Eerste Steen Resort, Blaauwberg, Cape Town.



- Hennops River clean-up, with Hennops Revival in Centurion, and led by Bianca Wernecke, a true environmental ambassador, and a senior scientist from SAMRC Environment and Health Research Unit.
- Community clean-up in the Fourways area in Johannesburg.



International Day of Clean Air for Blue Skies

A day to encourage efforts to improve air quality to protect human health. The 2021 theme: “Healthy Air, Healthy Planet” aimed to emphasize the health effects of air pollution, particularly during the COVID-19 pandemic. The SAMRC, in collaboration with the Clean Air Journal (CAJ), have highlighted air quality research conducted in Africa, by sharing some of the findings through insightful short videos. This endeavour was led by Dr Bianca Wernecke, who said: “Many South African households burn dirty fuels (coal and wood) as the primary source of energy for heating and cooking purposes.”





Kenya Medical Research Institution (KEMRI) visits SAMRC.

STAKEHOLDER ENGAGEMENTS

Geneva Delegation visits the mRNA Hub

A delegation from the Medicines Patent Pool (MPP), Geneva, met with the SAMRC leadership to discuss the ongoing mRNA Tech Transfer Hub. The meeting formed part of the MPP's 5-day African visit to meet the Hub's partners including Afrigen and Biovac sites.

Kenya Medical Research Institution (KEMRI) visits SAMRC:

A delegation including members from the Kenyan National Government visited SAMRC on an information sharing as well as possible collaboration mission. The two-day visit yielded partnerships between the two parties.

European Union (EU) countries visit SAMRC

SAMRC hosted a delegation of the European Union (EU) at its Head Office, Parow Campus in Cape Town. Attendees of the meeting included members from the Department of Science and Innovation and the SAMRC President and Executive Committee Members. Among the key areas of discussion included understanding the core business of the SAMRC, the mRNA vaccine hub as well as other vaccine funding opportunities and future developments. The meeting was also aimed at identifying the similarities, sharing achievements and challenges, as well as exploring possible future collaborations.



European Union visits SAMRC.

Zambian National Health Authority visits SAMRC-Pretoria office

A Zambian delegation visited SAMRC Pretoria offices on a learning mission as well as possible collaborations. The delegation was informed about the core business of the SAMRC, and the focus on support and development of new knowledge, innovation, and capacity building in South Africa and other research related matters.

DIGITAL PLATFORMS AND SERVICES

CMC offers Digital Platforms and Services and is also responsible for maintaining regular channels of communication with stakeholders including managing an online presence where real time information can be shared.

Project/Conference Websites developed for the 2021/2022 financial year.

GAPC2023

GAPC is the leading forum for the world's alcohol policy makers, advocates, researchers, civil society activists and practitioners. With its high level of heavy epidodic drinking and related harms, and its long history of challenges in getting policy shifts in areas such as controls on alcohol marketing and retail sales of alcohol, South Africa was an ideal venue in which to discuss alcohol policy and in which to host GAPC2023. The conference theme is: Investing in people before profits: building momentum towards the Framework Convention on Alcohol Control.

<http://gapc2023.samrc.ac.za/>

GAPA 2021

The Global Alcohol Policy Alliance Virtual Event 2021 was held 12-14 October 2021. The GAPA Virtual Event offered interactive sessions in different time zones. Each day there was a session with key-note speakers which was followed by a regional session with comments from a panel of regional representatives and discussion among participants.

<http://gapa.samrc.ac.za/>

ARS 2021

The 13th African Rotavirus Symposium (ARS), organised under the auspices of the African Rotavirus Network (AfrRN), was a virtual event. The symposium was hosted by the University of Nairobi in partnership with WHO African Regional Office (WHO AFRO), Bill & Melinda Gates Foundation (BMGF) and the South African Medical Research Council (SAMRC). The theme of the symposium was "Maintaining momentum for rotavirus immunisation during the COVID-19 era".

<http://afr-rn.samrc.ac.za/ars2021/>

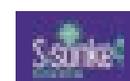
MeDDIC



The Medical Device and Diagnostic Innovation Cluster (MeDDIC) is a national initiative created to exploit a high concentration of skills, expertise, infrastructure and companies across South Africa within the medical devices field. The initiative, supported by the Technology Innovation Agency (TIA) and the Department of Science and Innovation (DSI), is aimed at stimulating and intensifying technology innovation within the sector as well as encouraging an integrated ecosystem in support of increasing the competitiveness of the industry. It is hosted by the South African Medical Research Council (SAMRC) under the Global Health Innovation Accelerator (GHIA) program.

<http://meddic.samrc.ac.za/>

Sisonke Study



Sisonke Study is a pragmatic, real world Phase 3b clinical trial of the single-dose COVID-19 vaccine candidate among frontline healthcare workers in South Africa. The Sisonke Programme is a collaboration between the National Department of Health, South African Medical Research Council, Desmond Tutu Health Foundation, CAPRISA, Janssen and Johnson & Johnson. It allows the government to make the Ad26.COVS COVID-19 vaccine (JnJ vaccine) immediately available to healthcare workers using a research programme.

<http://sisonkestudy.samrc.ac.za/indexsisonke.html>

CKD-Africa



Chronic Kidney Disease in Africa Collaboration (CKD-Africa) is a network of investigators representing studies related to kidney function and chronic kidney disease from all over Africa. The CKD-Africa Collaboration is an initiative of the Non-Communicable Diseases Research Unit of the South African Medical Research Council. The Collaboration is tasked with compiling and meta-analyzing the best available data on kidney measures and clinical outcomes.

<http://ckd-africa.samrc.ac.za/>

Invest4Health



Invest4health is a pipeline of catalytic projects focused on outcomes-based approaches for health in the public sector. I4h aims to improve health outcomes by researching, testing, institutionalising and scaling outcomes-based approaches to create a more productive, equitable and just society. The initiative will also design and develop innovative, blended finance instruments like Impact Bonds through cross-sectoral partnerships for health priorities. The initiative will generate and share evidence, forge partnerships and build capacity in the public sector.

PHASA2022

PHASA hosts an annual conference, with the aim of engaging public health practitioners and interested people from around the country and world to share their experiences and research, discuss topical public health issues, and mentor public health students and young researchers.

<http://phasa.samrc.ac.za/>

Sisonke2



Sisonke2 Study is an open label, single-arm phase 3B study to monitor the effectiveness of the single dose Ad26.COV2.S COVID-19 (Janssen) vaccine boost among Sisonke participants in South Africa.

<http://sisonkestudy.samrc.ac.za/>

WHOFICSA



The WHO-FIC Collaborating Centre in South Africa is hosted by the Burden of Disease Research Unit, South African Medical Research Council in Cape Town, South Africa. The Centre supports the development, implementation and maintenance of the WHO-FIC across the African region, and through the global WHO-FIC Network. – Drupal 9

<http://www.whofic.org.za/>

SAMRC

The SAMRC Website stats shows an average of 4m hits for the period 1 April 2021 – 30 November 2021 – due to implementation of the latest responsive technology that drives growth. December shows a significant increase in hits due to the news items pertaining to the Omicron variant. Total of 85 million hits for the year 2021/2022.

NEWSLETTERS

In September, CMC launched a monthly newsletter “Our stories”, a publication that features the organisation’s research, together with community engagements and outreach projects as well as the achievements of our staff members.

CMC also published the 1st Issue of our external newsletter “Advancing Life” in December 2021 to serve as research translation tool, communicating our science to South Africans, illustrating just how we aim to make a difference and impact on their lives for the better.”



WEBINARS

Refer to the table below.

Table XX: Summary of webinars during the reporting period

DATE OF EVENT	TITLE
10 May 2021	Preparedness of SAMRC staff for vaccination
19 May 2021	A Promising Sexual Violence Intervention for Post School Education and Training (PSET) Female Students in South Africa
3 June 2021	Youth Engagement: Impact of Lockdown on GBV GBV within Institutions of Higher Learning
11 June 2021	Youth Engagement: Using wastewater to detect the presence of COVID-19
15 June 2021	Youth Engagement: Using TB technology against COVID-19
21 June 2021	HPRU: Ethics Symposium
24 June 2021	Youth Engagement: Alcohol abuse and COVID-19
30 June 2021	Youth Engagement: Youth and Vaccinations
30 June 2021	Forgotten Agenda: Including Young Women with Disabilities and their SRHR needs under the COVID Epidemic in South Africa: What do we know and where are the Gaps?
27 August 2021	SAMRC Science Colloquium

DATE OF EVENT	TITLE
31 August 2021	Wastewater Surveillance in the Management of COVID-19 (jointly hosted by ASSAf and SAMRC)
30 September 2021	Prof Glenda Gray: COVID-19 vaccine data-driven insights
1 October 2021	SAMRC Science Colloquium
14 October 2021	Building community trust for COVID-19 vaccine confidence and deployment
14 October 2021	The case of intimate femicide in South Africa
15 October 2021	COVID-19 Conversations: The Podcast Series Prof Glenda Gray
18 October 2021	Evidence synthesis within the healthcare decision making ecosystem
18 October 2021	The Effects of COVID-19 on Maternal and Child Health in South Africa
18-19 October 2021	11 th Annual BRIP Research Symposium – extended abstract deadline 13 th of August
26 October 2021	Lead Exposure and Lead Poisoning Training
10 November 2021	COVID-19 Conversations with Prof Glenda Gray
25 November 2021	Forgotten Agenda
25-26 November 2021	Cochrane South Africa Virtual National Symposium
29 November 2021	SAMRC Family Meeting with Prof Glenda Gray
30 November – 3 December 2021	16 th Annual International Conference on Ethics & Consultation 2021
2 December 2021	16 Days of Activism GBV + COVID-19
6 December 2021	COVID-19 Vaccinations and Children
8 March 2022	Femicide Prevalence and Prevention Research Results and Strategy Launch
30 March 2022	Forgotten Agenda

MEDIA RELATIONS

The SAMRC's research, innovation and industry partnerships have seen the organisation feature on various media platforms sharing new knowledge, up-to-date developments and insights on the SAMRC, the South African health systems and factors impacting the health of the nation.

The advent of COVID-19 led to an increased demand for media engagement with the SAMRC experts. This is largely due to the fact that the SAMRC, as one of the leading organisations in science, has been in the forefront of the country's response against COVID-19, leading research and dialogue on the pandemic.

Press Releases

The SAMRC issued 46 press releases during the period from 01 April 2021 to 31 March 22 – this is in an increase of 15 from the previous reporting period which stood at 31. All the press releases 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:

MEDIA TYPE	AVE VALUE MEASURED* (FY 2021/22)	AVE VALUE MEASURED (FY 2020/2021)
Print	R61 708 725	R19 453 242
Broadcast	R17 454 006	R6 149 679
Online	R46 813 846	R6 398 610
Total	R125 976 577	R32 001 531

* AVE is the advertising value equivalency



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 51 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 National Health Act 61 of 2003.
- Intellectual Property, Rights from Publicly Financed Research and Development Act, 2008.
- Employment Equity Act 55 of 1998, as amended.
- 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".

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 29 July 2021 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 March 2022.

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 Committees 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) 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.
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.

BOARD MEMBERS

1 APRIL 2021 – 31 MARCH 2022



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 RONELE CAROLISSEN



PROF THANDISIZWE MAVUNDLA



PROF TIMOTHY TUCKER



PROF EUNICE SEEKOE



ADV DOROTHY KHOSA



MS JUNE WILLIAMS



PROF GLENDA GRAY

COMPOSITION OF BOARD: 1 APRIL 2021 – 31 MARCH 2022

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. J Mahlangu	Member	1 Nov 2016	n/a	MMed (Haem), clinical haematology subspecialist; Cert Clin Haem, Clinical haematology subspecialist; FCPath, Haematologist; MBBCh, 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"> • Poliomyelitis Research Foundation Board. • WITS Health Consortium Board 	Board Exco	9 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; Occupational Health Programme Evaluation; MCur in Community Health Nursing; PhD in Occupational Health Nursing; Health Practitioner's Dispensing Course; Post Graduate Diploma in International Research Ethics	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 7
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 R&D	9 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"> • Editorial board: ACSM's Health and Fitness Journal • Executive Director: Africa & Vice-President: Publications and Communication – International Physical Activity Projects (IPAP) 	Board Exco ARIC	9 2 9
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	9 2 9

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. 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; Phenomenology 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	9 8
Prof. S Velaphi	Member	1 Nov 2016	n/a	MChB; MMed; FC Paed, Fellowship in Perinatal Neonatal Medicine	Neonatology	<ul style="list-style-type: none"> Clothing Company for Church Clothes/Uniform 	Board R&D	8 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 	Board EXCO R&D	8 1 2
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	Obesity and Diabetes Metabolic syndrome Mitochondrial Energy metabolism Epigenetics of the Obesogenes	n/a	Board R&D	9 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
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) 	Board R&D	9 2
Prof. T Tucker	Member	1 Nov 2019	n/a	MBCbB; 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 • NHLS Research Trust – 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 8
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 Gemeenskapsdiens (Community Engagement): Chair of Board; • Psychological Association of South Africa: Member of Council and Chair of Division of Community and Social Psychology (Sept 2015-Sept 2019) 	Board REMCO	7 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
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) 	Board REMCO	9 8
Ms J Williams	Member	1 Nov 2019	n/a	Bachelor of Science; Higher Diploma in Education; BSc Honours; MSc Biological Education; Accountant's Conversion Course; 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	9 9
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	n/a	Board ARIC	7 7
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	9 9

BOARD AND COMMITTEES: 01 APRIL 2021 – 31 MARCH 2022

COMMITTEE	NO OF MEETINGS HELD	NO OF MEMBERS	NAME OF MEMBERS
Board	9	16	Prof. J Mahlangu
			Prof. L Zungu
			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. D Khosa
			Ms June Williams
Prof. T Mavundla			
Dr. M Madikizela			
ARIC	9	6	Prof. B Shaw
			Prof. L Skaal
			Ms J Williams
			Prof. T Mavundla
			Dr. M Madikizela
			Mr J Watson
REMCO	11	5	Prof. T Sodi
			Prof. L Zungu
			Prof. T Tucker
			Prof. R Carolissen
			Adv. D Khosa
R&D	2	5	Prof. E Seekoe
			Prof. E Mukwevho
			Prof. C Dandara
			Prof. W Rae
			Prof. S Velaphi
EXCO	2	4	Prof. J Mahlangu
			Prof. B Shaw
			Prof. E Seekoe
			Prof. L Skaal
			Prof. T Sodi

ENTERPRISE RISK MANAGEMENT

The SAMRC has a comprehensive risk management and internal control system designed to identify and appropriately mitigate emerging and significant risks faced by the organisation and ensure the accuracy and reliability of the financial reporting, while facilitating the delivery and sustainability of the SAMRC's strategic goals.

The Board is responsible for reviewing and confirming the effectiveness of the SAMRC's risk management practices and 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 maintains a strong and regular oversight of the committees work and receives regular updates on the activities of the ARIC, and reports on its review in the organisation's Annual Report.

The Enterprise Risk Management (ERM) Unit at SAMRC is a dedicated department that reports directly to the ARIC and has primary responsibility for the design, implementation and monitoring of enterprise-wide risk management across the SAMRC and its integration into the day-today activities.

The SAMRC's ERM strategy, policy and framework documents are reviewed annually and approved by the Board. 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 Unit continues to embed risk management principles and 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.

PRINCIPAL RISKS & MITIGATION ACTIVITIES

A key objective of risk management is to ensure that 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 assesses its impact on the achievement of the strategic objectives, which is updated as and when emerging risks and opportunities are identified. Where appropriate, management action plans to further improve the management of the risk are timeously developed and implemented.

