Annual Report 2018|2019

PUSHING THE BOUNDARIES
BETWEEN THE KNOWN AND THE UNKNOWN

saMRC advancinglife

CELEBRATING 50 YEARS

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.

IN **BRIEF**

The SAMRC was established in 1969 to conduct and fund health research and medical innovation. We focus on the top ten causes of death and disability associated risk factors. We acquire the most accurate health information and provide policy makers with the tools to make informed healthcare policy decisions to enhance the quality of life for the people in South Africa.

OUR **VISION**

Building a healthy nation through research and innovation

OUR **MISSION**

To improve the nation's health and quality of life by conducting and funding relevant and responsive health research, development, innovation and research translation

OUR **VALUES**

Pioneering:
We push the boundaries between the known and the unknown to further our knowledge of human existence.

Collaborating:
We celebrate the capacity of collective minds towards a common goal.

Excellence:
Distinction is in everything we do.

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
WEBSITE ADDRESS:	www.samrc.ac.za
EXTERNAL AUDITORS:	Auditor General of South Africa
BANKERS:	ABSA
COMPANY/ BOARD SECRETARY	Mr Nizar Davids nizar.davids@mrc.ac.za
INFORMATION OFFICER:	Dr Alfred Thutloa alfred.thutloa@mrc.ac.za

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A NOTE FROM THE BOARD CHAIRPERSON

PROFESSOR MIKE SATHEKGE

50 years and beyond advancing life!

Milestones are significant moments that offer an opportunity to reflect on the past, present and future. The South African Medical Research Council (SAMRC), entrusted to conduct and fund health research and innovation to improve the health of people in South Africa, has reached a true milestone – its 50th year Anniversary.

In the 2018/19 reporting period, the SAMRC can be commended for navigating a tight fiscal environment while responding to South Africa's evolving quadruple burden of disease through research priorities. These priorities are aligned to the National Development Plan, while supporting the facilitation and implementation of the Millennium Development Goals – positioning the SAMRC in a global context.

The Board is pleased that at a national level, the SAMRC among other public-private partnerships, programmes and collaborations, has been part of the Presidential Health Summit, held in October 2018. The Summit looked to "strengthen the South African health system towards an integrated and unified health system." Through such endeavours, the SAMRC continues to contribute towards improving the health ecosystem and enhancing the health and life of people in South Africa.

Another milestone is that the SAMRC is developing its 2020/21 – 2024/25 Strategic Plan, which will outline the future direction of the organisation. As a pioneering organisation, continuously pushing boundaries for research excellence, the current Strategic Plan (2015/16 – 2019/20) saw the SAMRC becoming a world class research organisation, strengthening its relationships with the National Department of Health and health sector partners. We are truly excited as the Board for the SAMRC in its 50th year and undertakings for a new Strategic Plan.

On behalf of the Board I also wish to congratulate Professor Quarraisha Abdool Karim, the Board Vice Chairperson, who is the recipient of the esteemed international Lifetime Achievement Award by the Institute for Human Virology. The Board congratulates Professor Abdool Karim for her important contributions made in the fight against HIV/AIDS.

The Board also wishes to acknowledge Professor Glenda Gray, the President and CEO of the SAMRC who has led the organisation through four clean audits, strengthened research capacity through the Mid-Career Scientist Programme, National Health Scholars Programme and other SAMRC capacity development programmes in support of Masters, Doctoral and Postdoctoral scholars.

Professor Gray has also accepted a second term as President & CEO of the SAMRC effective 1 April 2019. Professor Gray has, over the past five years, led the organisation to great strengths in scientific achievements, strong organisational governance and capacity development to build the next generation of scientists in Africa.

The SAMRC is mandated by the National Department of Health to conduct and fund health research, and I would like to thank the honourable Minister Dr Aaron Motsoaledi for supporting our efforts to improve the health of people in South Africa.

I also wish to thank the members of the Board for their contributions and a special word of acknowledgement to all South Africans who continue to bestow this responsibility on the people at the SAMRC.

Let us continue looking forth beyond 50 years to advance life.

Sincerely
PROFESSOR MIKE SATHEKGE
Board Chairperson

FOREWORD BY OUR PRESIDENT & CEO

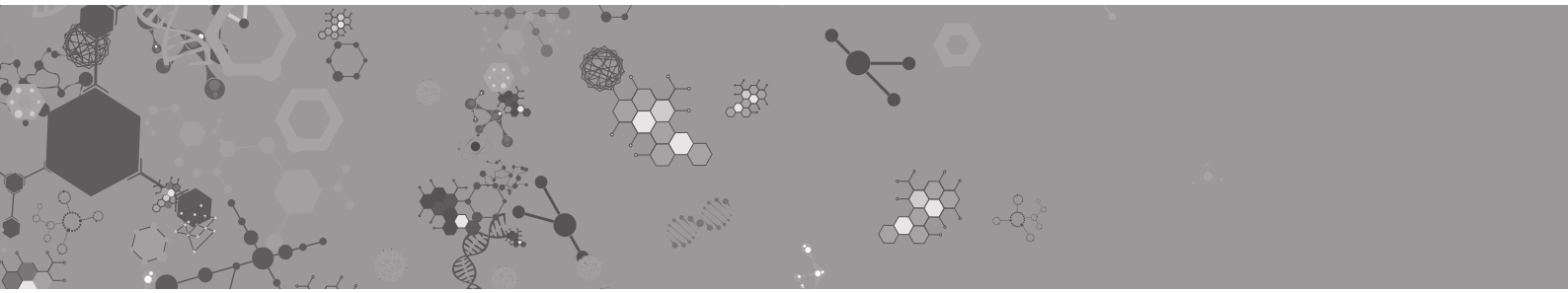
PROFESSOR GLENDA E GRAY

A vibrant organisation making impact in Africa and beyond

The South African Medical Research Council (SAMRC) strategy is underpinned by our mission and mandate to conduct and fund health research, innovation, development and research translation. As champions of research for health, we have ensured that our research is relevant, responsive and has impact.

As stewards for the health research agenda in South Africa, we have maintained the SAMRC's administrative budget below the 20% target. Following National Treasury's tighter regulations on government spending, the SAMRC Executive ensured that the organisation complies and that budget is prioritised for health research.

Apart from successfully operating within a legislative and compliance framework, we have achieved impact across a range of research outputs and policy guidelines, such as the WHO Roadmap for Zoonotic Tuberculosis, a multisectoral guide for addressing zoonotic tuberculosis in people and bovine tuberculosis in animals. Beyond our borders, our research also influenced policy in the Democratic Republic of Congo on faith engagement, gender norms and violence against women and girls in conflict-affected communities further, showing our impact across the continent.



To be able to show this level of impact, we have focused on transformation in research, specifically looking at funding previously under resourced universities, and addressing racial diversity in funding and gender parity. Through the competitive Self-Initiated Research (SIR) grants programme, more than 40% of funding was allocated to African people in 2018/19, with the bulk of awards in these priority areas: addressing the diabetes burden, innovative approaches to improve health, and understanding mental health. In addition, 54% of SIR grants were allocated to females and 46% to males in the reporting period.

In 2019, we look forward to the launch of Africa's first whole genome sequencing institute, established by the SAMRC as both a resource to South Africa and the African continent. We are also proud to have established seven new extramural units led by recognised and emerging science leaders.

Our partnership with the Beijing Genomics Institute sets the course to develop personalised medicine for African populations, who offer the greatest genetic diversity and opportunities to address Africa's disease burden.

I am pleased that in this 50th year of the SAMRC's existence, we can show our impact in health research and how we influence policy and practice. It is an exciting time in the SAMRC's calendar, as we remain committed to advancing science for health. The SAMRC is taking the lead in capacity development and building a pipe line of young scientists that are as diverse as the country we live in.

As a key institution in the health sector, we were privileged to be part of the Presidential Health Summit in November 2018, which brought together key stakeholders from a wide range of constituencies, to agentively participate and propose solutions for addressing the challenges facing the South African health system.

We are committed to partnering with international research organisations to strengthen medical science in South Africa. Our partnering with the U.S. NIH on a joint programme for biomedical research for a second round of funding, strengthens scientific collaborations between South African and U.S. scientists. SAMRC in partnership with the Department of Science and Technology collaborated with the United Kingdom Government and signed a Newton Fund Memorandum of Understanding in Parliament, Cape Town. The four main objectives were to 1) develop human capital, 2) engage with the private sector, 3) engage with other African countries and 4) build South African and United Kingdom research partnerships. SAMRC was responsible for establishing a health programme under this Newton Fund Partnership and to engage with the UK-based Newton Fund research partners.

In our 50th year there is a lot to celebrate: seven SAMRC scientists were rated by the National Research Foundation (NRF) in 2018. NRF rating has become a valuable tool for benchmarking the quality of our researchers against the best in the world.