Risk dashboards are utilized to report quarterly to the Executive Management Committee and Audit, Risk & IT Committee. 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.

Related risks are aggregated and grouped to determine the principal risk/risk category. Selected principal risks and opportunities (grouped by strategic priorities), together with key measures taken to mitigate these, are listed in the table below.

PRINCIPAL RISK CATEGORY/CONTEXT	RISK DESCRIPTION	KEY RESPONSE MEASURES
STRATEGIC FOCUS AREA: Administer health research effectively and efficiently in South Africa		
SAMRC 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
Corporate process improvements	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
Infrastructure management and revitalisation of Delft site	Infrastructure deterioration and aging buildings and research assets	<ul style="list-style-type: none"> • Asset management and verification • Capital project refurbishment • Preventative maintenance plans • Revamping office space
Data management	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		
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
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"> • Establish Research Integrity Office • Human and animal ethics committees • Policies, guidelines and SOPs
Transformation and diversity	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
Sustained leadership at EMC level	Early migration of EMC members	<ul style="list-style-type: none"> • Policies and guidelines
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
Inability to sustainably grow funding	<p>Failure to appropriately utilise available funding to generate future funding opportunities</p> <p>Uncertainty about the extent to which the SAMRC can develop funding opportunities in the private sector</p>	<ul style="list-style-type: none"> • Dedicated on-going investigation for further international funding opportunities
Moratorium on changes of employment terms and conditions	Loss of critical staff and senior team members due to public sectorsalary freeze	<ul style="list-style-type: none"> • Staff remuneration strategies • Ongoing discussions with the Union on employment terms and conditions

PRINCIPAL RISK CATEGORY/CONTEXT	RISK DESCRIPTION	KEY RESPONSE MEASURES
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 scientist	<ul style="list-style-type: none"> • Capacity building strategy for supporting the development of HDI research scientist • 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 acknowledge 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.

The ARIC is required to ensure that management has adequate controls in place over assets, risk and financial systems, and has systems to allow for timely and accurate financial reporting that complies with all applicable requirements and legislation. The ARIC therefore plays a key role in the assurance process and effectiveness of risk management process at the SAMRC.

The internal audit function is a key element of the organisation's internal control environment and works closely with the ERM Unit. The outsourced internal audit function reports functionally to the ARIC and is overseen by the Internal Audit Charter, which is reviewed annually and approved by the Board. 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. An Internal Audit Plan is prepared annually, which is approved by the ARIC. Internal audit continues to deliver on the agreed Internal Audit Plan and meet with stakeholders to understand their key risks and adapt their audit plan accordingly.

The ARIC receives regular reports on progress against the Internal Audit Plan and corrective actions taken by management in response to internal audit findings. Based on the results of the planned audits and adhoc reviews undertaken during the financial year, it is concluded that the key internal financial controls were generally effective in all material aspects and reported findings did not expose the SAMRC to significant risk.

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

General SAMRC Community

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.

Research integrity and Ethical Conduct

The SAMRC is committed to the conduct of research that is highly professional, ethical, safe, responsible, accountable, and contribute to uphold the integrity, credibility, and reputation of the SAMRC. The SAMRC takes into consideration that research ethics and integrity are core pillars at all stages of research. The SAMRC established Bioethics Advisory Panel (BAP) which functions

as an advisory panel to the SAMRC President and CEO. The panel was established with the intention of enhancing ethical and human rights, develop recommendations, statements as well as guidelines for research and research translation based on ethics and human rights. The Bioethics Advisory Panel (BAP) established a working group or sub-committee to develop the guidelines on ethico-legal issues relating to the conduct of- and use of knowledge derived from human genome research and gene editing. In addition, the SAMRC and the Department of Science and Innovation had a joined meeting and reached consensus to develop the guidelines on Data Transfer Agreement (DTA). Presently, there is no uniform guidance on what provisions should be incorporated into a DTA that includes both legal and ethical safeguards for research participants when their data is shared within and outside the country.

As part of its commitment to foster research integrity, research Ethics Committees members and staff members attend Good Clinical Practice (GCP) and research ethics training to better understand the underpinnings of ethical principles and professional standards essential for responsible conduct of research. Through training, the aim

is to influence the moral behaviour of individuals and to get researchers to collectively commit to conducting research within the lens of research integrity and ethical standards.

The SAMRC recognises that rules alone without ethics training will not resolve some of the personal conflicts and moral dilemmas that arise in research. Thus, research rules need to be supplemented with acquisition of good moral judgment and a strong sense of personal integrity. The SAMRC supports the best efforts to respect research participants, animals, and the environment; and also, by promoting respect amongst all stakeholders benefiting from unquestionable research methods. As a way of enhancing adherence to ethics guidelines, the SAMRC has created a site for reporting research misconduct and alleged breaches of research norms and standards. The SAMRC encourages all the staff members who have knowledge of occurrence of a breach of research norms and standards or research misconduct to promptly report any reasonable suspicions. The SAMRC categorically considers respect for human dignity, honesty, rigor, transparency, care, and respect as credo pillars in the promotion of research integrity.

SAMRC's MATERIALITY AND SIGNIFICANCE FRAMEWORK: 2021/2022

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 of 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 for approval and National Treasury for noting
b) participation in a significant partnership, trust, unincorporated joint venture or similar arrangement;	Qualifying transactions exceeds R13.4Mil (based on 2% guidance of total average SAMRC assets, as at 31 March 2020). 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 R13.4Mil (based on 2% guidance of total average SAMRC assets, as at 31 March 2020). 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 R13.4Mil transaction value (based on 2% guidance of total average SAMRC assets, as at 31 March 2020).	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 R13.4Mil (based on 2% guidance of total SAMRC assets, as at 31 March 2020)	

SECTION 55: ANNUAL REPORT AND FINANCIAL STATEMENTS

- 3) 2) 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.		

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 – (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.	Values excluded from the Delegation of Authority Framework Policy.	Instances that are excluded from the Delegation of Authority Framework Policy.
2) A delegation or instruction to an official in terms of subsection (1) – (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.	Values excluded from the Delegation of Authority Framework Policy.	Instances that are excluded from the Delegation of Authority Framework Policy.

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 R13.4 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 guidance parameters below, the SAMRC materiality level calculation outcomes are as follows:

ELEMENT	MAX. % TO BE APPLIED AGAINST R VALUE	AUDITED VALUE AT 31 MARCH 2020	MAX. CALCULATED MATERIALITY & SIGNIFICANCE VALUE
Total Assets (1%-2%)	2%	R674 862 028	R13 497 240

The SAMRC materiality and significance value will be R13.4 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

During the reporting period, SAMRC had submitted all the initial information required by the appointed independent economic empowerment rating agency to perform the audit. However, at the time of reporting, the SAMRC's B-BBEE certificate had expired and the agency was yet to finalize the rating process before issuing a new certificate.

OTHER NOTABLE RELATIONSHIPS

Other government departments	<ul style="list-style-type: none"> • Dept. of Science & Technology • Dept. of Social Development
Members of key management	<ul style="list-style-type: none"> • 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 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 and a board member of National Health Laboratory Services (NHLS) from October 2021. • Prof L Zuhlke (Vice President appointed on 1 February 2022). • 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 from 1 June 2017 – 31 January 2022). • Prof. MJ Mphahlele (Vice President appointed 1 October 2014 and resigned 30 June 2021, 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 Mdhluli (Chief research operations officer appointed 1 September 2017). • Mr. M Popo (General Counsel appointed 1 February 2019). • Dr M Mulder (Executive director appointed 1 June 2021. The official is a director of the controlled entities Medres (Pty) Ltd and Jirehsa Medical (Pty) Ltd. The official is a non-executive director of SAMRC supplier The Biologicals and Vaccine Institute of Southern Africa. • Ms. V Bam (Executive Director Human Capacity Development appointed 1 September 2021). • Prof. A Mathee (Executive Director Transformation appointed 1 March 2022).
Board members	<p>Board members are employed by Universities who contract with SA Medical Research Council for grant income or collaborative research</p> <ul style="list-style-type: none"> • 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, term started 1 November 2016 (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, term started 1 November 2016 (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, term started 1 November 2016 (University of Witwatersrand – grant recipient and debtor) • Prof. L Zungu, term started 1 November 2016 and Prof. T Mavundla, term started 1 November 2019 (University of South Africa – supplier and debtor) • Prof. B Shaw, term started 1 November 2016 (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 Mukwevho, term started 1 November 2019 (North West University – grant recipient and debtor) • Prof. L Skaal, term started 1 November 2016, is a director of Public Health Association of South Africa (PHASA) (supplier and debtor)

OTHER NOTABLE RELATIONSHIPS (CONTINUED)

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: Dr R Maharaj	• Lubombo Spatial Development Initiative 2 (SAMRC debtor, the staff member is a director)

	2022 31 MARCH R	2021 31 MARCH R
Notable relationship balances		
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
GARDP Foundation	1,719,350	–
Health Professions Council of South Africa	–	(3,220)
Lubombo Spatial Development Initiative 2	1,111,371	–
National Research Foundation	–	(400,000)
Tertiary Education and Research Network of South Africa (TENET)	(264,308)	–
University of Cape Town	124,655	1,653,494
University of Cape Town	(26,721,252)	(25,552,831)
University of Fort Hare	–	(155,250)
University of Limpopo	–	(75,000)
University of North West	(575,000)	(558,340)
University of Pretoria	(645,294)	(329,000)
UNISA	(230,000)	(859,488)
UNISA	20,287	109,789
University of Stellenbosch	294,067	476,987
University of Stellenbosch	(1,706,072)	(3,946,465)
University of Witwatersrand	(7,171,913)	(7,169,271)
Wits Health Consortium	500,148	657,751
Wits Health Consortium	(27,085,652)	(27,194,286)
University of Zululand	–	(402,500)
Deferred Income (grants received in advance)		
Dept. of Science and Technology (DST)	138,386,539	56,867,265
European and Developing Countries Clinical Trials Partnership (EDCTP)	–	17,214,461
Sefako Makgatho University	134,072	90,000
University of Cape Town	265,444	585,045
University of Stellenbosch	1,754,717	–
National Research Foundation (NRF)	3,666,427	3,547,395
University of Witwatersrand	117,330	299,463
Commitments		
Sefako Makgatho University	–	1,000,000
University of Cape Town	600	6,395,590
University of Stellenbosch	–	3,197,795
Wits Health Consortium	–	37,750,155
University of Witwatersrand	–	1,352,585

OTHER NOTABLE RELATIONSHIPS (CONTINUED)

	2022 31 MARCH R	2021 31 MARCH R
Revenue – grants received and services rendered to notable parties		
Dept. of Science and Technology (DST)	183,443,155	146,597,362
Dept. of Social Development	218,500	73,908
European and Developing Countries Clinical Trials Partnership (EDCTP)	276,969	11,484,640
GARDP Foundation	1,719,350	–
Lubombo Spatial Development Initiative	1,341,203	849,626
National Research Foundation	5,200,508	5,295,641
North West University	39,652	–
Sefako Makgatho Health Sciences University	45,000	90,000
University of Cape Town	2,012,045	1,704,507
University of Fort Hare	9,913	250,944
University of Limpopo	349,544	–
University of Pretoria	2,478	–
University of Stellenbosch	4,835,994	837,388
UNISA	929,255	109,789
University of Witwatersrand	436,087	280,912
Wits Health Consortium	4,039,211	983,752
	204,898,864	168,558,469
Expenditure such as grants awarded, extra-mural unit grants and collaborative research grants incurred with notable parties		
DNDI GARDP Southern Africa	3,882,609	–
European and Developing Countries Clinical Trials Partnership (EDCTP)	–	1,304,348
Health Professions Council of South Africa	41,080	4,830
Hutchinson Centre Research Institute of South Africa	5,097,081	–
National Research Foundation	1,340,000	1,740,000
North West University	3,893,770	3,519,441
Public Health Association of South Africa (PHASA)	227,513	–
Sefako Makgatho Health Sciences University	1,000,000	2,828,008
Tertiary Education and Research Network of South Africa (TENET)	1,042,866	1,161,002
The Biologicals and Vaccine Institute of Southern Africa	225,000	–
University of Limpopo	12,694,937	13,002,943
University of Pretoria	10,077,989	20,292,498
University of Cape Town	66,097,129	73,781,131
University of Fort Hare	4,186,656	3,470,243
UNISA	5,751,637	3,700,340
University of Stellenbosch	36,080,348	26,712,616
University of Western Cape	–	3,103,223
University of Witwatersrand	25,595,641	24,685,858
University of Zululand	1,356,260	1,490,000
Wits Health Consortium	126,344,965	91,452,676
	304,935,481	272,249,157

PART D
HUMAN
RESOURCES
MANAGEMENT



SAMRC ORGANOGRAM

EXECUTIVE MANAGEMENT COMMITTEE

The SAMRC Act No. 58 of 1991 mandates the Board to designate an Executive Management Committee, consisting of the President and other members who are employees of the SAMRC. The SAMRC Board has, in line with the SAMRC Act, appointed Professor Glenda Gray as the Chief Executive Officer of the SAMRC, and she occupies the post of President of the SAMRC. The President is the chairperson of the Executive Management Committee (EMC), and together with

other members of the EMC designated by- and under directives and control of the Board, are responsible for the management of the affairs of the SAMRC in accordance with the objects and policies of the SAMRC. The President and EMC members reports on affairs of the SAMRC to the Board as may be required from time-to-time. Members of the EMC and their portfolios are indicated in the diagram below.



PROF GLENDA E GRAY
SAMRC PRESIDENT AND CEO



PROF ANGELA MATHEE
EXECUTIVE DIRECTOR
TRANSFORMATION



DR MICHELLE MULDER
EXECUTIVE DIRECTOR GRANTS,
INNOVATION AND PRODUCT
DEVELOPMENT



MR NICK BUICK
CHIEF FINANCIAL OFFICER



MR MZIMHLE POPO
LEGAL COUNSEL



MS NTOZA BAM
EXECUTIVE DIRECTOR, HR



PROF LIESL ZÜHLKE
VICE PRESIDENT



DR MONGEZI MDHLULI
CHIEF RESEARCH
OPERATIONS OFFICER

EXECUTIVE SUMMARY

The Human Resource (HR) function is recognized for its critical role of enabling an effective and efficient employee life cycle, with special emphasis on a proactive and deliberate talent management approach. This approach strengthens processes such as attracting and developing employees in order to promote retention of talent and employee well-being. For greater impact on organizational performance, the human resource management policies and practices are aligned to the mission and strategic objectives of the South African Medical Research Council (SAMRC).

The 2021/2022 reporting period marks an extraordinary challenging period, as the department experienced loss and bereavement due to the impact of the COVID-19 pandemic. The HR department was able to respond appropriately and efficiently by ensuring that essential and strategic activities continued. The department optimised on its partnership with IT and digitised some HR practices while automating operational functions to enable the hybrid workplace that was emerging at the time. These hybrid HR activities were fit-for-purpose and contributed meaningfully to the SAMRC strategic plan/priorities and annual performance plan.

This part of the annual report highlights achievements during 2021/22 in the spheres of transformation, recruitment, organizational development (career development and performance management), employment relations and employee development (through numerous study assistance and training programmes).

EXECUTIVE MANAGEMENT APPOINTMENTS

The HR department proudly supported the appointments of the following three executive management committee (EMC) members during the reporting period:

- i) Dr. Michelle Mulder, Executive Director: GIPD, commenced 1 June 2021.
- ii) Ms Ntoza Bam, Executive Director: HR, commenced 1 September 2021.
- iii) Prof. Liesl Zühlke, Vice President-Extramural Research & Internal Portfolio, commenced 1 February 2022.

TRANSFORMATION

The SAMRC continues to be committed to the national transformation agenda, which is to systemically redress imbalances of the past through short to long-term processes of growing and transforming science. Integral to SAMRC's commitment, the HR related activities strive to entrench in the workplace, a culture of inclusion and sense of belonging. To this end, HR supported the introduction of virtual diversity and inclusion workshops.

Furthermore, SAMRC is looking forward to working closely with Prof. Angela Mathee, Chief Specialist Scientist, who has been designated to champion the transformation agenda at the executive level. Prof. Mathee's requisite transformation experience will provide the necessary leadership to the implementation of the Transformation Strategy (2022 – 2024).

CAREER AND CAPACITY DEVELOPMENT

The SAMRC remains committed to the career and capacity development of the intramural critical mass through funding of Masters and PhD studies, as well as post-doctoral opportunities. The Accelerated Development Programme has further been an integral initiative to support management development.

SUCCESSION PLANNING

The SAMRC acknowledges the need for succession planning by identifying and developing potential leaders who can move into leadership roles when they become vacant. The internal appointment of Deputy Directors within the research units continues to be an essential strategy for succession planning.

EMPLOYEE PERFORMANCE MANAGEMENT

The HR team supported a performance management process that allowed employees opportunities to meaningfully contribute to the success of the SAMRC through continuous engagement and completion of performance contracts. Whilst most performance discussions and reviews between managers and employees took place virtually, the line managers and HR ensured that the individual Key Performance Areas (KPA) continued to be aligned to the strategic intent and objectives of SAMRC.

EMPLOYEE RELATIONS

The appointment of an Employee Relations Specialist on 1 January 2022 created an opportunity to establish a formal Employee Relations Office. This development is envisaged to further strengthen relationship with Organized Labour. Management and NEHAWU continue to be committed to a collegial relationship that is mutually beneficial.

COACHING SUPPORT

Management and leadership coaching continued to be a valuable and strategic intervention for tailored support during the reporting period. The coaching approach

was further adjusted to support teams in relation to the pandemic challenges. Coaching unlocked higher levels of engagement and more confident management teams.

HUMAN RESOURCE MANAGEMENT INFORMATION SYSTEM (HRMIS)

The Human Resource Management Information System (HRMIS) helps HR manage employee information across different stages of the employee life cycle. During this reporting period, the HR department continued to benefit from the new Recruitment and Selection software that introduced a paperless environment and drastically improved the processing and turnaround time of the processing and turnaround time of recruitment of employees. In addition, the recruitment and selection process evolved from manual to the virtual platform, fit-for-purpose in the current hybrid work arrangement.

Furthermore, the new payroll component of the system continues to strengthen payroll administrator's ability to access information, and amongst other things, improve self-service functionality for the SAMRC community. The reporting functionality has enhanced data management effectiveness.

A LOOK TOWARDS THE FUTURE

A collective reflection and look towards the future in a complex, evolving, and dynamic work environment, appreciates the ability of the Human Resources function to enable a SAMRC culture that is responsive to an era characterised by flux and change. The Human Resources team has shown incredible resilience and adaptability to engage and support the SAMRC community during the pandemic crisis. The team is further committed to deliver its strategic objectives and is inspired by the implementation of an Integrated Talent Management framework.



Integrated Talent Management Framework

This framework intends to enhance and embed a talent-driven culture that promotes a conducive and supportive working environment through a range of HR activities associated with attracting, appointing, developing and retaining employees for the purposes of optimizing the SAMRCs performance, while transforming the equity profile to reflect the demographics of the country.

HUMAN RESOURCES STATISTICS

REMUNERATION

The SAMRC provides a total cost to company package. Tables 1A, 1B and 1C below summarise the personnel expenditure related to guaranteed remuneration packages. Table 1D below summarises the allowances (non-guaranteed) that were paid to employees. Table 2A summarises personnel expenditure for overtime work.

Table 1 A: Personnel expenditure by Occupational Category, 2021/22 (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)	4,222,871.12	1.1	36	117,301.98
Skilled (level 3-5)	Semi-skilled & discretionary decision making (Paterson B)	21,447,579.49	5.5	112	191,496.25
Highly skilled production (levels 6-8)	Skilled technical & academically qualified (Paterson C)	111,443,016.46	28.8	283	393,791.58
Highly skilled supervision (levels 9-12)	Professionally qualified & specialists (Paterson D)	163,222,358.97	42.2	191	854,567.32
Senior Management (Levels 13-16)	Senior and Top Management (Paterson E & F)	86,513,829.40	22.4	59	1,466,336.09
Total		386,849,655.44	100	681	3,023,493.22

Table 1 B: Personnel expenditure for Postdocs, Interns, European and Developing Countries Clinical Trials Partnership (EDCTP) and Post retirement contracts 2021/22

FUNCTION/AREA/STATUS	PERSONNEL EXPENDITURE (R)	PERSONNEL EXPENDITURE (%)	NO OF EMPLOYEES	AVERAGE REMUNERATION EXPENDITURE PER EMPLOYEE (R)
Postdocs/Interns	5,310,034.00	30.1	18	295,001.89
European and Developing Countries Clinical Trials Partnership (EDCTP)	6,036,900.80	34.2	5	1,207,380.16
Post retirement contracts	6,289,699.57	35.7	6	1,048,283.26
Total	17,636,634.37	100.0	29	2,550,665.31

Table 1 C: Personnel expenditure for Temporary employees, 2021/22

TEMPORARY EMPLOYEES	PERSONNEL EXPENDITURE (R)
Total	25,682,261.03

Table 1 D: Personnel expenditure: Allowances 2021/22

	TOTAL (R)
Allowances	3,741,640.09

Table 2 A: Personnel expenditure: Overtime by Occupational Category, 2021/22

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)	319.65	0.03
Skilled (Levels 3-5)	Semi-skilled & discretionary decision making (Paterson B)	304,614.08	31.60
Highly skilled production (Levels 6-8)	Skilled technical & academically qualified (Paterson C)	421,942.89	43.77
Highly skilled supervision (Levels 9-12)	Professionally qualified & specialists (Paterson D)	237,165.56	24.60
Senior Management (Levels 13-16)	Senior and Top Management (Paterson E & F)	0.00	0.00
Total		964,042.18	100.00

EMPLOYMENT

Table 3: Employment and vacancies by occupational categories as at 31 March 2022 (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)	38	36	2	5.3
Skilled (Levels 3-5)	Semi-skilled & discretionary decision making (Paterson B)	114	112	2	1.8
Highly skilled production (Levels 6-8)	Skilled technical & academically qualified (Paterson C)	296	283	13	4.4
Highly skilled supervision (Levels 9-12)	Professionally qualified & specialists (Paterson D)	198	191	7	3.5
Senior Management (Levels 13-16)	Senior and Top Management (Paterson E & F)	64	59	5	7.8
TOTAL		710	681	29	4.1

JOB EVALUATION

Table 4: Job evaluation, 1 April 2021 to 31 March 2022

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)	36	0	0	0	0.0
Skilled (Levels 3-5)	Semi-skilled & discretionary decision making (Paterson B)	112	11	9.8	11	13.7
Highly skilled production (Levels 6-8)	Skilled technical & academically qualified (Paterson C)	283	47	16.6	47	58.7
Highly skilled supervision (Levels 9-12)	Professionally qualified & specialists (Paterson D)	191	21	11.0	21	26.3
Senior management	Senior and Top Management (Paterson E & F)	59	1	1.7	1	1.3
Total		681	80	11.7	80	100

Note: Posts were evaluated for recruitment purposes and Career Advancement for 2021/22. No Top Management position was evaluated.

EMPLOYMENT EQUITY

Table 5 A: Total number of employees (including employees with disabilities) in each of the following occupational levels as at 31 March 2022

OCCUPATIONAL LEVELS	MALE				FEMALE				FOREIGN NATIONALS		TOTAL
	AFRICAN	COLOURED	INDIAN	WHITE	AFRICAN	COLOURED	INDIAN	WHITE	MALE	FEMALE	
Top Management	2	0	0	1	1	2	0	2	0	0	8
Senior Management	2	5	4	9	4	5	6	10	4	2	51
Professionally qualified and experienced specialists and mid-management	19	10	6	3	51	31	24	28	6	13	191
Skilled technical and academically qualified workers, junior management, supervisors, foremen, and superintendents	40	25	10	2	123	45	33	3	1	1	283
Semi-skilled and discretionary decision making	41	10	2	0	49	7	2	1	0	0	112
Unskilled and defined decision making	9	3	0	0	14	10	0	0	0	0	36
Total	113	53	22	15	242	100	65	44	11	16	681

Note: Top Management: 3 appointments during 2021/22 [1 African female (external appointment through recruitment) + 1 Coloured female (designated by the Board from internal staff and 1 white female (internal appointment through recruitment)].

Table 5 B: Total number of employees with disabilities only as at 31 March 2022

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	2	0	0	0	0	0	0	2
Professionally qualified and experienced specialists and mid-management	0	0	0	0	0	0	2	1	0	0	3
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	2	1	1	2	1	0	0	7

Note: 2 Disabled employees appointed during this reporting period (1 White male appointed at Senior Management Level and 1 Indian female appointed at Professional level). Our recruitment process encourages people with disabilities to apply and staff in the employ are requested to declare their disabilities, some of which may not be obviously visible or physical.

Table 6: Recruitment (new recruits), 1 April 2021 to 31 March 2022

OCCUPATIONAL LEVEL	MALE				FEMALE				FOREIGN NATIONAL		TOTAL
	AFRICAN	COLOURED	INDIAN	WHITE	AFRICAN	COLOURED	INDIAN	WHITE	MALE	FEMALE	
Top Management	0	0	0	0	1	1	0	1	0	0	3
Senior Management	0	0	0	1	2	0	0	0	0	0	3
Professionally qualified and experienced specialists and mid-management	6	3	1	0	14	3	2	4	0	3	36
Skilled technical and academically qualified workers, junior management, supervisors, foreman and superintendents	13	1	0	0	24	6	6	0	0	0	50
Semi-skilled and discretionary decision making	10	4	1	0	24	1	0	0	0	0	40
Unskilled and defined decision making	0	1	0	0	0	2	0	0	0	0	3
Total	29	9	2	1	65	13	8	5	0	3	135

Note: The table above excludes postdocs, interns and EDCTP.

Table 7: Career Progression and Advancement by race and gender, 1 April 2021 to 31 March 2022

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	1	0	0	0	0	0	0	0	0	1
Skilled (Levels 3-5) – Pat B	3	2	0	0	1	1	0	0	0	0	7
Highly skilled production – Pat C (Levels 6-8)	3	2	2	1	12	6	4	0	1	0	31
Highly skilled supervision (Levels 9-12) – Pat D	5	3	2	1	17	13	5	5	2	5	58
Senior Management – Pat E & F	1	1	0	0	0	1	1	3	2	0	9
Total	12	9	4	2	30	21	10	8	5	5	106

Tables 8 A: Exits by race, gender, and occupational level (including people with disabilities), 1 April 2021 to 31 March 2022

OCCUPATIONAL LEVEL	MALE				FEMALE				FOREIGN NATIONAL		TOTAL
	AFRICAN	COLOURED	INDIAN	WHITE	AFRICAN	COLOURED	INDIAN	WHITE	MALE	FEMALE	
Top Management	1	0	0	0	0	0	0	0	0	0	1
Senior Management	1	0	0	2	0	0	0	1	1	0	5
Professionally qualified and experienced specialists and mid-management	2	0	1	0	6	0	2	4	0	0	15
Skilled technical and academically qualified workers, junior management, supervisors, foreman and superintendents	3	1	1	1	17	5	0	2	0	0	30
Semi-skilled and discretionary decision making	7	1	0	1	16	0	0	1	0	0	26
Unskilled and defined decision making	1	0	0	0	3	1	0	0	0	0	5
Total	15	2	2	4	42	6	2	8	1	0	82

Table 8 B: Reasons why staff are leaving the organisation, 1 April 2021 to 31 March 2022

TERMINATION TYPE	NUMBER OF TERMINATIONS	% OF TOTAL TERMINATIONS
Death	7	8.5
Resignation	47	57.3
Expiry of contract	14	17.1
Retrenchment – operational requirements	0	0.0
Dismissal: Misconduct	3	3.7
Poor performance	0	0.0
Discharged due to ill-health	1	1.2
Retirement	10	12.2
Transfers to tertiary institution	0	0.0
Total	82	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		12.0
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		10.0

Table 9: Skills development, to all staff (including people with disabilities) who are in receipt of SAMRC study support and training, 1 April 2021 to 31 March 2022

OCCUPATIONAL LEVELS	MALE				FEMALE				TOTAL
	AFRICAN	COLOURED	INDIAN	WHITE	AFRICAN	COLOURED	INDIAN	WHITE	
Top management	1	0	0	0	0	0	0	0	1
Senior management	1	0	1	2	1	0	1	3	9
Professionally qualified and experienced specialists and mid-management	9	3	2	1	28	6	17	14	80
Skilled technical and academically qualified workers, junior management, supervisors, foremen, and superintendents	21	8	5	1	75	18	15	2	145
Semi-skilled and discretionary decision making	21	1	0	0	26	2	3	0	53
Unskilled and defined decision making	1	0	0	0	0	0	0	0	1
Total	54	12	8	4	130	26	36	19	289

PERFORMANCE REWARDS

Table 10: Performance Bonuses by Occupational Category, 1 April 2021 to 31 March 2022

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)	21	36	58.3	47,279.20	2,251.39	1.12
Skilled (Levels 3-5)	Semi-skilled & Discretionary decision making (Paterson B)	58	112	51.8	185,782.80	3,203.15	0.87
Highly Skilled Production (Levels 6-8)	Skilled technical and academically qualified (Paterson C)	192	283	67.8	1,274,094.50	6,635.91	1.14
Highly skilled supervision (Levels 9-12)	Professionally qualified & specialists (Paterson D)	135	191	70.7	1,881,138.10	13,934.36	1.15
Senior Management Band E&F	Senior Management and Top Management (Paterson E & F)	56	59	94.9	1,637,917.80	29,248.53	1.89
Total		462	681	67.8	5,026,212.40	10,879.25	1.29

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 2022

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	0.00
Skilled (Levels 3-5)	Semi-skilled & discretionary decision making (Paterson B)	1	0.15
Highly skilled production (Levels 6-8)	Skilled technical & academically qualified (Paterson C)	2	0.29
Highly skilled supervision (Levels 9-12)	Professionally qualified & specialists (Paterson D)	17	2.49
Senior Management (Levels 13-16)	Senior and Top Management (Paterson E & F)	7	1.03
Total		27	3.96

Table 12: Foreign Nationals by Job Title as at 31 March 2022

JOB TITLE	SAMRC EQUIVALENT OCCUPATIONAL CATEGORY	NUMBER	% OF TOTAL NO OF EMPLOYEES (681)
Unit Director	Senior and Top Management (Paterson E & F)	3	0.44
Chief Specialist Scientist	Senior and Top Management (Paterson E & F)	2	0.29
Senior Specialist Scientist	Senior and Top Management (Paterson E & F)	2	0.29
Specialist Scientist	Professionally qualified & specialists (Paterson D)	8	1.17
Senior Scientist	Professionally qualified & specialists (Paterson D)	5	0.73
Senior Data Manager	Professionally qualified & specialists (Paterson D)	1	0.15
Research Clinician	Professionally qualified & specialists (Paterson D)	1	0.15
Division Manager	Professionally qualified & specialists (Paterson D)	1	0.15
Research Technologist	Skilled technical & academically qualified (Paterson C)	1	0.15
Project Leader	Professionally qualified & specialists (Paterson D)	2	0.29
Pharmacist	Skilled technical & academically qualified (Paterson C)	1	0.15
Total		27	3.96