More achievements to celebrate include Professor Salim Abdool Karim's esteemed international Lifetime Achievement Award by the Institute for Human Virology. Professor Karim is the Director of the SAMRC/CAPRISA/UKZN HIV-TB Pathogenesis and Treatment Research Unit. Professor Kelly Chibale was also named Fortune magazine's 50 World's Greatest Leaders for 2018, Professor Chibale is Director of the SAMRC/UCT Drug Discovery and Development Research Unit; and Professor Keertan Dheda, Director of the SAMRC/UCT CAMRA, received a Health Excellence Award at the event hosted by the Clinix Health Group and the South African Clinician Scientists Society in 2018.

The SAMRC has shown to be a truly vibrant and responsive research organisation making impact in Africa and beyond. None of which would be possible, without the Executive, our Scientists and our entire SAMRC staff. I would like to express my gratitude to all of you and also the people of South Africa who make the work we do possible.

Sincerely
PROFESSOR GLENDA E GRAY
President & CEO: South African Medical Research Council

ACHIEVEMENTS AND HIGHLIGHTS

SOUTH AFRICAN MEDICAL RESEARCH COUNCIL: A VIBRANT ORGANISATION MAKING IMPACT IN AFRICA AND BEYOND

The South African Medical Research Council (SAMRC) is responding to South Africa's evolving quadruple burden of disease. Unlike most countries, the country's population and health system, are burdened by four major diseases namely: maternal, newborn and child health, HIV/AIDS and TB, non-communicable diseases, and violence and injury.

As a responsive health research council, the SAMRC focuses on conducting and funding health research, innovation, capacity development and research translation. Aligned to the national context, the SAMRC supports the National Department of Health, National Development Plan (NDP) Outcome 2, for "a long and healthy life for all South Africans." Through our 11 intramural research units and 19 extramural research units, several collaborating centres and strategic projects and initiatives, including recipients of Self-Initiated Research Grants, based at several universities across the country, the SAMRC researchers are conducting and enabling research to respond to the burden of diseases, including disease outbreaks.

MATERNAL, NEW-BORN AND CHILD HEALTH

A major focus of the SAMRC is placed on responding to the top ten causes of death, disability and associated risk factors in South Africa and the sub-continent. In the area of maternal, newborn and child health, some of the major innovations we have invested in include an innovative wave Doppler device, known as UmbiFlow, used to measure the Resistance Index (RI) in the umbilical cord, to evaluate the blood-flow through the placenta to the unborn child. Should the RI be abnormal, this device will show that the pregnancy is at high risk and warrant urgent attention.

In a study conducted in Mamelodi and Tshwane the use of Doppler - UmbiFlow - reduced the perinatal mortality rate by over 50%. The results of the study culminated in a further nine research sites across South Africa. At scale, UmbiFlow can be used by midwives and GPS in mobile, rural and resource-constrained primary health care settings.

The SAMRC's research translation initiatives also assisted the South African government to introduce the new Basic Antenatal Care Plus programme that has led to an approximately 50% increase in detection of pregnant women with hypertension. This research was led by the Maternal and Infant Health Care Strategies Research Unit, led by Professor Robert Pattinson at the University of Pretoria.

Through the Strategic Health Innovation Partnerships Grand Challenges programme, we have partnered with the Bill and Melinda Gates Foundation's (BMGF) Grand Challenges in Canada, Brazil, India, Grand Challenges Africa and the US, to focus on maternal and child health - especially - the last trimester and the first 28 days after childbirth. We collaborated with the BMGF in our mutual interest of addressing the abnormally high mortality rate of babies and mothers in Africa who typically die through HIV, hemorrhage, infection and hypertension.

HIV/AIDS, TB AND OTHER INFECTIOUS DISEASES

The SAMRC is at the forefront of cutting edge research and innovation to tackle HIV: 1) Several leading diagnostic laboratories in Africa and developed countries are using Exatype, a SAMRC funded innovation that provides rapid, accurate HIV drug resistance analysis for routine HIV drug resistance testing : 2) We have demonstrated the effectiveness of the national programme to Prevent Mother-to-Child-Transmission of HIV at six-weeks and 18 months post-delivery; and 3) over the past decade, we have funded ground breaking research into several aspects of HIV and AIDS such as Evaluating a new drug regimen for patients with drug-resistant TB – a randomised controlled trial (NExT)

- Understanding the SHARED ROOTS of Neuropsychiatric Disorders and Modifiable Risk Factors for Cardiovascular Disease
- Investigation of the Management of Pericarditis Trial II: A Randomized Comparison of Complete Percutaneous Pericardiocentesis plus Interferon Gamma Testing Versus Empiric Treatment Without Pericardiocentesis in Suspected Tuberculous Pericarditis (IMPI-2 Trial)
- Effectiveness of an alcohol-focused intervention in improving adherence to antiretroviral therapy (ART) and HIV treatment outcomes (AlcoholHIV)
- 2nd South African Comparative Risk Assessment (SA CRA 2)
- The impact of rape in women on HIV acquisition and retention linkages to care: a longitudinal study (RICE)

In 2016, we partnered with the P5, a public private partnership including the National Institutes of Health (NIH) and the Bill and Melinda Gates Foundation (BMGF) and the HIV Vaccine Trials Network (HVTN) and a number of researchers to launch the world's first HIV vaccine efficacy study in seven years at 15 research sites across the countryIn addition, in 2017, the SAMRC in partnership with Johnson and Johnson, the NIH, the BMGF and the HVTN embarked on a new proof-of-concept study called Imbokodo, which is evaluated an HIV vaccine regimen in 2,600 HIV-negative women aged 18 to 35 years in sub-Saharan Africa. Our HIV Prevention Research Unit is also participating in a number of vaccine trials supported by international partners. The trials are conducted among six different communities in the greater Durban area.

The SAMRC is committed to collaborating with international partners, such as the NIH to increase research capacity in South Africa. The SAMRC has invested an additional R45 million per annum to a joint programme with the U.S.-NIH for biomedical research. The South African Minister of Health Dr Motsoaledi approved the second phase of this Collaborative Programme, given the success of the initial programme.

Through the collaboration of the SAMRC/UCT Drug Discovery and Development Research Unit, we host Africa's first integrated drug discovery platform whose H3D Centre is focused on translating basic science knowledge into potential innovative new medicines to treat malaria, tuberculosis and combating antimicrobial resistance caused by bacterial that has become resistant to conventional antibiotics.

In addition, our studies (e.g.Influenza vaccination of pregnant women effectiveness study)[1] on influenza vaccination in pregnant women informed decision making to recommend for the prioritisation of pregnant women with seasonal influenza vaccine.

Apart from several research outcomes that have influenced policy and guidelines, the SAMRC's research informed the WHO Roadmap for Zoonotic Tuberculosis, a multisectoral guide for addressing zoonotic tuberculosis in people and bovine tuberculosis in animals.

NON-COMMUNICABLE DISEASES

Non-communicable diseases (NCDs) – mainly cancer, cardiovascular disease, chronic respiratory diseases, and diabetes remain the most common cause of death and disability globally, accounting for 70% of all deaths. Our researchers demonstrated that reducing salt content of bread can save 6400 lives from stroke and ZAR300 million in health care costs. This contributed to regulations on salt content of designated foods. The study "Intersectoral Case study: Successful Sodium Regulation in SA" was completed in 2012. The SAMRC hosts SAPRIN, part of the Department of Science and Technology South African Research Infrastructure Roadmap, and the largest network of Health and Demographic Surveillance centres that monitor the health and socio-economic wellbeing of the South African population with the aim of improving their health.

Understanding environmental risks to population health is also an integral research stream at the SAMRC, the Environment and Health Intramural Research Unit, investigates serious health risks such as climate change and rising heat, lead poisoning, air pollution, environmental exposures from living near mining land, and other health hazards specific to urban environments.

VIOLENCE AND INJURY

The SAMRC is implementing a £25 million global research programme on the prevention of gender-based violence. The What Works to Prevent Violence Against Women and Girls Programme (2013 to 2019), is working on developing evidence-based prevention interventions and evaluating them in 13 countries in Africa, the Middle East and Asia. The Programme influenced policy in the baseline research in Ituri Province, Democratic Republic of Congo, on faith engagement, gender norms and violence against women and girls in conflict-affected communities; further, showing our impact across the African continent.

CROSS CUTTING PROGRAMMES

Other exciting cross-cutting innovations and programmes include the African Genomics Centre – a first for the African continent –already under construction at the SAMRC head office in Cape Town. These state of the art labs launched through a partnership with Beijing Genomics Institute, a leader in genetic science and DNA sequencing, sets the course to develop personalised medicine for African populations who offer the greatest genetic diversity and opportunities to address Africa's disease burden.

SAMRC hosts Cochrane South Africa which is coordinating PACTR and SANCTR clinical trial registries. Along with Cochrane authors in the African region, Cochrane South Africa established the Cochrane African Network to increase and promote the use of evidence-informed healthcare in the African region.

Now in our 50th year, the SAMRC is a truly vibrant organisation making impact in Africa and beyond.