LEAVE UTILIZATION

Table 13: Sick leave utilization, 1 April 2021 to 31 March 2022

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	113	71	21	36	58	7.5	99,103.00
Skilled (Level 3-5)	Semi-skilled & Discretionary decision making (Paterson B)	419	193	46	89	112	79	4.7	305,111.00
Highly skilled production (Levels 6-8)	Skilled technical & academically qualified (Paterson C)	1170	534	46	212	285	74	5.5	1,779,951.00
Highly skilled supervision (Levels 9-12)	Professionally qualified & specialists (Paterson D)	680	362	53	116	191	61	5.9	2,257,691.00
Senior Management	Senior and Top Management (Paterson E & F)	73	20	27	23	59	39	3.2	354,618.00
Total		2500	1 222	49	461	681	68	5.4	4,796,474.00

Table 14: Special sick leave (temporary), 1 April 2021 to 31 March 2022

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)	90	100.00	1	36	2.77	90.00	76,191.58
Skilled (Levels 3-5)	Semi-skilled & discretionary decision making (Paterson B)	0	0.00	0	112	0.00	0.00	0.00
Highly skilled production (Levels 6-8)	Skilled technical & academically qualified (Paterson C)	90	100.00	3	285	1.05	30.00	137,730.96
Highly skilled supervision (Levels 9-12)	Professionally qualified & specialists (Paterson D)	94	100.00	2	191	1.05	47.00	378,334.38
Senior Management	Senior and Top Management (Paterson E & F)	0	0.00	0	59	0.00	0.00	0.00
Total		274	100.00	6	681	0.88	45.67	592,256.93

Note: Special sick leave refers to additional sick leave awarded for major incidents or illness in addition to normal sick leave allocation

Table 15: Annual Leave, 1 April 2021 to 31 March 2022

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)	36	151	4.19
Skilled (Levels 3-5)	Semi-skilled & discretionary decision making (Paterson B)	112	435	3.88
Highly skilled production (Levels 6-8)	Skilled technical & academically qualified (Paterson C)	283	918	3.24
Highly skilled supervision (Levels 9-12)	Professionally qualified & specialists (Paterson D)	191	533	2.79
Senior Management	Senior and Top Management (Paterson E & F)	59	123	2.08
Total		681	2160	3.17

Table 16: Forfeited leave, 1 April 2021 to 31 March 2022

PUBLIC SECTOR SALARY LEVELS	SAMRC EQUIVALENT OCCUPATIONAL CATEGORY	NO OF EMPLOYEES WHO FORFEITED LEAVE	TOTAL DAYS OF LEAVE FORFEITED	VALUE (R)
Lower skilled (Level 1-2)	Unskilled and defined decision making (Paterson A)	1	3.00	2,557.17
Skilled (Levels 3-5)	Semi-skilled & discretionary decision making (Paterson B)	3	13.50	11,470.96
Highly skilled production (Levels 6-8)	Skilled technical & academically qualified (Paterson C)	6	62.50	94,989.89
Highly skilled supervision (Levels 9-12)	Professionally qualified & specialists (Paterson D)	8	43.75	139,808.52
Senior Management	Senior and Top Management (Paterson E & F)	5	67.75	301,633.85
Total		23	190.50	550,460.39

Table 17: Leave pay outs, 1 April 2021 to 31 March 2022

REASON	NUMBER OF EMPLOYEES	TOTAL AMOUNT (R)
Terminations (all exits)	69	1,817,613.54
Encashment in service approved by Board	478	7,694,318.84
Total	547	9,511,932.38

EMPLOYEE WELLNESS PROGRAMME: HEALTH PROMOTION

Details of Health Promotion and HIV and AIDS Programmes (part of SAMRC Employee Wellness Program)

- The SAMRC's current service provider is Alexander Forbes, who outsources some of the services rendered to Life Health Solutions.
- The Wellness budget amounts to R500 000 per annum.
- With the onset of COVID-19, no physical Wellness Days were held in any of the Regions, whilst counselling services still continued via different mediums. Staff were not deterred by the lack of physical counselling sessions and continued to make use of online services.
- The employee assistance sessions remained on offer, while the call centre was operational 24/7. Services on offer included HIV counselling assistance, trauma debriefing, individual counselling, life management and work-life balance matters.
- With COVID-19 numbers on the decline, HR held Pap, Breast and PSA Health screenings in all of the regions, and they were very well attended.
- The focus of the programme was to assist employees with a work life balance during these trying times, especially in the instance we find ourselves in with the hybrid way of working.
- The organisation has suffered many losses during this period, and this prompted more counselling sessions with small individual groups.
- The service provider provides HR with regular reports with statistics, observations and trends to monitor and evaluate the impact of its employee wellness programme on staff across all regions. This helps the SAMRC to determine focus areas and assist staff with issues where it is needed the most. This is furthermore supported by promotion of the programme through information sessions and training.
- There is also 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.

LABOUR RELATIONS

Table 18: Disciplinary actions considered by a formal disciplinary hearing, 1 April 2021 to 31 March 2022

	MALE				FEMALE				FOREIGN NATIONAL		TOTAL
	AFRICAN	COLOURED	INDIAN	WHITE	AFRICAN	COLOURED	INDIAN	WHITE	MALE	FEMALE	
Disciplinary action	2	0	1	0	0	0	0	0	0	0	3

Table 19: Misconduct and disciplinary hearings finalised, 1 April 2021 to 31 March 2022

OUTCOME OF DISCIPLINARY HEARINGS	NUMBER
Verbal warning	0
Written warning	1
Final written warning	2
Suspended without pay	0
Fine	0
Demotion	0
Dismissal	3
Not guilty	1
Case withdrawn	0
Total	7

Table 20: Types of misconduct addressed at disciplinary hearings

TYPE OF MISCONDUCT	NUMBER OF EMPLOYEES
Breach of employment contract, Dishonesty, Leaving work without authorization, Misrepresentation on the CV.	1
Persistent late coming and poor time keeping, not following proper channels of communication when not coming to work or running late.	1
Staying away from work without permission	1
Non declaration of Interest	2
Not adhering to COVID-19 regulations	1
Coming to work under the influence of alcohol, staying away from work without permission, transporting and endangering SAMRC study participants.	1
Total	7

Table 21: Grievances lodged, 1 April 2021 to 31 March 2022

	NUMBER
Number of grievances resolved	1
Number of grievances not resolved	1
Total number of grievances lodged	2

Table 22: Disputes pending before the CCMA, 1 April 2021 to 31 March 2022

	NUMBER
Number of disputes in progress	0
Number of disputes settled	0

Table 23: Strike actions, 1 April 2021 to 31 March 2022

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 24: Precautionary suspensions, 1 April 2021 to 31 March 2022

Number of people suspended	0
Average number of days suspended	0
Cost (R) of suspensions	0

SKILLS DEVELOPMENT

This section highlights the strides made by the organisation to improve the development of skills.

Table 25: Training needs identified, 1 April 2021 to 31 March 2022 (WSP)

OCCUPATIONAL CATEGORY	GENDER	NUMBER OF EMPLOYEES AS AT 1 APRIL 2021	TRAINING NEEDS IDENTIFIED AT START OF REPORTING PERIOD			
			LEARNERSHIPS	SKILLS PROGRAMMES & OTHER SHORT COURSES	OTHER FORMS OF TRAINING	TOTAL
Legislators, senior officials, and managers	Female	27	0	1	0	1
	Male	28	0	0	0	0
Professionals	Female	127	0	16	18	34
	Male	37	0	2	0	2
Technicians and associate professionals	Female	191	0	26	82	108
	Male	66	0	10	19	29
Clerks	Female	59	0	3	13	16
	Male	49	0	4	15	19
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	27	0	1	0	1
	Male	13	0	1	0	1
Sub Total	Female	431	0	47	113	160
	Male	193	0	17	34	51
Total		624	0	64	147	211

NA=not applicable

Table 26: Training provided, 1 April 2021 to 31 March 2022 (ATR)

OCCUPATIONAL CATEGORY	GENDER	NUMBER OF EMPLOYEES AS AT 1 APRIL 2021	TRAINING PROVIDED WITHIN THE REPORTING PERIOD			
			LEARNERSHIPS	SKILLS PROGRAMMES & OTHER SHORT COURSES	OTHER FORMS OF TRAINING	TOTAL
Legislators, senior officials and managers	Female	27	0	0	0	0
	Male	28	0	2	0	2
Professionals	Female	127	0	118	82	200
	Male	37	0	25	6	31
Technicians and associate professionals	Female	191	0	130	142	272
	Male	66	0	45	25	70
Clerks	Female	59	0	16	43	59
	Male	49	0	9	27	36
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	27	0	0	0	0
	Male	13	0	1	0	1
Sub Total	Female	431	0	264	267	531
	Male	193	0	82	58	140
Total		624	0	346	325	671

INJURY ON DUTY

Table 27: Injury on duty, 1 April 2021 to 31 March 2022

NATURE OF INJURY ON DUTY	NUMBER
Required basic medical attention only	4
Temporary total disablement	4
Permanent disablement	0
Fatal	0
Total	8



A person wearing a dark blue suit is holding a tablet computer. The tablet screen displays various financial charts, including a line graph with a jagged black line and several pie charts. The background is a light blue wall with a grid pattern. A dark purple gradient bar is overlaid on the top left of the image.

PART E
AUDITED
FINANCIAL
STATEMENTS

INDEX

The reports and statements set out below comprise the annual financial statements :

	Page
Nature of Business and Principal Activities	250
Report of the Chief Executive Officer & President	251
Report of the Auditor General to Parliament on the South African Medical Research Council	252
Annexure-Auditor General's Responsibility for the Audit	255
Accounting Authority's Responsibilities and Approval	256
Audit committee Report	257
Statement of Financial Position	258
Statement of Financial Performance	259
Statement of Changes in Net Assets	260
Cash Flow Statement	261
Statement of Comparison of Budget and Actual Amounts	262
Accounting Policies	263
Notes to the Annual Financial Statements	290
The following supplementary information does not form part of the financial statements	324
Detailed Income statement	324

NATURE OF BUSINESS AND PRINCIPAL ACTIVITIES

The South African Medical Research Council (SAMRC) is a Schedule 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 8.4% to R1 267 979 (R1 169 593). This consists of a decrease in government grants of 0.4% to R740 057 (R743 168) offset by a significant increase in contract income of 23.8% to R527 921 (R426 425).

Operating expenses reflected an increase of 15.8% to R1 306 199 (R1 128 037). This is mainly the result of increased research activities following the relaxation of COVID-19 lockdown restrictions.

Since the onset of the pandemic, the SAMRC has been at the forefront of the COVID-19 response, a total of around R250M was allocated to COVID-19 funding by March 2021, with the Department of Science and Innovation (DSI) contributing R65.7M by March 2021 and allocating an additional R81M in the 2021/22 financial year.

This has resulted in an operating deficit of R20 608 for the year compared to an operating surplus of R57 330 in 2020/21. An increase in investment income of 31% to R25 730 (R19 638) due to an increase in the average balance of investments during the year under review resulted in a net surplus for the year of R6 021 compared to a net surplus of R79 218 in 2020/2021.

The organisation remains financially strong with accumulated reserves of R426 770 (R420 749).

Total assets have increased by 15.1% to R1 061 674 (R922 077) due mainly to an increase in cash and cash equivalents of R94 460 from National Government as well as local and international funders to fund COVID-19 research. Vat receivable has increased by R19 110 while Property, Plant and Equipment has increased by R32 079 due to increased capital expenditure on Infrastructure and Information Technology.

Deferred income has increased by R144 150 to R450 503 due to additional funds received for research activities not yet performed while payables from exchange transactions increased by R2 254 to R10 651 due to contractual liabilities recognised on research contracts.

The SAMRC generated a positive operating cashflow of R146 813 compared to a positive operating cashflow of R284 646 in the prior period due mainly to an increase in payments to suppliers.

Net cash flows from investing activities were negative due mainly to capital expenditure of R48 943 (R49 318).

The net impact of the above is an increase of R94 241 in cash and cash equivalents compared to an increase of R230 576 in the prior year.

SPENDING TRENDS

Operating expenses reflected an increase of 15.8% to R1 306 199 (R1 128 037). This is mainly the result

of increased research activities following the relaxation of COVID-19 lockdown restrictions and includes increases in employee costs of R50 564, laboratory costs of R16 306, travel and subsistence of R12 527, and consulting fees of R10 969. Also included in operating costs is the donation of vaccines to the National Department of Health amounting to R58 982.

Employee related costs have increased by 13.1% to R436 775 (R386 210). Basic salary costs have increased by 7.7% to R350 753 (R325 706).

Leave payments have increased by 6.7% to R10 405 (R9 752) while temporary staff costs have increased by 52.7% to R26 329 (R17 240).

Employee related costs include net bonus provision costs of R5 876 (R5 025). The net asset pertaining to the Pension Fund and Post-Retirement medical aid obligations has reduced by R2 775 compared to an increase of R7 975 in the year.

The net surplus for the year of R 6 021 compared to a final budget deficit of R 60 248. Revenue was R24 211 over budget while expenditure was R42 430 under budget. This was due to lower than anticipated collaborative research expenditure which was R100 247 under budget. This was offset by the donation of vaccines to the National department of Health amounting to R58 983 which was not budgeted for.

REQUESTS FOR ROLL OVER OF FUNDS

The organisation remains financially strong with accumulated reserves of R426 770 (R420 749). 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 revised 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 R779 523 for 2022/23 have been approved by Government. This together with accumulated reserves of R426 770 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

1. I have audited the financial statements of the South African Medical Research Council set out on pages 6 to 69, which comprise the statement of financial position as at 31 March 2022, the 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.
2. 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 2022, and its financial performance and cash flows for the year then ended in accordance with the Standards of Generally Recognised Accounting Practice (GRAP) and the requirements of the Public Finance Management Act 1 of 1999 (PFMA).

Basis for opinion

3. 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.
4. 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.
5. I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my opinion.

Emphasis of matter

6. I draw attention to the matter below. My opinion is not modified in respect of this matter

Material donations made with regards to COVID-19

7. As disclosed in note 27 the public entity donated vaccines to the Department of Health for the vaccine roll-out in response to the COVID-19 pandemic. The value of the donations was R58.98 million.

Other matter

8. I draw attention to the matter below. My opinion is not modified in respect of this matter.

Unaudited supplementary schedules

9. The supplementary information set out on page 324 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 on it.

Responsibilities of the accounting authority for the financial statements

10. 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.
11. In preparing the financial statements, the accounting authority is responsible for assessing the 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 entity or to cease operations, or has no realistic alternative but to do so.

REPORT OF THE AUDITOR GENERAL TO PARLIAMENT ON THE SOUTH AFRICAN MEDICAL RESEARCH COUNCIL (CONTINUED)

Auditor-general's responsibilities for the audit of the financial statements

12. 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.
13. 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

14. 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 the selected programme presented in the annual performance report. I performed procedures to identify material findings but not to gather evidence to express assurance.
15. My procedures address the usefulness and reliability of the reported performance information, which must be based on the 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 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.

16. 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 entity's annual performance report for the year ended 31 March 2022:

PROGRAMMES	PAGES IN THE ANNUAL REPORT
Programme 2: Core Research	36 – 37

17. 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.
18. I did not identify any material findings on the usefulness and reliability of the reported performance information for this programme:
 - Programme 2 – core research

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 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.