[1] Nunes MC, Cutland CL, Jones S, Downs S, Weinberg A, Ortiz JR, Neuzil KM, Simoes EAF, Klugman KP, Madhi SA https://www.ncbi.nlm.nih.gov/pubmed/28575286

HIGHLIGHTS IN BRIEF

SCIENCE AND INNOVATION

- Demonstrated excellence in scientific output through increase in NRF-rated scientists, from 9 to 30 between 2014 and 2017, including two NRF A rated scientists in leadership positions within the SAMRC.
- R45 million per annum invested to a joint Biomedical Research Programme with the U.S. National Institutes of Health. Phase one of the study has resulted in a phylogenetic study that is characterizing the cycle of HIV transmission between adolescent girls/young women and older young men. This study has informed policy and was featured in the UNAIDS 2016 report: Get on the Fast-Track: The life-cycle approach to HIV. The study also contributed to the South African National Strategic Plan on HIV, TB and Sexually Transmitted Infections (STIs) through its progress on Goal 1, which focuses on breaking the cycle of transmission.
- The SAMRC/UCT Drug Discovery and Development Research Unit is Africa's first integrated drug discovery platform H3D Centre that translates basic science knowledge into potential innovative new medicines for the treatment of malaria, tuberculosis and to combat antimicrobial resistance.
- Funded studies in the production & characterisation of CAP256-VRC 26 Monoclonal in plants, which promises a broadly neutralising monoclonocal antibodies against HIV-1 in reducing viral load in HIV infected individuals demonstrated by several research groups.
- User-friendly portable continuous wave Doppler – UmbiFlow, reduced perinatal mortality rate in the study group by over 50% in Mamelodi, Tshwane. Results have culminated in a further nine research sites across South Africa.
- New gene discovered - CDH2 - that predisposes young adults and athletes to sudden cardiac arrest through a global collaboration.
- Several leading diagnostic laboratories in Africa and developed countries are using Exatype, a SAMRC funded innovation and platform that provides rapid, accurate HIV drug resistance analysis at affordable rates for routine HIV drug resistance testing.
- First in Africa Genomics Centre to create a pathway for scientific excellence already under construction at the South African Medical Research Council head office in Cape Town. These state of the art laboratories launched through a partnership with Beijing Genomics Institute, a leader in genetic science and DNA sequencing, sets the course to develop personalised medicine for African populations who offer the greatest genetic diversity and opportunities to address Africa's disease burden.
- Undertaking the first National TB Prevalence Survey which

entered its second leg as fieldworkers visited households around the Eastern Cape to invite eligible community members to participate in a study that aims to determine the prevalence of TB disease in South Africa.

- Scientists from the South African Medical Research Council's Biomedical Research and Innovation Platform (BRIP), in collaboration with Stellenbosch University have revealed a number of cases in which alternative treatments have altered the effects of prescription medication, either by diluting it, making it more potent or causing dangerous side effects.
- Collaborated with the Agricultural Research Council (ARC) and local wellness product development company Afriplex to produce Afriplex GRTTM, an ingredient rich in aspalathin, one of the key actives in rooibos. The Afriplex GRTTM will be formulated into products aimed at managing conditions linked to cholesterol, blood glucose and insulin resistance.
- Established the Centre for the Study of Antimicrobial Resistance (CAMRA) at the University of Cape Town in response to the emerging antimicrobial resistance (AMR) crisis.
- Invested R4 million in the development and delivery of new and affordable antibiotic treatments for drug resistant neonatal sepsis and sexually transmitted infections. Conducted by the Global Antibiotic Research and Development Partnership (GARDP), the clinical research studies aim to have a treatment for drug resistant gonorrhoea registered in a number of countries, including South Africa, and to develop two new treatments for neonatal sepsis.
- South Africa Demographic and Health Survey: The national household survey collected a wide range of health data from over 11 000 households around the country during 2016. The survey includes essential demographic indicators; information about maternal, new-born and child health; HIV and sexual behaviour; management of non-communicable diseases as well as the status of violence against women in the country. The survey was conducted by a partnership between the National Department of Health (NDoH), Statistics South Africa (Stats SA) and the South African Medical Research Council (SAMRC) with technical support from ICF through the DHS Program of the United States Agency for International Development (USAID). The full report was finalised during 2018 and released together with a summary report of Key Findings. The data have been anonymised and made available for further analysis by academics and other institutions.
- Rapid Mortality Surveillance: Preparations for the 2017 Rapid Mortality Surveillance are underway. Data up until 2017 has been processed and compared with the Stats SA data up until 2016. This has helped to identify provinces where there appears to be problems with the transfer of death registration forms, which has been shared with government through quarterly meetings between Stats SA, NDoH, DHA and the SAMRC to improve civil registration and vital statistics. Work has been undertaken to explore the behaviour of the mortality rates in the age range 5-19 years. Estimates of the premature mortality from NCDs have also been included in the 2017 report.

CROSS CUTTING PROGRAMMES & PARTNERSHIPS

- Influenced the WHO Roadmap for Zoonotic Tuberculosis, which offers a multisectoral guide for addressing zoonotic tuberculosis in people and bovine tuberculosis in animals.
- Launched SAPRIN, a research node of the Department of Science and Technology South African Research Infrastructure Roadmap, offering the largest network of Health and Demographic Surveillance centres to monitor the health and socio-economic wellbeing of the people in South Africa.
- Under the SAPRIN umbrella, the DIMAMO Population Health Research Centre became one of the founding SAPRIN nodes. It operates as a Health and Demographic Surveillance, and it was developed to expand and strengthen the previous Dikgale Health and Demographic Surveillance System that has been running at the University of Limpopo since 1995.
- Partnership with the HIV Vaccine Trials Network to conduct HIV vaccine trials across sub-Saharan Africa.
- Key partner in the roll out of BioEconomy SA, a national initiative by the Department of Science and Technology to advance biotechnology and spur economic growth through four key sectors: industry & environment, health, agriculture, and indigenous knowledge systems.
- Procurement of a national licence for the Cochrane Library, making South Africa the first country on the continent to procure one that has allowed 60 000 people to access evidence based health care findings at the tip of their fingertips.
- Under the umbrella of the What Works to Prevent Violence Against Women and Girls Programme (2013 to 2019), policy influenced in the baseline research in Ituri Province, Democratic Republic of Congo - on faith engagement, gender norms and violence against women and girls in conflict-affected communities - showing our impact across Africa.
- A project by the South African Medical Research Council (SAMRC) has compiled evidence on the type of violence, risk factors and potential solutions to reduce violence against women and girls with disabilities. The collaborative project between the SAMRC, the Botswana Council for the Disabled (BCD) and the Institute of Development Management is titled ALIGHT Botswana and is the first project that has enabled women with disabilities to co-lead research concerning them.
- A systematic review by the South African Medical Research Council has shown that school-based condom availability programmes can help to prevent unintended pregnancies, HIV and sexually transmitted infections

among adolescents in the United States, indicating how these interventions can impact in South Africa as well.

- The results of a large, international systematic review published in the journal PLOS Medicine show that tuberculosis treatment is successful in children with multidrug-resistant tuberculosis (MDR-TB). The study was used to inform the World Health Organization guidelines on treatment of MDR-TB in children.
- With the National Research Foundation, the SAMRC co-funded the Research Chair in Biostatistics. Professor Ding Chen took the helm as Research Chair in Biostatistics at the University of Pretoria on 8 August 2018.
- The South African Medical Research Council is part of the Brazil, Russia, India, China and South Africa (BRICS) TB Research Network to accelerate research and innovation through collaboration across the BRICS countries.
- New agreement with the Foundation for Innovative New Diagnostics (FIND) to support diagnostic innovation for childhood tuberculosis (TB) in South Africa. The project is part of a global effort to improve childhood TB diagnosis, guide paediatric treatment, and reduce suffering, disease transmission and deaths from TB in babies and children.

CAPACITY DEVELOPMENT

- SAMRC Received a R10 million boost to assist young South African scientists who are studying towards their PhDs in clinical and health research for the National Health Scholars Programme from the Public Health Enhancement Fund.
- National Research Foundation (NRF) recognised SAMRC Mid-Career scientist beneficiary. Social and Behavioural Scientist, Professor Kebogile Mokwena was awarded the sponsorship of the South African Research Chairs Initiative (SARChI) for Substance Abuse and Population Mental Health by the NRF. This significant grant will enable her to conduct further research into the various public health and clinical aspects of the South African street drug, Nyaope.
- We have established seven new extramural units with women heading these units.

Building research capacity through science communication and capacity development programmes

AWARDS AND ACKNOWLEDGEMENTS

Professor Mike Sathekge, Board Chairperson of the South African Medical Research Council received a Research Excellence Award for an individual who has published extensively, and has taught, mentored and supervised undergraduate and postgraduate students in a manner that has inspired them to become researchers. Co-hosted by the Clinix Health Group and the South African Clinician Scientists Society, the award aimed to celebrate scientists, researchers, practitioners and administrators in the medical sector for their leadership, innovation and service to the country.

Professor Keertan Dheda, Director of the SAMRC/UCT CAMRA, also received a Health Excellence Award at the event hosted by the Clinix Health Group and the South African Clinician Scientists Society on 24 November 2018 in Johannesburg.