REPORT OF THE AUDITOR GENERAL TO PARLIAMENT ON THE SOUTH AFRICAN MEDICAL RESEARCH COUNCIL (CONTINUED)

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.



Cape Town

31 July 2022



AUDITOR-GENERAL
SOUTH AFRICA

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 the selected programme and on the 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 entity's internal control
 - evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the board of directors, which constitutes the accounting authority
 - conclude on the appropriateness of the accounting authority'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 South African Medical Research Council 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 an 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. 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 Accounting Authority 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 ended to March 31, 2023 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, they are 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 pages 252 to 255.

The annual financial statements set out on pages 258 to 324, which have been prepared on the going concern basis, were approved by the Accounting Authority on 28 July 2022 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, 2022.

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 9 meetings were held. The unaudited annual financial statements were reviewed and discussed at a meeting held on 27 May 2022.

NAME OF MEMBER	NUMBER OF MEETINGS ATTENDED
Professor B Shaw	9
Doctor M Madikizela	9
Professor T Mavundla	7
Professor L Skaal	9
Ms. J Williams	9
Mr. J Watson (independent audit committee member)	7

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 the Auditor-General of South Africa's management report and management's response thereto;
- 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.

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 hardware and infrastructural upgrades were implemented. Additional functionality was implemented on the research management platform.



Professor Brandon Shaw Chairperson of the Audit Committee

Date: 30 August 2022

STATEMENT OF FINANCIAL POSITION AS AT MARCH 31, 2022

	NOTE(S)	2022 31 MARCH R	2021 31 MARCH R
Assets			
Current Assets			
Financial assets at fair value	3	9,294,786	8,047,704
Receivables from exchange transactions	4	46,276,937	50,746,101
Receivables from non-exchange transactions	5	3,129,990	3,369,481
VAT receivable	6	19,985,200	874,940
Prepayments	7	12,537,734	11,719,980
Cash and cash equivalents	8	695,596,899	601,037,366
		786,821,546	675,795,572
Non-Current Assets			
Biological assets that form part of an agricultural activity	9	50,000	80,000
Property, plant and equipment	10	253,533,751	221,474,681
Intangible assets	11	15,029,685	15,279,797
Living Resources	12	1,356,897	1,418,590
Investments in controlled entities	13	2	2
Employee benefit asset	17	4,882,000	8,028,000
		274,852,335	246,281,070
Total Assets		1,061,673,881	922,076,642
Liabilities			
Current Liabilities			
Payables from exchange transactions	14	162,849,587	175,449,706
Provisions	15	10,651,420	8,397,476
Deferred Income	16	450,502,887	306,352,589
		624,003,894	490,199,771
Non-Current Liabilities			
Employee benefit obligation	17	6,343,000	6,714,000
Earmarked funds	18	4,556,898	4,414,042
		10,899,898	11,128,042
Total Liabilities		634,903,792	501,327,813
Net Assets		426,770,089	420,748,829
Accumulated surplus	19	426,770,089	420,748,829

STATEMENT OF FINANCIAL PERFORMANCE

	NOTE(S)	2022 31 MARCH R	2021 31 MARCH R
Revenue	20	1,267,978,551	1,169,592,562
Other income	21	17,612,723	15,774,552
Operating expenses	23	(1,306,199,153)	(1,128,036,885)
Operating (deficit) surplus	30	(20,607,879)	57,330,229
Investment income	22	25,729,929	19,638,086
Fair value adjustments	28	1,103,297	2,396,550
Finance costs	25	(204,087)	(146,531)
Surplus for the period		6,021,260	79,218,334

STATEMENT OF CHANGES IN NET ASSETS

	TOTAL NET ASSETS
Balance at April 1, 2020	341,530,495
Changes in net assets	
Surplus for the 12 months ended	79,218,334
Total changes	79,218,334
Balance at April 1, 2021	420,748,829
Changes in net assets	
Surplus for the year	6,021,260
Total changes	6,021,260
Balance at March 31, 2022	426,770,089

CASH FLOW STATEMENT

	NOTE(S)	2022 31 MARCH R	2021 31 MARCH R
Cash flows from operating activities			
Receipts			
Interest income	22	25,584,537	19,535,723
Dividends received	22	145,392	102,363
Cash receipts from grants and other income		1,415,021,124	1,310,698,176
		1,440,751,053	1,330,336,262
Payments			
Suppliers		(1,293,733,832)	(1,045,543,731)
Finance costs		(204,087)	(146,531)
		(1,293,937,919)	(1,045,690,262)
Net cash flows from operating activities	31	146,813,134	284,646,000
Cash flows from investing activities			
Purchase of property, plant and equipment	10	(48,943,298)	(49,318,189)
Proceeds from sale of property, plant and equipment		48,062	15,802
Proceeds from sale of financial assets	3	–	4,134
Purchase of other intangible assets	11	(3,820,064)	(4,809,655)
Living resource additions	12	–	(38,917)
Purchase of biological assets that form part of an agricultural activity	9	–	(114,401)
Proceeds from sale of biological assets that form part of an agricultural activity	9	–	61,867
Net cash flows from investing activities		(52,715,300)	(54,199,359)
Cash flows from financing activities			
Movement in earmarked funds	18	142,856	128,872
Net (decrease) increase in cash and cash equivalents		94,240,690	230,575,513
Cash and cash equivalents at the beginning of the year		601,037,366	370,461,853
Effect of exchange rate movement on cash balances		318,843	–
Cash and cash equivalents at the end of the period	8	695,596,899	601,037,366

An amount of R450,502,887 (March 2021: R306,352,589) 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	ADJUSTMENTS	FINAL BUDGET	ACTUAL AMOUNTS ON COMPARABLE BASIS	DIFFERENCE BETWEEN FINAL BUDGET AND ACTUAL	REFERENCE
Statement of Financial Performance						
Revenue						
Non-tax revenue						
Sale of goods and services	483,073,000	36,952,000	520,025,000	527,921,160	7,896,160	
Other non-tax	47,889,894	(21,389,894)	26,500,000	44,445,949	17,945,949	40
Transfers received	616,633,043	123,423,957	740,057,000	740,057,391	391	
Total revenue	1,147,595,937	138,986,063	1,286,582,000	1,312,424,500	25,842,500	
Expenses						
Compensation of employees	(443,975,000)	(597,000)	(444,572,000)	(436,774,619)	7,797,381	
Goods and services	(682,926,273)	(194,331,727)	(877,258,000)	(845,692,833)	31,565,167	40
Depreciation	(24,000,000)	(1,000,000)	(25,000,000)	(23,935,788)	1,064,212	
Total expenses	(1,150,901,273)	(195,928,727)	(1,346,830,000)	(1,306,403,240)	40,426,760	
Surplus/(deficit)	(3,305,336)	(56,942,664)	(60,248,000)	6,021,260	66,269,260	
Actual Amount on Comparable Basis as Presented in the Budget and Actual Comparative Statement	(3,305,336)	(56,942,664)	(60,248,000)	6,021,260	66,269,260	

The accounting policies on pages 263 to 289 and the notes on pages 290 to 323 form an integral part of the annual financial statements.

ACCOUNTING POLICIES

1. PRESENTATION OF ANNUAL FINANCIAL STATEMENTS

The annual financial statements have been prepared in accordance with the Standards of Generally Recognised Accounting Practice (GRAP), issued by the Accounting Standards Board in accordance with Section 91(1) of the Public Finance Management Act (Act 1 of 1999).

These annual financial statements have been prepared on an accrual basis of accounting and are in accordance with historical cost convention as the basis of measurement, unless specified otherwise. They are presented in South African Rand, which is also the functional currency. The amounts presented in the financial statements are rounded to the nearest Rand.

In the absence of an issued and effective Standard of GRAP, accounting policies for material transactions, events or conditions were developed in accordance with paragraphs 8, 10 and 11 of GRAP 3 as read with Directive 5.

Assets, liabilities, revenues and expenses were not offset, except where offsetting is either required or permitted by a Standard of GRAP.

A summary of the significant accounting policies, which have been consistently applied in the preparation of these annual financial statements, are disclosed below.

These accounting policies are consistent with the previous period.

1.1 GOING CONCERN ASSUMPTION

These annual financial statements have been prepared based on the expectation that the entity will continue to operate as a going concern for at least the next 12 months.

1.2 MATERIALITY

Material omissions or misstatements of items are material if they could, individually or collectively, influence the decisions or assessments of users made on the basis of the financial statements. Materiality depends on the nature or size of the omission or misstatement judged in the surrounding circumstances. The nature or size of the information item, or a combination of both, could be the determining factor.

Assessing whether an omission or misstatement could influence decisions of users, and so be material, requires consideration of the characteristics of those users. The Framework for the Preparation and Presentation of Financial Statements states that users are assumed to have a reasonable knowledge of government, its activities, accounting and a willingness to study the information with reasonable diligence. Therefore, the assessment takes into account how users with such attributes could reasonably be expected to be influenced in making and evaluating decisions.

1.3 SIGNIFICANT JUDGEMENTS AND SOURCES OF ESTIMATION UNCERTAINTY

In preparing the annual financial statements, management is required to make estimates and assumptions that affect the amounts represented in the annual financial statements and related disclosures. Use of available information and the application of judgement is inherent in the formation of estimates. Actual results in the future could differ from these estimates which may be material to the annual financial statements. Significant judgements include:

Trade receivables and loans and receivables

The entity assesses its trade receivables and loans and receivables for impairment at the end of each reporting period. In determining whether an impairment loss should be recorded in surplus or deficit, the entity makes judgements as to whether there is observable data indicating a measurable decrease in the estimated future cash flows from a financial asset.

The impairment for trade receivables and loans and receivables is calculated on a portfolio basis, based on a review of the full trade debtors book, adjusted for national and industry-specific economic conditions and other indicators present at the reporting date that correlate with defaults on the portfolio.

ACCOUNTING POLICIES (CONTINUED)

1.3 SIGNIFICANT JUDGEMENTS AND SOURCES OF ESTIMATION UNCERTAINTY (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 assesses 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.

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 vaccines received from Janssen Vaccines & Prevention BV at no cost for a clinical trial was recognised as an asset controlled by the entity as its distribution achieves the research mandate of the SAMRC. The cost of the study drug can be measured reliably as the study drug for this clinical trial is the commercial vaccine. Control of the vaccines has been transferred to the SAMRC. The value of the vaccines are disclosed as inventory. The fair value accepted by National Treasury and the National Department of Health is the value reported in the financial statements.

The vaccine doses received is recognised as inventory.

Budget judgements

Variance amounts above materiality will be disclosed in note 40.

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.

ACCOUNTING POLICIES (CONTINUED)

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.

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 in 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.

ACCOUNTING POLICIES (CONTINUED)

1.5 PROPERTY, PLANT AND EQUIPMENT (CONTINUED)

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
Laboratory equipment	Straight line	5 – 30 years

The items listed above are grouped in land; buildings; vehicles and containers; furniture and office equipment; computer equipment and laboratory equipment 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).

ACCOUNTING POLICIES (CONTINUED)

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.

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.

ACCOUNTING POLICIES (CONTINUED)

1.8 FINANCIAL INSTRUMENTS (CONTINUED)

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.

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.

ACCOUNTING POLICIES (CONTINUED)

1.8 FINANCIAL INSTRUMENTS (CONTINUED)

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.

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 at fair value
Unit trusts	Held for trading 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.

ACCOUNTING POLICIES (CONTINUED)

1.8 FINANCIAL INSTRUMENTS (CONTINUED)

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 uncollectability 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.

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.

ACCOUNTING POLICIES (CONTINUED)

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.

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.

ACCOUNTING POLICIES (CONTINUED)

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.

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:

- (a) the period of time over which an asset is expected to be used by the entity; or
- (b) the number of production or similar units expected to be obtained from the asset by the entity.

ACCOUNTING POLICIES (CONTINUED)

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:

- (a) the period of time over which an asset is expected to be used by the entity; or
- (b) 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.

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.

ACCOUNTING POLICIES (CONTINUED)

1.13 IMPAIRMENT OF NON-CASH-GENERATING ASSETS (CONTINUED)

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.

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 SAMRC 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.

ACCOUNTING POLICIES (CONTINUED)

1.14 EMPLOYEE BENEFITS (CONTINUED)

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 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; and
- as an expense, unless another Standard requires or permits the inclusion of the contribution in the cost of an asset.

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.

ACCOUNTING POLICIES (CONTINUED)

1.14 EMPLOYEE BENEFITS (CONTINUED)

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 recognises 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.

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.

ACCOUNTING POLICIES (CONTINUED)

1.14 EMPLOYEE BENEFITS (CONTINUED)

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.

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.

ACCOUNTING POLICIES (CONTINUED)

1.14 EMPLOYEE BENEFITS (CONTINUED)

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.

ACCOUNTING POLICIES (CONTINUED)

1.17 REVENUE FROM EXCHANGE TRANSACTIONS (CONTINUED)

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.

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.

ACCOUNTING POLICIES (CONTINUED)

1.17 REVENUE FROM EXCHANGE TRANSACTIONS (CONTINUED)

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.

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.

ACCOUNTING POLICIES (CONTINUED)

1.18 REVENUE FROM NON-EXCHANGE TRANSACTIONS (CONTINUED)

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.

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.

ACCOUNTING POLICIES (CONTINUED)

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.

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. 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 Accounting Authority.

ACCOUNTING POLICIES (CONTINUED)

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 Accounting Authority 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.

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 01/04/2021 to 31/03/2022.

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.

The Statement of comparative and actual information has been included in the annual financial statements as the recommended disclosure when the annual financial statements and the budget are on the same basis of accounting as determined by National Treasury. The Statement of comparison of budget and actual amounts is presented for the revenue and expenses as this is the information submitted to Executive Authority. The Estimates of National Expenditure (ENE) submitted to National Treasury in 2020 does not agree to the figures approved by the Executive Authority and has not been used in the Statement of comparison of budget and actual amounts. The Annual Performance Plan (APP) does not reflect the 2021/2022 approved budget, SAMRC has used the budget approved by the Executive Authority for the Statement of comparison of budget and actual amounts.

Comparative information is not required.

ACCOUNTING POLICIES (CONTINUED)

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 person is 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 the Annual Report.

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.

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.

ACCOUNTING POLICIES (CONTINUED)

1.28 LIVING AND NON-LIVING RESOURCES (CONTINUED)

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 is 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 recognises, 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

Cost model

After recognition as an asset, a group of living resources are carried at its cost less any accumulated depreciation and any accumulated impairment losses.

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:

- (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.

ACCOUNTING POLICIES (CONTINUED)

1.28 LIVING AND NON-LIVING RESOURCES (CONTINUED)

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 living resources 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

	2022 31 MARCH R	2021 31 MARCH R
--	-----------------------	-----------------------

2. NEW STANDARDS AND INTERPRETATIONS

2.1 STANDARDS AND INTERPRETATIONS EFFECTIVE AND ADOPTED IN THE CURRENT YEAR

There were no new standards and interpretations that were effective in the current financial period.

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, 2022 or later periods but are not relevant to its operations:

Guideline	Impact	Notes
Guideline The Application of Materiality to Financial Statements	Undetermined	Unable to reliably estimate the impact
IGRAP 21 The Effect of Past Decisions on Materiality	Undetermined	Not expected to impact results but may result in additional disclosure
GRAP 25 Employee Benefits	Undetermined	Not expected to impact results but may result in additional disclosure
GRAP 104 Financial Instruments (Revised)	Undetermined	Not expected to impact results but may result in additional disclosure

3. FINANCIAL ASSETS AT FAIR VALUE

Designated at fair value		
Class 1 Listed shares	1,033,443	852,840
Sanlam demutualisation shares No. of shares 12715 (2021: 12715); Old Mutual demutualisation shares No. of shares 3682 (2021: 3682); Quilter shares No. of shares 1079 (2021: 1079) and Nedbank Ltd shares No. of shares 150 (2021: 103)		
Class 2 Unit trusts	8,261,343	7,194,864
SIM General Equity Fund R – 17570,87 units (2021: 17271,86 units) and SIM Balanced Fund R – 30769,78 (2021: 30202,72)		
	9,294,786	8,047,704
Current assets		
Designated at fair value	9,294,786	8,047,704

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 2022 (31 March 2021) 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.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

	2022 31 MARCH R	2021 31 MARCH R
3. FINANCIAL ASSETS AT FAIR VALUE (CONTINUED)		
Level 3 applies inputs which are not based on observable market data.		
Level 1		
Class 1 Listed shares	1,033,443	852,840
Class 2 Unit trusts	8,261,343	7,194,864
	9,294,786	8,047,704

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.

47 Nedbank shares were received from the unbundling of Old Mutual's stake in Nedbank.

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 2022

	OPENING BALANCE	GAINS OR LOSSES IN SURPLUS OR DEFICIT	PURCHASES	CLOSING BALANCE
Class 1 Listed shares	852,840	172,601	8,002	1,033,443
Class 2 Unit trusts	7,194,864	930,696	135,783	8,261,343
	8,047,704	1,103,297	143,785	9,294,786

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

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

	2022 31 MARCH R	2021 31 MARCH R
4. RECEIVABLES FROM EXCHANGE TRANSACTIONS		
Trade and research grant debtors	45,485,025	46,199,141
Employee costs in advance	48,787	221,997
Deposits	743,125	1,480,478
South African Revenue Services	–	2,824,561
Staff Loans	–	19,924
	46,276,937	50,746,101

The decrease in receivables from exchange transactions is attributed to lower funder/grantor debtors. There was also a decrease in employee costs in advance and deposits.

The South African Revenue Services (SARS) amount at 31 March 2021 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 was claimable and SAMRC lodged several disputes with SARS to resolve the matter. The vat was claimed in the period under review, we are waiting on the outcome of the interest and penalties dispute.

The staff loans bear interest at 7.50%. There are no staff loans at 31 March 2022

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 the specific debtor.

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, 2022:R 5,507,303 (2021: R441,439) were past due but not impaired. Payments were received in April 2022 for three months past due debtors.

The ageing of amounts past due but not impaired is as follows:

1 month past due	1,233,356	430,517
2 months past due	957	1,062
3 months past due	4,272,990	9,860

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

	2022 31 MARCH R	2021 31 MARCH R
4. RECEIVABLES FROM EXCHANGE TRANSACTIONS (CONTINUED)		
Trade and other receivables impaired		
The amount of the provision was R394,366 as of March 31, 2022 (2021: R128,592). 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	412
2 months but less than 3 months past due	412	412
More than 3 months past due	393,542	127,768
The carrying amount of trade debtors are denominated in the following currencies:		
Rand	31,446,510	41,208,641
US Dollar	13,626,092	4,357,890
Pound sterling	–	141,079
Euro	412,423	491,531
	45,485,025	46,199,141
Reconciliation of provision for impairment of trade and other receivables		
Opening balance	128,592	76,483
Provision for impairment	394,366	128,592
Unused amounts reversed	(128,592)	(76,483)
	394,366	128,592
5. RECEIVABLES FROM NON-EXCHANGE TRANSACTIONS		
Trade debtors	3,129,990	3,369,481

At March 31, 2022 there were non-exchange accrued income and funder/grantor non-exchange debtors (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, 2022, R 2,550,000 (2021: RNil) were past due but not impaired.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

	2022 31 MARCH R	2021 31 MARCH R
5. RECEIVABLES FROM NON-EXCHANGE TRANSACTIONS (CONTINUED)		
1 month past due	2,550,000	–
Receivables from non-exchange transactions impaired		
The amount of the provision was RNil as at March 31, 2022 (2021: RNil), the amounts owing are considered fully recoverable.		
The carrying amount of other receivables from non-exchange transactions are denominated in the following currencies:		
Rand	3,129,990	3,369,481
	3,129,990	3,369,481
6. VAT RECEIVABLE		
VAT	19,985,200	874,940

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; accommodation and advance payments for equipment.

Subsistence and travel advances	317,492	340,857
Prepayments – other	12,220,242	11,379,123
	12,537,734	11,719,980

The increase in prepayments – other is mainly as a result of an increase in additional insurance cover for research studies; annual computer licences; computer software updates and maintenance and computer warranties paid during the period under review.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

	2022 31 MARCH R	2021 31 MARCH R
8. CASH AND CASH EQUIVALENTS		
Cash and cash equivalents consist of:		
Cash on hand	27,964	18,637
Bank balances	695,568,935	601,018,729
	695,596,899	601,037,366
Analysis of bank balances		
ABSA and Standard Bank	5,289,539	3,506,173
ABSA funder accounts	30,252,335	2,225,252
First National Bank	254,583	190,895
Cash at the Reserve Bank	659,772,478	595,096,409
	695,568,935	601,018,729

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 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	4,359,922	4,090,952
Allocation for the year	249,320	268,970
	4,609,242	4,359,922

9. BIOLOGICAL ASSETS THAT FORM PART OF AN AGRICULTURAL ACTIVITY

	MARCH 2022		MARCH 2021	
	COST/ VALUATION	CARRYING VALUE	COST/ VALUATION	CARRYING VALUE
Bearer mature biological assets	50,000	50,000	80,000	80,000

Reconciliation of biological assets that form part of an agricultural activity – March 2022

	OPENING BALANCE	DISPOSALS	TOTAL
Bearer mature biological assets	80,000	(30,000)	50,000

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

2022
31 MARCH
R

2021
31 MARCH
R

9. BIOLOGICAL ASSETS THAT FORM PART OF AN AGRICULTURAL ACTIVITY (CONTINUED)

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

During the 2021 year 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.

Fair value less costs to sell of biological assets during the period	50,000	80,000
----------------------------------------------------------------------	--------	--------

10. PROPERTY, PLANT AND EQUIPMENT

	MARCH 2022			MARCH 2021		
	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	177,073,498	(47,995,377)	129,078,121	151,460,308	(44,056,227)	107,404,081
Vehicles and containers	21,404,176	(13,611,570)	7,792,606	19,368,044	(13,106,313)	6,261,731
Furniture and office equipment	51,226,538	(24,617,575)	26,608,963	44,140,018	(23,063,145)	21,076,873
Computer equipment	86,634,386	(48,599,841)	38,034,545	77,294,991	(42,072,596)	35,222,395
Laboratory equipment	89,036,651	(38,786,316)	50,250,335	81,478,465	(31,738,045)	49,740,420
Total	427,144,430	(173,610,679)	253,533,751	375,511,007	(154,036,326)	221,474,681

Reconciliation of property, plant and equipment – March 2022

	OPENING BALANCE	ADDITIONS	DISPOSALS	DEPRE- CIATION	IMPAIRMENT LOSS	IMPAIRMENT REVERSAL	TOTAL
Land	1,769,181	–	–	–	–	–	1,769,181
Buildings	107,404,081	25,914,923	(186,057)	(4,117,903)	(82,717)	145,794	129,078,121
Vehicles and containers	6,261,731	2,724,919	(149,771)	(898,794)	(145,479)	–	7,792,606
Furniture and office equipment	21,076,873	8,474,881	(157,327)	(2,324,917)	(555,630)	95,083	26,608,963
Computer equipment	35,222,395	13,118,915	(378,430)	(7,926,103)	(2,025,674)	23,442	38,034,545
Laboratory equipment	49,740,420	8,499,695	(137,761)	(5,405,388)	(2,743,014)	296,383	50,250,335
Total	221,474,681	58,733,333	(1,009,346)	(20,673,105)	(5,552,514)	560,702	253,533,751

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

2022
31 MARCH
R

2021
31 MARCH
R

10. PROPERTY, PLANT AND EQUIPMENT (CONTINUED)

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

Other information

	SAMRC INTRAMURAL UNITS
IMPAIRED ASSETS MARCH 2022	
Property, plant and equipment – Laboratory equipment	3,845,971
Property, plant and equipment – Computer equipment	2,098,853
Property, plant and equipment – Furniture and office equipment	733,464
Property, plant and equipment – Buildings	89,689
Property, plant and equipment – Vehicles	371,664
	7,139,641

	SAMRC INTRAMURAL UNITS
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

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	14,965,309	7,819,814
-----------	------------	-----------

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

2022
31 MARCH
R

2021
31 MARCH
R

10. PROPERTY, PLANT AND EQUIPMENT (CONTINUED)

Reconciliation of Work-in-Progress March 2022

	INCLUDED WITHIN INFRASTRUCTURE	TOTAL
Opening balance	7,819,814	7,819,814
Additions/capital expenditure	7,145,495	7,145,495
	14,965,309	14,965,309

Reconciliation of Work-in-Progress March 2021

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

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	11,955,177	10,732,923
-------------------------------------------	------------	------------

11. INTANGIBLE ASSETS

	MARCH 2022			MARCH 2021		
	COST/ VALUATION	ACCUMULATED AMORTISATION AND IMPAIRMENT	CARRYING VALUE	COST/ VALUATION	ACCUMULATED AMORTISATION AND IMPAIRMENT	CARRYING VALUE
Computer software	22,379,601	(7,349,916)	15,029,685	29,776,970	(14,497,173)	15,279,797

Reconciliation of intangible assets – March 2022

	OPENING BALANCE	ADDITIONS	DISPOSALS	AMORTISATION	TOTAL
Computer software	15,279,797	3,820,064	(882,173)	(3,188,003)	15,029,685

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

There are no restrictions on the title of intangible assets.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

12. LIVING RESOURCES

	MARCH 2022			MARCH 2021		
	COST/ VALUATION	ACCUMU- LATED IMPAIRMENT LOSSES	CARRYING VALUE	COST/ VALUATION	ACCUMU- LATED IMPAIRMENT LOSSES	CARRYING VALUE
Rhesus monkeys	1,005,705	(365,785)	639,920	1,100,539	(399,726)	700,813
Vervet monkeys	1,315,596	(598,619)	716,977	1,334,390	(616,613)	717,777
Total	2,321,301	(964,404)	1,356,897	2,434,929	(1,016,339)	1,418,590

Reconciliation of living resources – March 2022

	OPENING BALANCES	ADDITIONS	DISPOSALS	DEPRECIATION	TOTAL
Rhesus monkeys	700,813	76,267	(103,226)	(33,934)	639,920
Vervet monkeys	717,777	96,318	(56,372)	(40,746)	716,977
	1,418,590	172,585	(159,598)	(74,680)	1,356,897

Reconciliation of living resources – March 2021

	OPENING	ADDITIONS	DISPOSALS BALANCE	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
	–	38,917	(73,449)	1,898,826	(445,704)	1,418,590

SAMRC holds rhesus monkeys and vervet monkeys for research purposes. During 2020/2021 year 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 2020/2021 year. 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	% HOLDING	CARRYING AMOUNT	CARRYING AMOUNT
		MARCH 2022	MARCH 2021	MARCH 2022	MARCH 2021
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)

	2022 31 MARCH R	2021 31 MARCH R
14. PAYABLES FROM EXCHANGE TRANSACTIONS		
Trade payables	107,123,293	71,182,624
Leave accrual	22,089,407	26,404,111
Accruals	33,506,709	77,775,460
Interest due to funders	130,178	87,511
	162,849,587	175,449,706
The decrease 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:		
Rand	105,322,150	68,756,549
US Dollar	1,682,402	2,426,075
Pound Sterling	19,789	–
Euro	98,952	–
	107,123,293	71,182,624
Leave accrual		
Balance at the beginning of the year	26,404,111	25,646,681
Leave payouts	(9,454,826)	(9,259,369)
Movement recognised in surplus or deficit	5,140,122	10,016,799
	22,089,407	26,404,111

15. PROVISIONS

Reconciliation of provisions – March 2022

	OPENING BALANCE	ADDITIONS	UTILISED DURING THE YEAR	REVERSED DURING THE YEAR	TOTAL
Provision for legal fees	929,019	–	–	–	929,019
Provision for collaborative research	327,500	958,000	(100,000)	(227,500)	958,000
Provision for performance bonus	5,048,064	5,897,840	(5,026,212)	(21,852)	5,897,840
Other provisions	2,092,893	2,082,369	(630,304)	(678,397)	2,866,561
	8,397,476	8,938,209	(5,756,516)	(927,749)	10,651,420

Reconciliation of provisions – March 2021

	OPENING BALANCE	ADDITIONS	UTILISED DURING THE YEAR	REVERSED DURING THE YEAR	TOTAL
Provision for legal fees	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

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

	2022 31 MARCH R	2021 31 MARCH R
15. PROVISIONS (CONTINUED)		
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. One grant was paid and two grants were cancelled. Self initiated grants were provided for as the institution has not submitted its audit report for the previous year or the institution did not respond to the request to submit the invoice (March 2021: 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 legal fees		
The legal fees provision relates to the estimated legal costs that is due to NEHAWU regarding a previous bonus dispute.		
Other provisions		
The other provisions that relate to research units that closed during the rationalisation process were reversed during the year under review. The other provisions at year-end relate to repayment of unspent grant funds to National Institute of Health; the Department of Labour assessment for the claim for occupational injury on duty assessment for 2022 (COIDA) and retention payable on building works. The estimate for the Department of Labour assessment for the claim for occupational injury on duty assessment for 2021 was paid during the period under review and a portion of the retention held for building works was paid. (March 2021: 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 2021 (COIDA) and repayment of grant/contract funds the National Institute of Health and retention payable on building works).		
Provision for performance bonus		
The performance bonus cycle was changed after discussions and agreement with the union. The Accounting Authority approved the change in bonus cycle which will result in payments being made after the financial year end. The amount reflected is the 2021/2022 provision for performance bonuses.		
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 Philanthrope; Michelle & Susan Dell Foundation; Global Fund; MRC UK; EDCTP and Bill & Melinda Gates Foundation.		
Deferred income	450,502,887	306,352,589
Summary of deferred income		
Research grants received in advance	450,188,137	306,165,694
Other funds received in advance	314,750	186,895
	450,502,887	306,352,589
17. EMPLOYEE BENEFIT OBLIGATIONS		
Post retirement medical aid obligation	6,343,000	6,714,000
Pension fund – Defined benefit (asset)	(4,882,000)	(8,028,000)
Net (asset)	1,461,000	(1,314,000)

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

17 EMPLOYEE BENEFIT OBLIGATIONS (CONTINUED)

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 are valued annually in compliance with GRAP 25.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

	2022 31 MARCH R	2021 31 MARCH R
17 EMPLOYEE BENEFIT OBLIGATIONS (CONTINUED)		
Post retirement medical aid plan		
The amounts recognised in the statement of financial position are as follows:		
Carrying value		
Present value of the defined benefit obligation-wholly unfunded	(1,163,000)	(1,168,000)
Present value of the defined benefit obligation-partly or wholly funded	(19,219,000)	(20,320,000)
Fair value of plan assets	14,039,000	14,774,000
Net liability	(6,343,000)	(6,714,000)
Changes in the present value of the defined benefit obligation are as follows:		
Opening balance	21,488,000	22,522,000
Interest costs	1,964,000	2,416,000
Benefits paid	(2,337,000)	(2,515,000)
Actuarial (gains)	(733,000)	(935,000)
Closing balance	20,382,000	21,488,000
Net expense recognised in the statement of financial performance		
Interest cost	1,964,000	2,416,000
Expected return on plan assets	(1,319,000)	(1,516,000)
Contributions by employer	(584,000)	–
Recognised actuarial (gains)	(432,000)	(2,150,000)
Total included in employee related cost	(371,000)	(1,250,000)
Calculation of actuarial gains and losses		
Actuarial (gains) – Obligation	(733,000)	(935,000)
Actuarial losses (gains) – Plan assets	301,000	(1,215,000)
	(432,000)	(2,150,000)
Changes in the fair value of plan assets are as follows:		
Opening balance	14,774,000	14,558,000
Actuarial (losses) gains	(301,000)	1,215,000
Expected return on plan assets	1,319,000	1,516,000
Contributions by employer	584,000	–
Benefits paid	(2,337,000)	(2,515,000)
Closing balance	14,039,000	14,774,000

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.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

	2022 31 MARCH R	2021 31 MARCH R
17 EMPLOYEE BENEFIT OBLIGATIONS (CONTINUED)		
Key assumptions used		
Assumptions used at the reporting date:		
Discount rates used	9.80%	9.70%
General increases to medical aid subsidy	7.50%	7.40%
Expected rate of return on assets	9.80%	9.70%
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 valuation is based on the Projected Unit Credit valuation method.