Professor Glenda E. Gray, an NRF A rated scientist, accepted a second term as President and CEO of the South African Medical Research Council effective 1 April 2019. Professor Gray has, over the past five years, led the organisation to great strengths in scientific achievements, strong organisational governance and capacity development to build the next generation of scientists in Africa.

TRANSFORMING STRATEGIC COLLABORATIONS, PUBLIC PRIVATE PARTNERSHIPS & AGREEMENTS

SAMRC COLLABORATIONS

SAMRC AND THE FOUNDATION FOR INNOVATIVE NEW DIAGNOSTICS

- SAMRC and the Foundation for Innovative New Diagnostics (FIND), announced a new agreement to support diagnostic innovation for childhood tuberculosis (TB) in South Africa.
- This is part of a global effort to improve childhood TB diagnosis, guide paediatric treatment, and reduce suffering, disease transmission and deaths from TB in babies and children.
- The collaboration aims to identify opportunities for joint research, development, and manufacturing.
- Introduction and scaling up of innovative health technologies and programmes that would result in the reduction of mortality and morbidity due to AMR and TB.
- Working together to stem the tide of AMR.

SAMRC AND BEIJING GENOMICS INSTITUTE

- Memorandum of Understanding signed between the parties in April 2017.
- Agreement signed between the parties on the 16 February 2018 to establish the first in Africa Genomics Centre.
- Beijing Genomics Institute (BGI) is at the forefront of the global scientific progress on genetic science and DNA sequencing. SAMRC identified an opportunity, through this partnership, to build the country's capacity for whole human genome sequencing.
- Knowledge of the DNA sequence is critical for understanding disease. By establishing the sequence of an individual's genetic material, it is possible to identify mutations which are specific to a particular person. These genetic tools will help us to understand South Africa's diverse gene pool and convey insights on treatments for non-communicable diseases.
- The SAMRC Genomics Centre, emanating from this collaboration, is currently under construction at the SAMRC head office in Cape Town, South Africa.

The first high throughput genomics sequencing facility launched

SAMRC, NOVARTIS, AND DEPARTMENT OF SCIENCE AND TECHNOLOGY

- Memorandum of Understanding (MoU) with Norvatis and the South African Department of Science and Technology (DST) signed in May 2017.
- MoU had formalised Novartis' ongoing investment in developing South African research capabilities, scientific cooperation and collaboration for capacity building and innovation.
- Novartis expects this ongoing collaboration with the DST and SAMRC to build capability and potentially lead to breakthrough innovations stemming from South Africa.
- The SAMRC and Novartis collaboration is revealing significant latent potential for scientific discovery in South Africa.

COCHRANE AFRICAN NETWORK (CAN)

- A network with a vision to increase the use of best evidence to inform healthcare decision making in sub-Saharan Africa.
- This is a global and independent network of researchers, professionals, patients, carers and people interested in health.
- Systematic reviews are produced to summarise and offer the best available evidence for different audiences.
- This evidence is informed by guideline developers and health care decisions makers worldwide.

GLOBAL ALLIANCE FOR CHRONIC DISEASE

- Global Alliance for Chronic Disease (GACD) is a group of the world's largest public research funding agencies.
- A spin-off of the Grand Challenges Partnership announced in 2007, GACD funds, develops and facilitates innovative research programmes between low- and middle-income and vulnerable populations in high-income countries in the fight against chronic illnesses.
- GACD focuses on diabetes, heart disease, mental illnesses, cancer, and lung diseases.
- Professor Glenda Gray, President & CEO of the SAMRC Chaired the GACD from 2016-2018.

HEALTHY LIFE TRAJECTORIES INITIATIVE: BUKHALI TRIAL

- Healthy Life Trajectories Initiative (HeLTI) focuses on maternal, newborn, child and adolescent health.
- SAMRC is the South African partner that funds South Africa's participation in the initiative.
- The Bukhali project will establish a pre-conception to early childhood cohort in South Africa and test interventions along the continuum of care from pre-conception to pregnancy, infancy and childhood: reduce the prevalence of obesity & adiposity.
- Assess metabolic markers indicative of future risk of cardiovascular disease, diabetes and other NCDs.
- Use harmonized protocols, methods and interventions with similar cohorts and teams in Canada, China and India.
- The objective is to develop and implement new interventions that will drive policy changes and improvement in the prevention and management of non-communicable diseases in South Africa.

GLOBAL ANTIMICROBIAL RESISTANCE RESEARCH AND DEVELOPMENT (GARD) PARTNERSHIP

- Identify key medical priorities for Antimicrobial resistance (AMR).
- Stakeholder engagement on the joint research & innovation strategy.
- Conduct an analysis of the current R&D pipeline for antibiotics in South Africa and Africa.
- Identify priority projects on which GARDP and the SAMRC can collaborate with regional partners.
- Promote the development of new antibiotics and antibiotic treatments.
- Leverage additional funding from local and international funding sources.
- The SAMRC is also providing funding to GARDP amounting to R4 million for neonatal sepsis surveillance and sexually transmitted infections (STIs) studies in South Africa in 2018/19.

THE SOUTH AFRICAN AIDS VACCINE INITIATIVE (SAAVI)

- Assess the quality of cellular responses to the RV144/ HVTN 097 and HVTN 100 vaccine regimens.
- Provision of PrEP to participants of HIV prevention trials in South Africa.
- Vaccine-mediated effects on immunological, viral and clinical factors in HIV breakthrough infections.
- National Strategic Framework for stakeholder engagement in HIV prevention research in South Africa.
- The evidence for contraceptive options and HIV outcomes (ECHO).
- Immediate or Deferred Pre-exposure Prophylaxis for HIV Prevention: Safe Options for Pregnant and Lactating Women - An Open-Label Randomised Control Study.
- Part of the SAMRC-WSU Research Capacity Development Programme.
- Conducted population based surveys for HIV in Eastern Cape accident and emergency departments.
- Development of the Nelson Mandela Academic Hospital Clinical Research Unit.

PARTNERSHIPS WITH OTHER COUNTRIES

SENEGAL

- Focus on capacity building, joint human capital development programmes, as well as joint strategic research projects.

SWEDEN

- SAMRC and the Swedish Research Council for Health, Working Life & Welfare (FORTE) have an MoU to strengthen collaboration between South Africa and Sweden in Science, Technology, and Innovation.
- Focus areas include inequalities in health, and health systems and healthy systems policies.
- Partnership sets to fund 11 collaborative projects with a budget of R22 million from SAMRC and R15.9 million over three years from Forte.

SUDAN

- Focus of the collaboration is on drug research and development from natural products and diagnostic development.
- MoU in place with the Department of Science and Technology (DST) for managing the collaboration since March 2016.
- The DST is providing R1 million over two years for joint projects with matching funding from the Sudanese government for partners in Sudan.

INDIA

- Collaboration between SAMRC, the South African DST, Department of Science and Technology of India and the Indian Department of Biotechnology.
- Focus on HIV and TB with a selection of seven projects for funding, four of these are in South Africa looking to strengthen capacity development.