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.

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 2022		
Assumptions as above	20,382	
Discount rate – increase by 1% p.a.	19,042	(7)
Discount rate – decreases by 1% p.a.	21,912	8
Medical inflation – increases by 1% p.a.	21,823	7
Medical inflation – decreases by 1% p.a.	19,100	(6)
March 2021		
Assumptions as above	21,488	
Discount rate – increase 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)

Amounts for the current period and previous four years are as follows:

	2022	2021	2020	2019	2018
Defined benefit obligation – partially or wholly funded	19,219,000	20,320,000	21,314,000	24,753,000	26,667,000
Defined benefit obligation wholly unfunded	1,163,000	1,168,000	1,208,000	1,231,000	1,326,000
Plan assets	14,039,000	14,774,000	14,558,000	17,512,000	17,581,000
(Deficit) in the plan	(6,343,000)	(6,714,000)	(7,964,000)	(8,472,000)	(10,412,000)

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

	2022 31 MARCH R	2021 31 MARCH R
17 EMPLOYEE BENEFIT OBLIGATIONS (CONTINUED)		
Pension funds		
Defined benefit obligation – Wholly funded		
Present value of obligation	(82,304,000)	(85,789,000)
Fair value of plan assets	87,186,000	93,817,000
Net Asset	4,882,000	8,028,000
Changes in the present value of the defined benefit obligation are as follows:		
Opening defined benefit obligation	85,789,000	84,536,000
Benefits paid	(17,566,000)	(10,522,000)
Service cost	2,626,000	2,503,000
Interest cost	8,982,000	9,781,000
Actuarial losses (gains)	1,913,000	(1,978,000)
Member contributions	1,019,000	1,133,000
Re-insurance premiums	(312,000)	(211,000)
Expenses	(147,000)	(163,000)
Re-insurance proceeds	–	710,000
Closed defined benefit obligation closing balance	82,304,000	85,789,000
Changes in the fair value of plan assets are as follows:		
Opening fair value of plan assets after limitation	93,817,000	85,839,000
Contributions – Employer	2,926,000	3,255,000
Contributions – Plan participants	1,019,000	1,133,000
Benefits paid	(17,566,000)	(10,522,000)
Expected return on plan assets	9,719,000	9,787,000
Actuarial (losses) gains	(2,270,000)	3,989,000
Re-insurance premiums	(312,000)	(211,000)
Expenses	(147,000)	(163,000)
Re-insurance proceeds	–	710,000
Closing fair value of plan assets	87,186,000	93,817,000
Calculation of actuarial gains and losses		
Actuarial losses (gains) – Obligation	1,913,000	(1,978,000)
Actuarial losses (gains) – Plan assets	2,270,000	(3,989,000)
	4,183,000	(5,967,000)
Staff costs includes the following in respect of the defined benefit pension plan:		
Current service cost	2,626,000	2,503,000
Interest cost	8,982,000	9,781,000
Expected return on plan assets	(9,719,000)	(9,787,000)
Net actuarial gains (losses) recognised in current year	4,183,000	(5,967,000)
Contributions paid	(2,926,000)	(3,255,000)
	3,146,000	(6,725,000)
The principal actuarial assumptions used in determining the pension plan per annum were:		
General inflation rate	6.00%	6.50%
Discount rate	10.80%	11.20%
Interest income on assets	10.80%	11.20%
Salary inflation – percentage plus merit increase	7.00%	7.50%

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

2022
31 MARCH
R

2021
31 MARCH
R

17. EMPLOYEE BENEFIT OBLIGATIONS (CONTINUED)

The entity expects to contribute R2,194,000 to its defined benefit plan in the following financial year.

	2022	2021	2020	2019	2018
Defined benefit obligation	82,304,000	85,789,000	84,536,000	98,927,000	111,435,000
Plan assets	87,186,000	93,817,000	85,839,000	98,604,000	99,663,000
Surplus (deficit) in the plan	4,882,000	8,028,000	1,303,000	(323,000)	(11,772,000)

18. EARMARKED FUNDS

Botha trust	151,636	151,636
Bruhns trust	1,368,422	1,332,296
Melville Douglas trust	13,325	13,325
Q&S Abdool Karim trust	2,912,073	2,805,343
FJ Kleynhans trust	111,442	111,442
	4,556,898	4,414,042

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	426,770,089	420,748,829
---------------------	-------------	-------------

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.

20. REVENUE

Income from contracts, grants and services rendered (exchange)	318,124,133	331,477,753
Rental income	6,751,129	5,342,179
Bad debt recovered	500	–
Other income	10,332,851	10,432,373
Interest received – investment	25,584,537	19,535,723
Dividends received	145,392	102,363
Fair value adjustments	1,103,297	2,396,550
Gain on foreign exchange	528,243	–
Government grants & subsidies	740,057,391	743,167,826
Income from contracts, and grants (non-exchange)	209,797,027	94,946,983
	1,312,424,500	1,207,401,750

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

	2022 31 MARCH R	2021 31 MARCH R
20. REVENUE (CONTINUED)		
The amount included in revenue arising from exchanges of goods or services are as follows:		
Income from contracts, grants and services rendered (exchange)	318,124,133	331,477,753
Rental income	6,751,129	5,342,179
Bad debt recovered	500	–
Gain on foreign exchange	528,243	–
Fair value adjustments	1,103,297	2,396,550
Other income	10,332,851	10,432,373
Interest received – investment	25,584,537	19,535,723
Dividends received	145,392	102,363
	362,570,082	369,286,941
The amount included in revenue arising from non-exchange transactions is as follows:		
Baseline grant	740,057,391	743,167,826
Income from contracts and grants (non-exchange)	209,797,027	94,946,983
	949,854,418	838,114,809
Included in the March 2021 baseline grant is the amount of R130,434,800 received for the Sisonke research project.		
Revenue		
Income from contract, grants and services rendered – exchange	318,124,133	331,477,753
Income from contract, grants and services rendered – non-exchange	209,797,027	94,946,983
Government grants	740,057,391	743,167,826
	1,267,978,551	1,169,592,562
21. OTHER INCOME		
Rental income	6,751,129	5,342,179
Debt impairment recovered	500	–
Gain on foreign exchange	528,243	–
Other income	10,332,851	10,432,373
	17,612,723	15,774,552

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

	2022 31 MARCH R	2021 31 MARCH R
22. INVESTMENT INCOME		
Dividend revenue		
Listed financial assets – Local	145,392	102,363
Interest revenue		
Unit trusts	20,908	28,154
Bank	129,246	140,123
Interest charged on trade and other receivables	4,440	9,268
Corporation for public deposits	25,429,943	19,358,178
	25,584,537	19,535,723
	25,729,929	19,638,086
23. OPERATING EXPENSES		
Depreciation and amortisation	23,935,788	25,518,222
Debt impairment	276,834	62,432
Employee costs	436,774,619	386,209,756
Loss on disposals	2,003,056	2,840,501
Impairment loss on property, plant and equipment	4,991,812	1,065,450
General expenses	818,464,794	688,672,942
Lease rentals on operating lease	5,026,214	6,408,947
Loss on foreign exchange	–	5,186,925
Repairs and maintenance	14,726,036	12,071,710
	1,306,199,153	1,128,036,885
24 EMPLOYEE RELATED COSTS		
Basic	350,753,455	325,705,922
Bonus	5,875,988	5,025,409
UIF	1,516,642	1,204,404
Leave payments	10,405,163	9,752,002
Adjustments from the application of GRAP 25	2,775,000	(7,975,000)
Other salary related costs	7,905,503	6,725,367
Defined pension benefit plan expense – current service cost	3,075,199	3,383,775
Overtime payments	1,530,039	1,356,817
Temporary staff	26,329,282	17,239,524
Defined pension contribution plan expense	26,024,504	23,791,536
Post retirement medical aid contribution	583,844	–
	436,774,619	386,209,756

The bonus amount includes the 2021/2022 provision for performance bonus of R5,897,840 and an unutilised amount of R21,852 relating to the 2020/2021 provision 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.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

	2022 31 MARCH R	2021 31 MARCH R
25. FINANCE COSTS		
Other interest paid	204,087	146,531

SAMRC had to refund interest due to its funders for monies received in advance (March 2022: R21,146; March 2021: R15,632), to the earmarked funds (March 2022: R 164,377; March 2021: R128,872). 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 2022: R1,938; March 2021: R2,027). During the period under review an incorrect amount was submitted in the monthly return, the refund was received in the same month the return was submitted. The matter was brought to the attention of SARS and the vat return was resubmitted. Interest amounting to R16,626 were levied on the overstated amount. Interest was earned by SAMRC on the amount refunded by SARS.

26. DEBT IMPAIRMENT

Debt impairment	41,045	16,851
Provision for debt impairment	235,789	45,581
	276,834	62,432

The provision for debt impairment reflected above include the current periods provision for bad debt of R394,366 (including VAT of R44,227 and reversal of the previous year's provision (March 2021 provision for bad debts of R128,592 (including VAT of R14,242)).

The debt written off relates to amounts owed by rental tenant Express Clothing and an ex staff member K Ngoepe.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

	2022 31 MARCH R	2021 31 MARCH R
27. GENERAL EXPENSES		
Advertising	1,494,924	1,958,278
Auditors remuneration	3,544,976	1,561,883
Bank charges	444,659	406,287
Cleaning consumables	2,936,838	2,925,080
Computer expenses	29,344,057	28,179,544
Consulting and professional fees	18,820,322	7,851,435
Donations	58,982,792	-
Insurance	5,272,902	2,442,448
Personal Protective Equipment	500,356	3,645,676
Magazines, books and periodicals	6,990,594	6,739,977
Postage and courier	4,132,540	7,924,026
Printing, stationery and publication costs	9,436,502	7,683,060
Security	10,796,306	9,206,231
Subscriptions and membership fees	669,489	632,759
Telephone and fax	6,682,178	1,727,872
Training	2,286,061	2,198,977
Travel, subsistence and conference attendance	24,786,493	12,259,248
Utilities	17,013,397	13,712,484
Laboratory operating cost	55,662,659	39,357,287
Skills Development levies	3,088,496	1,832,902
Collaborative research	547,781,333	532,719,210
Other expenses	7,796,920	3,708,278
	818,464,794	688,672,942
Travel, subsistence and conference attendance		
Local travel	1,904,533	335,325
Overseas travel	786,325	284,092
Accommodation – local and overseas	2,960,133	677,347
Subsistence and travel expenditure	6,355,963	3,612,933
Conference expenditure	5,482,204	2,537,491
Participant incentives	7,297,335	4,812,060
	24,786,493	12,259,248
Other expenses		
Canteen costs	898,567	336,871
Administrative costs	1,227,721	-
Personnel teas	1,261,265	427,835
Hire of premises and equipment	3,152,703	2,178,089
Licences	86,128	67,283
Staff recruitment costs	443,852	150,042
Employee wellness costs	376,718	316,612
Pot and plant rental	104,202	171,999
Uniforms	245,764	59,547
	7,796,920	3,708,278

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

	2022 31 MARCH R	2021 31 MARCH R
27. GENERAL EXPENSES (CONTINUED)		
The increase in travel and subsistence costs; collaborative research costs and laboratory operating costs is attributed to the resumption of activities to pre COVID levels.		
During the year under review the vaccine donation received from Janssen Vaccine & Prevention B.V. was donated to the Department of Health for the vaccine roll-out.		
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 2021/2022 amount is R132,309,197 (2020/2021 amount is R180,083,151).		
The increase in other expenses is partly attributed to the resumption of activities to pre COVID levels and additional administrative expenses.		
28. FAIR VALUE ADJUSTMENTS		
Other financial assets		
Other financial assets at fair value	1,103,297	2,396,550
29. AUDITORS' REMUNERATION		
Fees	3,544,976	1,561,883
30. OPERATING (DEFICIT) SURPLUS		
Operating (deficit) surplus for the year is stated after accounting for the following:		
Operating lease charges		
Premises		
Contractual amounts	5,026,214	6,408,947
Loss on disposal of assets	2,003,056	2,840,501
Impairment loss/reversal of impairments on intangible assets and property, plant and equipment	4,991,812	1,065,450
(Gain) Loss on exchange differences	(528,243)	5,186,925
Amortisation on intangible assets	3,188,003	3,603,222
Depreciation on property, plant and equipment	20,673,105	21,469,296
Depreciation on living resources	74,680	445,704
Employee costs	436,774,619	386,209,756
General expenses	818,464,794	688,672,942

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

	2022 31 MARCH R	2021 31 MARCH R
31. CASH GENERATED FROM (USED IN) OPERATIONS		
Surplus		
Adjustments for:	6,021,260	79,218,334
Depreciation and amortisation	23,935,788	25,518,222
Loss on sale of assets	2,003,056	2,840,501
(Gain) Loss on foreign exchange	(528,243)	5,186,925
Fair value adjustments	(1,103,297)	(2,396,550)
Impairment loss/ reversal of impairments on intangible assets and property, plant and equipment	4,991,812	1,065,450
Debt impairment	276,834	62,432
Movements in retirement benefit assets and liabilities	2,775,000	(7,975,000)
Movements in provisions	2,253,944	(3,901,715)
Capitalisation of financial assets	(143,785)	(96,543)
Non cash adjustment on biological assets	30,000	9,533
Non cash adjustment on living resources Changes in working capital:	(172,585)	–
Receivables from exchange transactions	4,401,730	7,361,759
Receivables from non-exchange transactions	239,491	(1,088,428)
Prepayments	(817,754)	(3,992,993)
Payables from exchange transactions	(22,390,155)	65,032,706
VAT	(19,110,260)	9,814,950
Deferred income	144,150,298	107,986,417
	146,813,134	284,646,000

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

32. FINANCIAL INSTRUMENTS DISCLOSURE

Categories of financial instruments

March 2022

Financial assets

	AT FAIR VALUE	AT AMORTISED COST	AT COST	TOTAL
Trade and other receivables from exchange transactions	–	46,276,937	–	46,276,937
Receivables from non-exchange transactions	–	3,129,990	–	3,129,990
Cash and cash equivalents	–	695,596,899	–	695,596,899
Investment in controlled entities	–	–	2	2
Financial assets	9,294,786	–	–	9,294,786
	9,294,786	745,003,826	2	754,298,614

Financial liabilities

	AT AMORTISED COST	TOTAL
Trade and other payables from exchange transactions	162,849,587	162,849,587