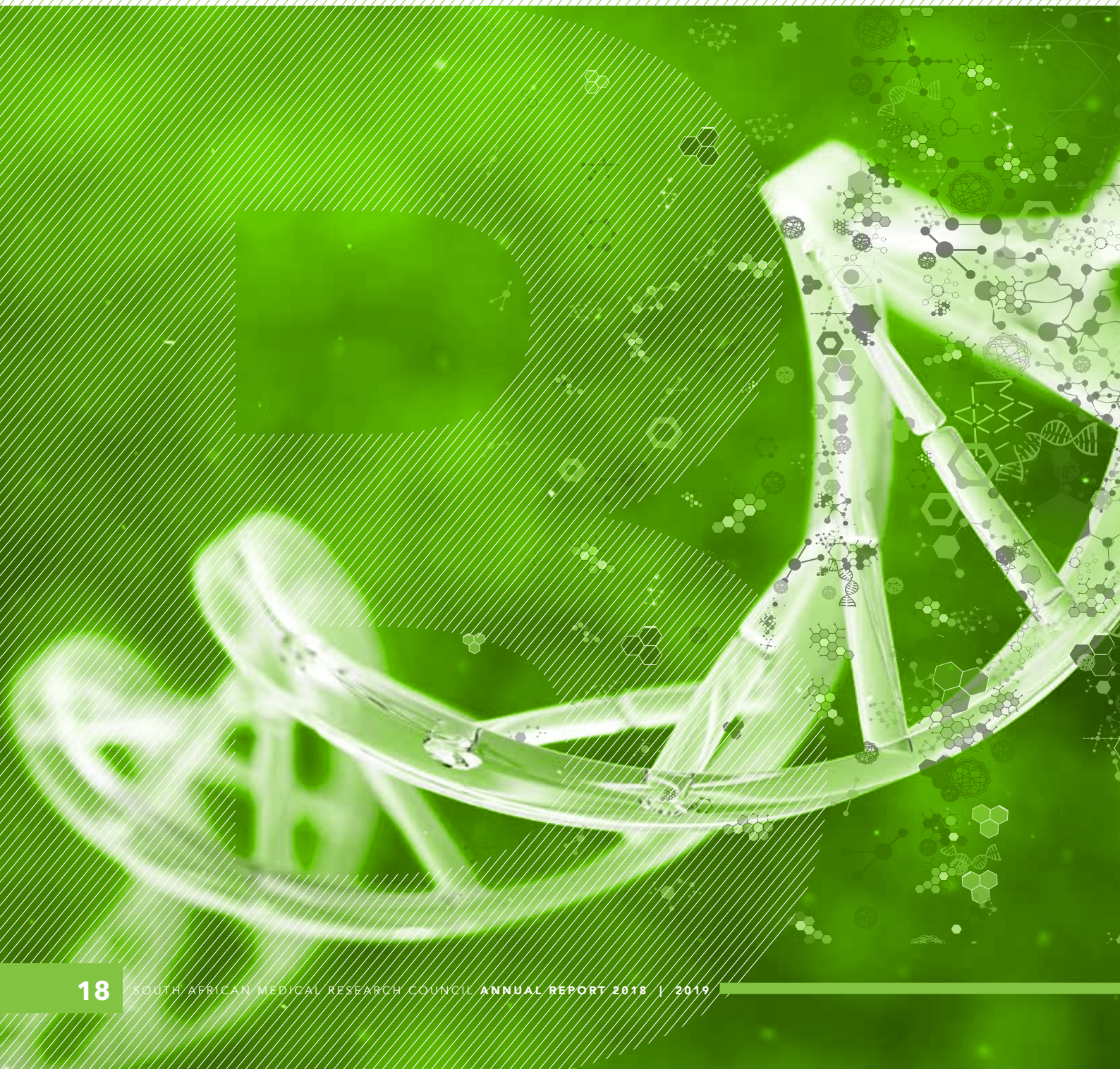
BRICS TB RESEARCH NETWORK

- The Network is an endeavour to collaborate with BRICS Ministries of Health and scientists to address the problems with TB in BRICS and to raise resources to find local solutions.
- SAMRC is a strategic partner in the BRICS TB Research Network.
- The National Department of Health hosted the third BRICS TB Research Network Meeting, over 28 – 29 June 2018, in Johannesburg, with delegates from BRICS countries and the World Health Organization (WHO).
- The Network is expanding and strengthening its existing research network in BRICS by developing partnerships in BRICS who share a vision of ending TB.
- Prof Glenda Gray, SAMRC President & CEO, serves as a member of the South African mission.

SOUTH AFRICA-US PROGRAM FOR COLLABORATIVE BIOMEDICAL RESEARCH

- Established in 2015 the joint programme is between the SAMRC and the U.S. National Institutes of Health (NIH).
- In November 2018, Dr Aaron Motsoaledi, approved the second phase of the Biomedical joint programme. The programme had awarded 31 grants in its first five years.
- The first five-year phase of the programme started in 2013 and will end in 2019.
- Current projects have generated outstanding scientific discovery, resulted in multiple publications and have assisted in training a significant number of young South African investigators.
- A key impact from phase one is a phylogenetic study that is characterizing the cycle of HIV transmission between adolescent girls/young women and older young men. The study has influenced policy and was featured in the UNAIDS 2016 report: Get on the Fast-Track: The life-cycle approach to HIV.
- This particular study has also contributed to the South African National Strategic Plan on HIV, TB and Sexually Transmitted Infections (STIs) through its progress on Goal 1, which focuses on breaking the cycle of transmission.

PERFORMANCE INFORMATION



STATEMENT OF RESPONSIBILITY

PERFORMANCE FOR YEAR ENDED 31 MARCH 2019

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 2019. The South African Medical Research Council's performance information for the year ended 31 March 2019 has been examined by external auditors and their report is presented on page 169.

The performance information of the South African Medical Research Council set out on pages 20 to 27 have been approved by the Board.

PROFESSOR GLENDA E. GRAY
President & Chief Executive Officer
South African Medical Research Council
31 March 2019

STRATEGIC OUTCOME ORIENTATED GOALS

The South African Medical Research Council is guided by four strategic goals, which are aligned with the four outputs of the health sector Negotiated Service Delivery Agreement (NSDA), a charter that commits key sectors and partners to the delivery of identified outputs as they relate to a particular sector of Government. These strategic goals are aligned with the NSDA that contributes to outcome 2 "A long and healthy life for all South Africans".

STRATEGIC GOAL 1

ADMINISTER HEALTH RESEARCH EFFECTIVELY AND EFFICIENTLY IN SOUTH AFRICA

GOAL STATEMENT	Strengthening of financial processes towards an unqualified audit opinion from the Auditor General
STRATEGIC OBJECTIVES	1.1 To ensure good governance, effective administration, an unqualified audit and compliance with government regulations 1.2 To promote the organisation's administrative efficiency to maximise the funds available for research
OBJECTIVE STATEMENT	To strengthen financial management, monitoring and evaluation
BASELINE (2015-16)	Improved financial management at all levels within the SAMRC and an unqualified audit
INDICATOR	1.1 Compliance with legislative prescripts, reflected in the final audit report relating to the processes and systems of the SAMRC 1.2 Percentage (%) of the 2018/19 SAMRC total budget spent on salaries and operations of all corporate administrative functions

The South African Medical Research Council has adhered to strict corporate governance strategies in administering scientific research and received five consecutive clean audits

STRATEGIC GOAL 2

LEAD THE GENERATION OF NEW KNOWLEDGE AND FACILITATE ITS TRANSLATION INTO POLICIES AND PRACTICES TO IMPROVE HEALTH

GOAL 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
STRATEGIC OBJECTIVES	2.1 To produce and disseminate new scientific findings and knowledge on health 2.2 To promote scientific excellence and the reputation of South African health research 2.3 To provide leadership in the generation of new knowledge in health 2.4 To facilitate the translation of SAMRC research findings into health policies and practices 2.5 To provide funding for the conduct of health research
OBJECTIVE STATEMENT	Number of indexed journal articles published during the year to create and disseminate new quality knowledge through research with expert endorsement from specialists in the field
BASELINE (2015-16)	2.1 450 2.2 115 2.3 12 2.4 165 2.5 4 2.6 110
INDICATOR	2.1 Number of published journal articles, book chapters and books by SAMRC researchers within intramural, extramural research units and collaborating centres at the SAMRC (Malaria, TB, HIV and Cancer), Self-Initiated Research, SHIP and Flagship projects 2.2 Number of journal articles published by SAMRC grant-holders with acknowledgment of SAMRC support during the reporting period 2.3 Number of published indexed impact factor journal articles with a SAMRC affiliated author 2.4 Number of journal articles where the first and/or last author is affiliated to the SAMRC during the reporting period 2.5 Number of new policies and guidelines that reference SAMRC research during the reporting period 2.6 Number (new and renewals) of research grants awarded by the SAMRC during the reported period

The South African Medical Research Council is committed to improving the nation's health through health research. The National Research Foundation (NRF) aims to build a competitive science system and the NRF rating has become a valuable tool for benchmarking the quality of the SAMRC's researchers against the best in the world.

During the 2018 NRF rating, seven SAMRC scientists were rated including two additional scientists who were re-evaluated and received higher ratings. This brings the total number of SAMRC rated scientists from 18 to 37, between 2015 – 2019.

STRATEGIC GOAL 3

SUPPORT INNOVATION AND TECHNOLOGY DEVELOPMENT TO IMPROVE HEALTH

GOAL STATEMENT	Promote the improvement of health and quality of life (prevention of ill health, improvements in public health and treatment) in South Africa through innovation, technology development and transfer
STRATEGIC OBJECTIVES	3. To provide funding for health research innovation and technology development
OBJECTIVE STATEMENT	Number of innovations to promote the improvement of health and quality of life in the country through innovation, technology development and transfer (innovation projects supported, invention disclosures, patents filed and licences concluded) developed in the year
BASELINE (2015-16)	3.1 Thirty (30) innovation and technology developments 3.2 New indicator
INDICATOR	3.1 Number of innovation and technology projects funded by the SAMRC to develop new diagnostics, devices, vaccines and therapeutics 3.2 Number of new diagnostics, devices, vaccines and therapeutics developed during the reporting period

STRATEGIC GOAL 4

BUILD CAPACITY FOR THE LONG-TERM SUSTAINABILITY OF THE COUNTRY'S HEALTH RESEARCH

GOAL STATEMENT	To provide research support in the broad field of health research, describing original research initiated by a researcher at a recognised research institution and creating and maintaining collaborative research initiatives in collaboration with research programmes. The guiding elements for each initiative/project are: Long-term and sustainable; Focused; Strong corrective action; Private – public partnerships; Africa centric perspective; Innovation; Operationally – best business practices; Technology infrastructure
STRATEGIC OBJECTIVES	4. To enhance the long-term sustainability of health research in South Africa by providing funding for the next generation of health researchers
OBJECTIVE STATEMENT	Study bursaries, scholarships and fellowships are awarded to students towards a postgraduate degree in health research
BASELINE (2015-16)	4.1 Sixty five (65) bursaries/scholarships/fellowships 4.2 New indicator
INDICATOR	4.1 Number of SAMRC bursaries, scholarships and fellowships provided for postgraduate study at masters, doctoral and postdoctoral levels 4.2 Number of masters and doctoral students graduated during the reporting period

Year on year, the SAMRC aims to increase the number of masters and doctoral students funded, and to grow the limited critical mass of health researchers, specifically the cohort of interns and clinicians, through the National Health Scholars Programme (NHSP), a public-private partnership with funding from the Public Health Enhancement Fund, an initiative of the National Department of Health. The SAMRC through the Research Capacity Development Division, administers the NHSP.

The NHSP is a flagship PhD development programme and a national asset to advance the next generation of African health and clinical scientists. The programme has produced 478 graduates (87% of which are PhDs) in various health professions.

STRATEGIC OBJECTIVES, PERFORMANCE INDICATORS, PLANNED TARGETS AND ACTUAL ACHIEVEMENTS

STRATEGIC GOAL	STRATEGIC OBJECTIVE	INDICATOR NO.	PROGRAMME PERFORMANCE INDICATOR	
Administer health research effectively and efficiently in South Africa	To ensure good governance, effective administration and compliance with government regulations	1.1	Compliance with legislative prescripts, reflected in the final audit report relating to the processes and systems of the SAMRC	
	To promote the organisation's administrative efficiency to maximise the funds available for research	1.2	Percentage (%) of the 2018/19 SAMRC total budget spent on salaries and operations of all corporate administrative functions	
Lead the generation of new knowledge and facilitate its translation into policies and practices to improve health	To produce and disseminate new scientific findings and knowledge on health	2.1	Number of published journal articles, book chapters and books by SAMRC researchers within intramural, extramural research units and collaborating centres at the SAMRC (Malaria, TB, HIV and Cancer), Self-Initiated Research, SHIP and Flagship projects **	
		2.2	Number of journal articles published by SAMRC grant-holders with acknowledgement of SAMRC support during the reporting period **	
	To promote scientific excellence and the reputation of South African health research	2.3	Number of published indexed impact factor journal articles with a SAMRC affiliated author **	
	To provide leadership in the generation of new knowledge in health	2.4	Number of journal articles where the first and/or last author is affiliated to the SAMRC during the reporting period **	
	To facilitate the translation of SAMRC research findings into health policies and practices	2.5	Number of new policies and guidelines that reference SAMRC research during the reporting period	
	To provide funding for the conduct of health research	2.6	Number (new and renewals) of research grants awarded by the SAMRC during the reported period	

** SAMRC makes use of the Scopus, Web of Science and PubMed databases for the collection of performance information (journal articles) for the indicators 2.1 to 2.4. Various journals affiliate to various databases, which is dependent on many factors, thus there is inconsistency as to which journal affiliates to which specific database. In addition, there is no consistency, uniformity and time limitation in the way the databases capture the journal articles.
While some journals and database have open access, others are based on paid subscription and license agreements. Timely accessing published journal articles from these databases is a challenge due to the complexities of uploading journal articles in a timely fashion based on many factors including licensing agreements. For example, Scopus does not rule out the possibility of missing key research information.
Databases continuously update their sites with new journal articles and have different dates on which information is available to the intended audience such as the SAMRC. The latter gives rise to an inherent limitation in SAMRC quantifying the amount of journal articles present on a database at any given time. The SAMRC has a cut-off date at which information is collected from the databases, and this process has been consistently applied from year-to-year. Therefore, it is impractical, given the limitations of the databases, for the SAMRC to ascertain precisely which journal articles that would have been submitted for publishing during the reporting period, would have already been included in the databases at the time when performance information is submitted to the Auditor General of South Africa (AGSA).

	SP TARGET (2015/16 - 2019/20)	FINAL 2017/18 PERFORMANCE	REPORTING PERIOD: 2018/19 PERFORMANCE TARGET	FINAL 2018/19 PERFORMANCE	VARIANCE
	Clean audit	Unqualified audit with findings	Unqualified	Clean Audit	
	20%	19%	20%	16%	The SAMRC has over performed due to efficiency improvements within Administration divisions and containing staff numbers. With these efficiency improvements the SAMRC managed to keep the costs below 20% of total expenditure and deliver an effective service to the core business. Contract revenue increased by 10% (R48m) which also contributed to the decrease in administration percentage vs total costs.
	*3150	865	750	936	The SOP has been circulated to all the unit directors and it was presented at the Unit Director's Forum meeting. More researchers have started to comply with the SOP regarding the affiliation to the SAMRC.
	*825	197	196	251	SOP has been circulated to all unit directors and it was presented at the Unit Directors Forum. More researchers have started to comply with the SOP regarding the acknowledgement of non-baseline SAMRC funding and/ or any additional grant funding above the normal baseline budget that is received.
	*2124	765	700	787	There has been an increase in the number of publications in journals with an Impact Factor, as opposed to publishing in journals with no Impact Factor.
	*1830	490	500	538	There has been a move by the SAMRC researchers that collaborate to have themselves positioned either as the first or the last author on the publications.
	27	9	6	6	
	750	168	176	176	

STRATEGIC GOAL	STRATEGIC OBJECTIVE	INDICATOR NO.	PROGRAMME PERFORMANCE INDICATOR	
Support innovation and technology development to improve health	To provide funding for health research innovation and technology development	3.1	Number of innovation and technology projects funded by the SAMRC to develop new diagnostics, devices, vaccines and therapeutics	
		3.2	Number of new diagnostics, devices, vaccines and therapeutics progressed to the next stage of development during the reporting period	
Build capacity for the long-term sustainability of the country's health research	To enhance the long-term sustainability of health research in South Africa by providing funding for the next generation of health researchers	4.1	Number (new and renewals) of SAMRC bursaries, scholarships and fellowships funded for postgraduate study at masters, doctoral and postdoctoral levels	
		4.2	Number of masters and doctoral students graduated during the reporting period	

	SP TARGET (2015/16 - 2019/20)	FINAL 2017/18 PERFORMANCE	REPORTING PERIOD: 2018/19 PERFORMANCE TARGET	FINAL 2018/19 PERFORMANCE	VARIANCE
	180	92	40	79	The SAMRCs was able to attract more funding towards the development of new diagnostics, devices, vaccines and therapeutics during this financial year, which resulted in more grants being allocated to successful applicants. Corrective action: The SAMRC will use the performance for this financial year, in line with available budget, as a baseline to set a more realistic target, going forward.
	New Indicator	2	2	2	
	435	155	101	141	There were more bursaries, scholarships and fellowships provided for post-graduate study than anticipated. Corrective action: The SAMRC will use the performance for this financial year as a baseline to set a more realistic target for the allocation of bursaries/scholarships/ fellowships
	New Indicator	80	60	47	77 masters and doctoral students completed their studies in the reporting period. However, only 47 graduated as at a number of universities, the graduation ceremonies that are usually held at the end of March were rescheduled for dates in April 2019, as the month of March ended on a weekend. This unfortunately influenced the SAMRC's performance for the reporting period as the 30 graduates in April 2019 could not be included, as the current indicator refers to students who graduated and not students who completed their studies. Corrective action: Those students who completed their studies in 2018 but only graduated in April 2019 will be reported on in the 2019/20 financial year. The indicator to be amended for the 2019/20 reporting period to reflect students who graduated, as well as students who completed their studies before the end of March but their graduation ceremonies are scheduled to take place after the end of March

OUR RESEARCH PROFILE

South Africa faces a quadruple of evolving major epidemics: Maternal, new-born and child health, HIV/AIDS and TB, Non-communicable diseases, and violence and injury (also see the narrative under Achievements and highlights, page 9).

MATERNAL, NEWBORN AND CHILD HEALTH

The burden of maternal, newborn and child health on SA is three times above average for comparable countries.

Our research shows that the under **5** mortality rate has decreased to **34** per **1000** livebirths in 2016 from **80** per 1000 livebirths in 2003.

Interventions by community health workers in community treatment could decrease deaths to under **200 000** over ten years.

NON-COMMUNICABLE DISEASES (NCDS)

Non-Communicable Diseases, as a group, account for the highest number of deaths in SA.

Four major NCDs: cancers, cardiovascular diseases, chronic respiratory diseases and diabetes.

Our first-of-its-kind research shows that more than **70%** of women in sub-Saharan Africa are overweight and obese and five out of every **10** adults in South Africa suffer from hypertension.

HIV/AIDS AND TB

SA is estimated to have the biggest burden of TB in the world – a sizeable number of HIV/AIDS deaths are associated with TB.

We have conducted research that has mapped the true burden of MDR/XDR TB in the country allowing accurate and concerted interventions.

The roll-out of ART and earlier PMTCT interventions has resulted in a steady decline in HIV mortality: from **300 000** in 2006 to **153 000** in 2012.

VIOLENCE AND INJURY

SA is five times above average for homicide. Interpersonal violence accounts for a considerable amount of premature deaths in SA.