March 2021

Financial assets

	AT FAIR VALUE	AT AMORTISED COST	AT COST	TOTAL
Trade and other 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
Trade and other payables from exchange transactions	175,449,706	175,449,706

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

	2022 31 MARCH R	2021 31 MARCH R
33. COMMITMENTS		
Authorised commitments		
Already contracted for but not provided for		
– Property, plant and equipment	6,760,240	5,131,168
– Goods and services	9,203,573	10,665,018
– Research grants	529,500	2,152,585
– Operating leases	4,990,701	895,898
– Sisonke grants	–	117,075,039
	21,484,014	135,919,708
Already contracted for but not provided for	21,484,014	135,919,708
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 and funds internally generated. Sisonke 1 grants were finalised during the year under review.		
Operating leases – as lessee (expense)		
Minimum lease payments due		
– within one year	1,795,261	895,898
– in second to fifth year inclusive	3,195,440	–
	4,990,701	895,898
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		
– within one year	5,120,785	3,746,148
– in second to fifth year inclusive	4,231,750	5,471,249
– later than five years	2,164,287	3,092,495
	11,516,822	12,309,892

Certain of the entity's buildings generate rental income. Lease agreements have terms from 12 months to 9 years and eight months.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

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	<p>Prof G Gray (President appointed 1 April 2014).</p> <p>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.</p> <p>Mr. N Buick (Chief Financial Officer appointed 16 July 2012). The official is a director of the controlled entity Medres (Pty) Ltd and a board member of National Health Laboratory Services (NHLS) from October 2021.</p> <p>Prof L Zuhlke (Vice President appointed 1 February 2022)</p> <p>Dr. R Gordon (Ex officio Executive Management Committee member from 1 April 2013- 31 December 2020).</p> <p>Prof. R Jewkes (Executive scientist research strategy in the office of the president from 1 June 2017 to 31 January 2022).</p> <p>Prof. MJ Mphahlele (Vice President appointed 1 October 2014 and resigned 30 June 2021).</p> <p>Mr. B Spies (Executive Director Human Capacity Development appointed 1 August 2016 till October 2020).</p> <p>Dr. M Mdhuli (Chief research operations officer appointed 1 September 2017).</p> <p>Mr. M Popo (Legal Counsel)</p> <p>Dr M Mulder (Executive director appointed on 1 June 2021). The official is a director of the controlled entities Medres (Pty) Ltd and Jirehsa Medical (Pty) Ltd. The official is a non-executive director of SAMRC supplier The Biologicals and Vaccine Institute of Southern Africa.</p> <p>Ms VN Bam (Executive director appointed on 1 September 2021)</p>
Board members	<p>Prof. M Sathekge,(Chairperson, term ended 31 October 2019)</p> <p>Prof. J Mahlangu (Chairperson from 1 November 2019)</p> <p>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</p> <p>Prof. Q Abdool Karim,term ended 31 October 2019 Prof. L Skaal</p> <p>Prof. T Sodi</p> <p>Prof E Seekoe, term started 1 November 2019 Prof. M Cotton, term ended 31 October 2019 Prof, S Velaphi</p> <p>Prof. T Mavundla</p> <p>Prof. L Zungu Prof. B Shaw</p> <p>Dr. R Chikwamba, term ended 31 October 2019 Dr. M Madikizela, Term started 1 November 2019</p> <p>Prof. E Mukwevho, term started 1 November 2019</p> <p>Dr. M Madikizela, Term started 1 November 2019</p> <p>Prof. E Mukwevho, term started 1 November 2019</p>

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

	2022 31 MARCH R	2021 31 MARCH R
34. RELATED PARTIES (CONTINUED)		
Related party balances		
Loan accounts – Owing (to) by related parties		
Medres (Pty) Ltd (The loan is not considered to be recoverable and has been written off.)	234,630	219,585
Amounts included in Trade receivable (Trade Payable) regarding related parties		
National Health Laboratory Services (NHLS)	120,823	115,608
Deferred Income (grants received in advance)		
Dept. of Health (DOH)	7,762,883	1,926,607
Revenue – grants received and services rendered to related parties		
Dept. of Health (DOH, revenue from non-exchange)	740,057,391	743,167,826
Dept. of Health (DOH) Contracts, revenue from exchange	6,650,435	558,261
National Health Laboratory Services	–	1,589,492
	746,707,826	745,315,579
Expenditure such as donations, grants awarded, extra-mural unit grants and collaborative research grants incurred with related party suppliers		
Dept. of Health (DOH)	58,968,000	–
National Health Laboratory Services	28,000	819,969
South African Health Products Regulatory Authority (SAHPRA)	286,700	102,940
	59,282,700	922,909
Executive authority information		
Minister: Dr. J Phaahla		
No subsistence, travel and other related re-imbusement costs have been paid.		
Director General: Dr S Buthelezi		
No subsistence, travel and other related re-imbusement costs have been paid.		
Executive Directors leave balances		
Ms V Bam	85,993	–
Mr. N Buick	242,276	241,689
Prof. G Gray	273,394	380,490
Mr. M Popo	77,364	39,404
Prof. M Mphahlele	–	247,718
Prof. R Jewkes	–	232,665
Dr A Mathee	118,158	–
Dr. M Mdhluli	275,506	277,893
Dr M Mulder	140,045	–
Prof. L Zuhlke	15,751	–
	1,228,487	1,419,859

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

35. MEMBER'S EMOLUMENTS

Executive

March 2022

	EMOLUMENTS	VEHICLE & PARKING & CELLPHONE ALLOWANCE	ACCOMMODATION AND ENTERTAINMENT	LOCAL AIR TRAVEL AND PARKING	TOTAL
Professor J Mahlangu	140,763	12,084	2,330	20,661	175,838
Professor R Carolissen	81,189	3,684	–	–	84,873
Professor C Dandara	81,189	3,684	–	–	84,873
Advocate D Khosa	99,522	3,684	–	–	103,206
Professor M Madikizela	107,379	3,684	–	–	111,063
Professor T Mavundla	81,189	3,684	2,331	22,821	110,025
Professor E Mukwevho	86,427	3,684	5,305	19,224	114,640
Professor W Rae	70,713	3,684	–	–	74,397
Professor E Seekoe	86,139	3,684	3,783	19,469	113,075
Professor B Shaw	155,211	3,684	–	–	158,895
Professor L Skaal	109,998	3,684	2,330	17,821	133,833
Professor T Sodi	194,064	3,684	2,487	21,892	222,127
Doctor T Tucker	115,236	3,684	–	–	118,920
Professor S Velaphi	68,094	3,684	–	–	71,778
Ms J Williams	99,522	3,684	183	–	103,389
Professor L Zungu	96,903	3,684	–	–	100,587
	1,673,538	67,344	18,749	121,888	1,881,519

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

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

35. MEMBER'S EMOLUMENTS (CONTINUED)

EXECUTIVE DIRECTORS EMOLUMENTS

March 2022

	PACKAGE TOTAL INCL. LEAVE PAYOUT; ALLOWANCES AND LUMP SUM	BONUS	SUBSISTENCE & TRAVEL	COMPANY CONTRI- BUTIONS	TOTAL
G Gray (President)	3,023,823	58,352	17,830	234,620	3,334,625
N Buick (CFO)	2,757,478	58,352	600	289,461	3,105,891
** V Bam (Executive Director)	958,142	–	–	127,515	1,085,657
**** R Jewkes (Executive Scientist Research Strategy)	1,702,985	58,352	–	193,855	1,955,192
***** A Mathee (Executive Director)	83,887	–	4,110	10,926	98,923
*** MJ Mphahlele (Vice President)	572,132	58,352	–	46,825	677,309
M Mdhuli (CROO)	2,080,876	58,352	453	224,622	2,364,303
* M Mulder (Executive Director)	1,518,328	19,739	300	186,074	1,724,441
M Popo (Executive Director)	1,806,716	58,352	–	141,897	2,006,965
**** L Zuhlke (Vice President)	415,001	–	2,463	44,368	461,832
	14,919,368	369,851	25,756	1,500,163	16,815,138

* M Mulder appointed on 1 June 2021

** V Bam appointed on 1 September 2021

*** M Mphahlele resigned on 30 June 2021

**** R Jewkes term ended on 31 January 2022t

***** L Zuhlke appointed on 1 February 2022t

***** A Mathee appointed on 1 March 2022

March 2021

	PACKAGE TOTAL INCL. LEAVE PAYOUT; ALLOWANCES AND LUMP SUM	BONUS	COMPANY CONTRI- BUTIONS	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)

	2022 31 MARCH R	2021 31 MARCH R
36. FRUITLESS AND WASTEFUL EXPENDITURE		
Fruitless and wasteful expenditure – opening balance	1,107	4
Fruitless and wasteful expenditure – current year	19,816	2,027
Recovered and approved for write-off	(19,076)	(924)
	1,847	1,107

Expenditure relates to interest on the late renewal of motor vehicle licences; traffic fines and the Participant re-imbusement accounts being overdrawn.

Interest was charged on Participant cashless accounts with ABSA Bank, a portion of this interest was reversed during the period under review.

The Accounting Authority approved that interest on late payment of motor vehicle licences are not recoverable from staff in light of the prevailing circumstances at the licensing departments (March 2022: R1791; March 2021: R1,072).

Interest charged due to negligence on the part of the staff members and traffic fines paid is recovered from the employees. (During 2020/2021 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 R11 charged by Telkom is being disputed as the account was paid by the due date, the amount was subsequently reversed. An amount of R28 reflected in the previous year was reversed by Telkom.

Expenditure relates to interest charged by SARS on the resubmission of a vat return. During the period under review an incorrect amount was submitted in the monthly return, the refund was received in the same month the return was submitted. The matter was brought to the attention of SARS and the vat return was resubmitted. Interest amounting to R16,626 were levied on the overstated amount. Interest was earned by SAMRC on the amount refunded by SARS. The Accounting Authority approved the write-off of interest as not recoverable from staff.

37. IRREGULAR EXPENDITURE

During the year under review no irregular expenditure was incurred (2021: RNil).

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 Accounting Authority 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.

39. PUBLIC FINANCE MANAGEMENT ACT (PFMA)

Section 55 (2)

No material losses through criminal conduct were incurred during the period ended 31 March 2022. 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.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

40. BUDGET DIFFERENCES

Material differences between budget and actual amounts

The final budget differed from the approved budget as a result of allocations within the budget. In the approved budget the transfers received excludes VAT (Transfers received R709,128,000 less VAT of R92,494,957). The final budget includes the increase in transfers received of R123,423,957. The final budget was increased to take into account additional contract and grant revenue.

Other non-tax revenue which includes other income; rental income; interest received and dividends received were higher than anticipated.

Included in goods and services were infra-structural, communication and statutory costs and travel, subsistence and vehicle fleet costs; printing, stationery and publication costs; donations made and information technology costs were higher than anticipated for the period under review due to increased activity resulting from relaxing of COVID lockdowns.

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 29% of SAMRC's Trade Debtors (R14,038,515) are exposed to currency compared to 9% last year (R4,990,500).

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.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

2022	2021
31 MARCH	31 MARCH
R	R

41. RISK MANAGEMENT (CONTINUED)

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	7.75 %	48,615,015	–	–	–	–
Cash in current banking institutions	-%	695,596,899	–	–	–	–
Trade and other payables – extended credit terms	7.75 %	162,849,587	–	–	–	–

Foreign exchange risk

The entity does not hedge foreign exchange fluctuations.

Exchange rates on 31 March 2022 (31 March 2021) used for conversion of foreign items were:

USD – ABSA buying	14.6038	14.7665
USD – ABSA selling	14.6140	14.7870
GBP – ABSA buying		20.3532
GBP – ABSA selling	19.2127	
EURO – ABSA buying	16.1646	17.3178
EURO – ABSA selling	16.1871	

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.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

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 less than R300,000 (2021: less than R150,000).

In addition a staff member was seconded from Wits Health Consortium to the SAMRC to provide secretarial support to the President for a portion of the year under review. The estimated annual value of this service is less than R200,000 (2021: R386,316).

43. IN-KIND DONATIONS AND ASSISTANCE

During the year under review the SAMRC received a donation of COVID-19 rapid antibody test kits from the AOM Group. The test kits were used by SAMRC research units and donated to NHLS and universities. The value of the test kits donated to the SAMRC is estimated to be less than R8,000,000.

44. CONTINGENCIES

Contingent liabilities

There is a high court claim by an ex-employee who passed-on shortly after instituting the claim that the SAMRC disputes. The Board has agreed to a mediation process to resolve the dispute and the SAMRC and the heir of the estate have agreed to appoint a mediator. However, before a mediator could be appointed the heirs directly approached the SAMRC to negotiate a settlement. Negotiations have started and were not finalized during the reporting period. Should the SAMRC and the parties agree to settle, payment in terms of the settlement agreement will have to be made. However, at this stage, it is not known whether a settlement can be reached as this depends on the parties reaching a consensus, something which has eluded the parties so far.

The SAMRC will be applying to National Treasury to retain the accumulated surplus funds of R426,770,089. 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 has been claimed in the period under review. SAMRC anticipates to recover the interest and penalties amounting R 664,876 from SARS.

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.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

(CONTINUED)

	2022 31 MARCH R	2021 31 MARCH R
46. STATUTORY RECEIVABLES		
The entity had the following statutory receivables where the Framework for the Preparation and Presentation of Financial Statements have been applied:		
Vat receivable	19,985,200	874,940
South African Revenue Services	–	2,824,561
Output vat disallowed September 2016 vat period (refer note 4)		
	19,985,200	3,699,501

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 in March 2021 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 has been recovered from SARS in the period under review. Several disputes have been lodged with SARS in order to resolve this matter. We are waiting on the outcome of the waiver of the interest and penalties.

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	4,991,812	1,065,450
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.		

DETAILED INCOME STATEMENT

	NOTE(S)	2022 31 MARCH R	2021 31 MARCH R
Revenue			
Revenue from exchange transactions			
Income from contracts, grants and services rendered		318,124,133	331,477,753
Rental income		6,751,129	5,342,179
Bad debts recovered		500	–
Other income		10,332,851	10,432,373
Interest received – investment	22	25,584,537	19,535,723
Gain on foreign exchange		528,243	–
Fair value adjustments	28	1,103,297	2,396,550
Dividends received	22	145,392	102,363
Total revenue from exchange transactions		362,570,082	369,286,941
Revenue from non-exchange transactions			
Transfer revenue			
Baseline grant		740,057,391	743,167,826
Income from contracts and grants (non-exchange)		209,797,027	94,946,983
Total revenue from non-exchange transactions		949,854,418	838,114,809
Total revenue	20	1,312,424,500	1,207,401,750
Expenditure			
Employee related costs	24	(436,774,619)	(386,209,756)
Depreciation and amortisation		(23,935,788)	(25,518,222)
Impairment loss/Reversal of impairments	48	(4,991,812)	(1,065,450)
Finance costs	25	(204,087)	(146,531)
Lease rentals on operating lease		(5,026,214)	(6,408,947)
Debt Impairment	26	(276,834)	(62,432)
Repairs and maintenance		(14,726,036)	(12,071,710)
Loss on disposal of assets and liabilities		(2,003,056)	(2,840,501)
Loss on foreign exchange		–	(5,186,925)
General Expenses	27	(818,464,794)	(688,672,942)
Total expenditure		(1,306,403,240)	(1,128,183,416)
Surplus for the period		6,021,260	79,218,334

The supplementary information presented does not form part of the financial statements and is unaudited.



PO BOX 19070
7505 TYGERBERG, SOUTH AFRICA
ENQUIRIES: TEL: +27 21 938 0911
EMAIL: INFO@MRC.AC.ZA
www.samrc.ac.za