Between 1997 and 2012, there was a **52%** reduction in death rates caused by interpersonal violence.

Data from our Burden of Disease Research Unit shows that interpersonal violence ranks as the number two cause of premature death in Gauteng and the Western Cape.

The South African Medical Research Council is a health research organisation focusing on the top ten causes, disability and associated risk factors in the South African population. Since 1969 the SAMRC has been at the cutting edge of leading medical research, innovations, development and has strengthened its research translation efforts. The scope of the SAMRC's research includes basic laboratory investigations, clinical research and public health studies.

LEADING CAUSES OF DEATH IN SOUTH AFRICA

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

MORTALITY INDICATORS	2012	2013	2014	2015	2016	2017
LIFE EXPECTANCY AT BIRTH						
Life expectancy at birth **Total**	61.2	62.2	62.9	63.3	63.8	64.2
Life expectancy at birth **Male**	58.5	59.4	60.0	60.3	60.8	61.2
Life expectancy at birth **Female**	64.0	65.1	65.8	66.4	66.9	67.6
YOUNG CHILD MORTALITY (0-5 YEARS)						
Under-5 mortality rate (U5MR) per 1 000 live births	11.0	8.1	7.4	7.0	6.6	6.0
Infant mortality rate (IMR) per 1 000 live births	11.9	8.9	8.4	7.9	7.5	7.0
Neonatal mortality rate (<28 days) per 1 000 live births	10.1	7.3	6.5	6.2	5.6	5.1
OLDER CHILDREN & YOUNG ADOLESCENTS (5-14 YEARS)						
Older children & young adolescents ($_{10}q_5$ per 1000) **Total**	11.0	8.1	7.4	7.0	6.6	6.0
Older children & young adolescents ($_{10}q_5$ per 1000) **Male**	11.9	8.9	8.4	7.9	7.5	7.0
Older children & young adolescents ($_{10}q_5$ per 1000) **Female**	10.1	7.3	6.5	6.2	5.6	5.1
OLDER ADOLESCENTS & YOUTH (15-24 YEARS)						
Older adolescents & youth ($_{10}q_{15}$ per 1000) **Total**	24.5	23.5	22.5	22.1	21.4	21.4
Older adolescents & youth ($_{10}q_{15}$ per 1000) **Male**	25.9	25.9	25.6	25.7	25.3	25.9
Older adolescents & youth ($_{10}q_{15}$ per 1000) **Female**	23.2	21.1	19.5	18.4	17.5	17.0

OUR RESEARCH PROFILE CONTINUED

MORTALITY INDICATORS	2012	2013	2014	2015	2016	2017
ADULT MORTALITY (15-59 YEARS)						
Adult mortality ($_{45}q_{15}$) **Total**	38%	36%	34%	34%	33%	32%
Adult mortality ($_{45}q_{15}$) **Male**	44%	42%	40%	40%	39%	38%
Adult mortality ($_{45}q_{15}$) **Female**	32%	30%	28%	28%	27%	26%
LIFE EXPECTANCY AT AGE 60						
Life expectancy at age 60 **Total**	17.6	17.4	17.4	17.3	17.4	17.4
Life expectancy at age 60 **Male**	15.5	15.3	15.3	15.2	15.2	15.2
Life expectancy at age 60 **Female**	19.2	19.1	19.1	19.0	19.1	19.1
CAUSE SPECIFIC INDICATORS	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**
MATERNAL MORTALITY (15-49 YEARS)						
Maternal mortality ratio (MMR) per 100 000 live births	200	165	154	164	152	134
PREMATURE MORTALITY ATTRIBUTED TO CARDIOVASCULAR DISEASE, CANCER, DIABETES OR CHRONIC RESPIRATORY DISEASE (PEOPLE AGED 30-69 YEARS)						
Cardiovascular disease $_{40}q_{30}$ **Total**	15%	15%	14%	15%	14%	14%
Cardiovascular disease $_{40}q_{30}$ **Male**	18%	18%	17%	18%	18%	17%
Cardiovascular disease $_{40}q_{30}$ **Female**	12%	12%	11%	11%	11%	11%
Cancer $_{40}q_{30}$ **Total**	9%	9%	9%	9%	9%	9%
Cancer $_{40}q_{30}$ **Male**	10%	10%	11%	11%	11%	10%
Cancer $_{40}q_{30}$ **Female**	7%	7%	7%	8%	8%	8%
Diabetes $_{40}q_{30}$ **Total**	5%	5%	5%	5%	6%	5%
Diabetes $_{40}q_{30}$ **Male**	5%	5%	5%	6%	6%	5%
Diabetes $_{40}q_{30}$ **Female**	5%	5%	5%	5%	5%	5%
Chronic respiratory disease $_{40}q_{30}$ **Total**	4%	4%	4%	4%	4%	4%
Chronic respiratory disease $_{40}q_{30}$ **Male**	6%	6%	6%	6%	6%	6%
Chronic respiratory disease $_{40}q_{30}$ **Female**	3%	3%	2%	2%	2%	2%

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

To conduct responsive health research, the SAMRC has research units based at offices in Cape Town, Gauteng, and Durban. These are called intramural research units (IRUs) and extramural research units (ERUs) based at various tertiary institutions across the country.

Intramural Research Units (IRU) are based at the SAMRC campuses and the scientists are directly employed by the organisation. Extramural Research Units (ERU) enable scientists based at tertiary institutions to conduct research funded by the SAMRC.

We focus on responsive health research and innovation to respond to the National Department of Health's promise of a long and happy life for all South Africans. We research, analyse and categorise the causes of death, to find suitable ways to prevent disease in a certain population group, or to improve the standard of living of those living with existing medical conditions.

Our research programmes and units are specified in the table below.

RESEARCH PROGRAMMES	RESEARCH UNITS
HEALTH PROMOTION AND DISEASE PREVENTION NSDA 1: INCREASING LIFE EXPECTANCY	• Alcohol, Tobacco and Other Drug Research Unit (IRU) • Anxiety and Stress Disorders Research Unit (ERU) • Non-Communicable Diseases Research Unit (IRU) • Environment and Health Research Unit (IRU) • Rural Public Health and Health Transition Research Unit (ERU) • Violence, Injury and Peace Research Unit (IRU) • Hypertension and Cardiovascular Disease Research Unit (ERU) • Microbial Water Quality Monitoring Research Unit (ERU)
MATERNAL, CHILD AND WOMEN'S HEALTH NSDA 2: DECREASING MATERNAL AND CHILD MORTALITY	• Gender and Health Research Unit (IRU) • Maternal and Infant Health Care Strategies Research Unit (ERU) • Development Pathways Research Unit (ERU) • Child and Adolescent Lung Health Research Unit (ERU)
HIV, AIDS, TB AND OTHER COMMUNICABLE DISEASES NSDA 3: COMBATING HIV AND AIDS, AND DECREASING THE BURDEN OF DISEASE FROM TB	• HIV Prevention Research Unit (IRU) • Centre for Tuberculosis Research Unit (IRU) • Molecular Mycobacteriology Research Unit (ERU) • Respiratory and Meningeal Pathogens Research Unit (ERU)
HEALTH SYSTEMS STRENGTHENING NSDA 4: STRENGTHENING HEALTH SYSTEMS EFFECTIVENESS	• Burden of Disease Research Unit (IRU) • Biostatistics Research Unit (IRU) • Cochrane South Africa (IRU) • Health Systems Research Unit (IRU) • HIV-TB Pathogenesis and Treatment Research Unit (ERU) • Health Services to Systems Research Unit (ERU)
PUBLIC HEALTH INNOVATION	• Drug Discovery and Development Research Unit (ERU) • Primate Unit and Delft Animal Centre (IRU) • The Biomedical Research and Innovation Platform (IRU) • Herbal Drugs Research Unit (ERU)
BIOMEDICAL RESEARCH	• Bioinformatics Capacity Development Research Unit (ERU) • Immunology of Infectious Diseases Research Unit (ERU) • Stem Cell Research and Therapy Research Unit (ERU) • Antiviral Gene Therapy Research Unit (ERU)

FUNDING HEALTH INNOVATION

GRANTS, INNOVATION AND PRODUCT DEVELOPMENT

TOTAL VALUE OF FUNDING ALLOCATED TO RESEARCH & INNOVATION DURING THE 2018/19 REPORTING PERIOD

R211,253,793.33
(GIPD PROJECTS INCLUDING SHIP, NEWTON AND STRATEGIC PROJECTS)

R23,662,535
SELF-INITIATED RESEARCH GRANTS

OVERVIEW

The Grants, Innovation and Product Development (GIPD) division of the SAMRC is the custodian of grant funding (including innovation funding), IP management and commercialisation. We therefore report on items 2 and 3 in the Annual Performance Plan (APP) relating to publication output and innovation. There are a number of programmes that fall under GIPD, many of which involve strategic partnerships with organisations that include the Department of Science and Technology (DST), the Newton Fund, the Bill and Melinda Gates Foundation (BMGF), PATH and Anglo American Platinum (AAP).

In addition to the above partnerships, GIPD represents South Africa on several international ventures, including the Joint Program In Anti-Microbial Research (JPIAMR, www.jpiamr.com), Grand Challenges South Africa (https://grandchallenges.org/video/grand-challenges) and the Healthy Life Trajectories Initiative (HeLTI).

FUNDING IMPACT & STRATEGIC ALIGNMENT

The Division is responsible for a large proportion of the SAMRC's external funding mechanisms, including product development funds. Since it was first established in 2013, the level of funding has grown from R33M per year to more than R150M per year. This has been achieved through the establishment of a number of global strategic partnerships with external partners supported by a strong and diverse grant management team and robust processes.

Everything that is funded seeks to address a national priority. This is achieved through a variety of mechanisms such as:

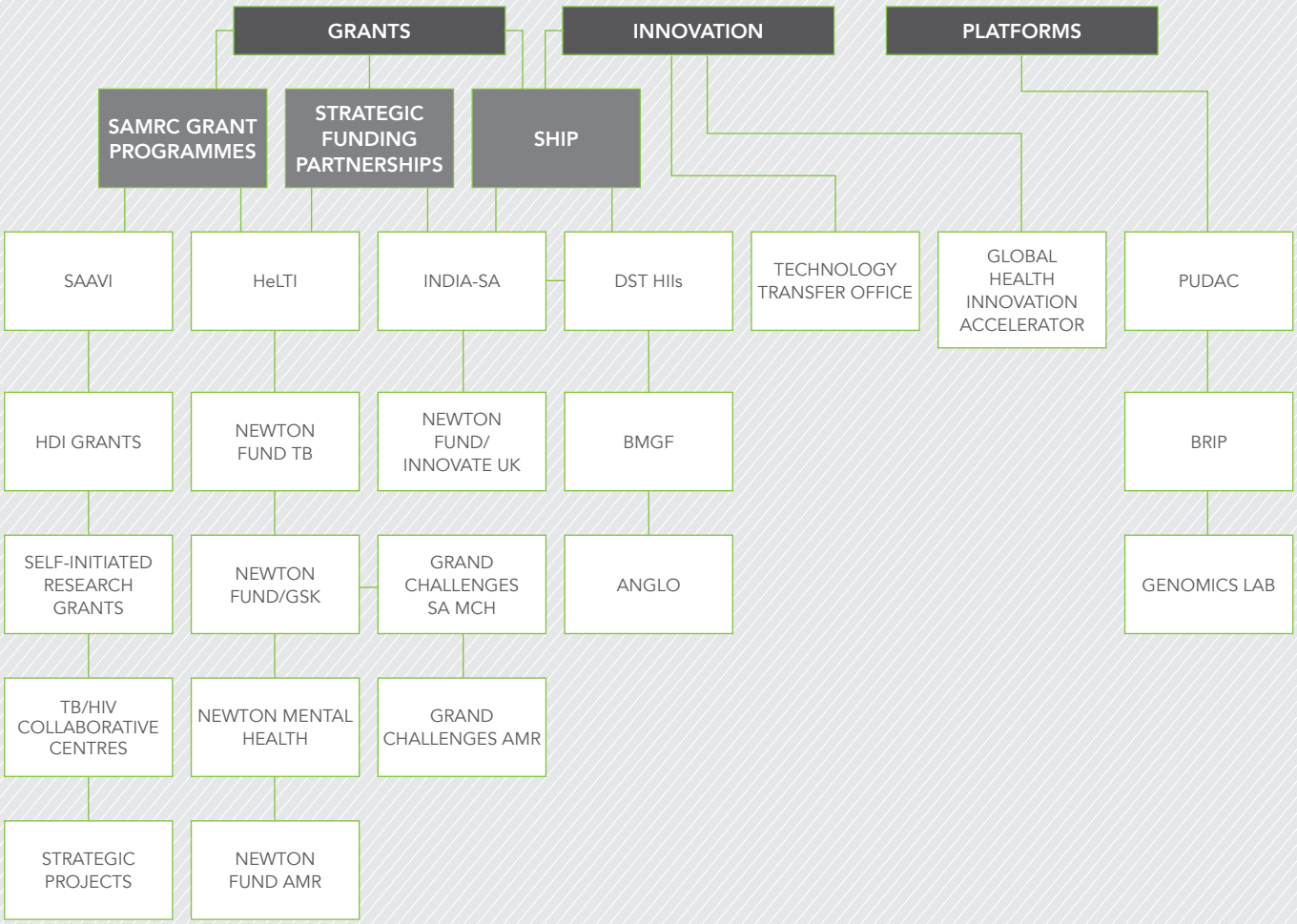
- Targeting calls to address key gaps in knowledge. For example, the recent programme focusing on TB implementation science – the topics for the open call were derived directly from the National Department of Health TB Think Tank programme priorities.
- Targeting calls to address key gaps in healthcare. This is illustrated through a number of partnerships, such as the Grand Challenges South Africa programme where the SAMRC chose to fund programmes that address innovations in the last trimester of pregnancy and to drive their implementation through the Global Health Innovation Accelerator (GHIA). There are a number of innovations that are now saving lives in this area and are showcased in this report.
- Strategic governance: Grant governance structures are designed to ensure that programmes that are funded address national rather than internal priorities. For example, SHIP's steering committee consists of representatives from the SAMRC, the Department of Science and Technology, the Department of Trade and Industry and the National Department of Health who all assist in prioritising areas that address national priorities. In some cases projects are selected for scientific impact, in others they are funded to build capacity, and in other cases to invest in product development, commercialisation and job creation.

GIPD operates at a global level and almost everything the division does is in partnership with international partners from around the globe. In the reporting year the Division has initiated and/or executed partnerships with JPIAMR (which represents more than 25 countries), China, India, Brazil, the African Academy of Sciences, UK, NIH and the Gates Foundation.

GIPD PROGRAMMES

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

Figure: GIPD programmes



THE DEPARTMENT OF SCIENCE AND TECHNOLOGY:

Grants, Innovation and Product Development manages two major programmes for the DST:

1. STRATEGIC HEALTH INNOVATION PARTNERSHIPS (SHIP)

SHIP is a partnership between the SAMRC and the DST to facilitate and support health innovation to address national priorities and enable the national system of innovation more broadly. It incorporates all DST-funded projects and initiatives managed by the SAMRC as well as DST- and SAMRC-leveraged strategic partnerships for health innovation.

SHIP has established robust governance, project selection and project management structures and processes that have stood up to rigorous external auditing, substantially expanded its funding sources for health innovation through strategic partnerships and programmes, and established a diverse portfolio of >40 projects ranging from discovery to implementation, with the predominant focus being on product development and testing.

2. SOUTH AFRICAN POPULATION RESEARCH INFRASTRUCTURE NETWORK (SAPRIN)

SAPRIN is a national research infrastructure funded through the DST. One of SAPRIN's key goals in the first three-year cycle, April 2016 – March 2019, was to harmonise the three current Health and Demographic Surveillance System (HDSS) Nodes. These long-standing nodes are the MRC/ Wits University Agincourt HDSS in Bushbuckridge District,

Mpumalanga, established in 1992, with a population of 116 000 people; the University of Limpopo DIMAMO HDSS in the Capricorn District of Limpopo, established in 1996, with a current population of 100 000; and the Africa Health Research Institute (AHRI) HDSS in uMkhanyakude District, KwaZulu-Natal, established in 2000, with a current population of 125 000. SAPRIN implementation has included building the DIMAMO Population Health Research Centre at the University of Limpopo that was successfully launched on 10 December 2018 (see pictures below). The second key goal has been to release harmonised, longitudinal, population data from the three HDSS nodes. A third has been expanding the public engagement with SAPRIN, the platform and its products.

SAPRIN data are processed for longitudinal analysis by organising the demographic data into residence episodes at a geographical location, and membership episodes within a household. Start events include enumeration, birth, in-migration and relocating into a household from within the study population; exit events include death (by cause), out-migration, and relocating to another location in the study population. Variables routinely updated at individual level include health care utilisation, marital status, labour status, education status, and disease monitoring through the collection of dry blood spots, as well as recording household asset status.

Anticipated outcomes of SAPRIN include:

(i) regular releases of up-to-date, longitudinal data, representative of South Africa's fast-changing poorer communities for research, interpretation and calibration of national datasets

(ii) national statistics triangulation, whereby longitudinal SAPRIN data are triangulated with National Census data for calibration of national statistics and studying the mechanisms driving the national statistics

(iii) an interdisciplinary research platform for conducting observational and interventional research at population level

(iv) policy engagement to provide evidence to underpin policy-making for cost evaluation and targeting intervention programmes, thereby improving the accuracy and efficiency of pro-poor, health and wellbeing interventions

(v) scientific education through training at related universities; and

(vi) community engagement, whereby coordinated engagement with communities will enable two-way learning between researchers and community members, and enabling research site communities and service providers to have access to and make effective use of research results.

THE UK GOVERNMENT

On the 9th of September 2014, the South African and United Kingdom Governments signed a Newton Fund Memorandum of Understanding in Parliament, Cape Town. The four main objectives were to 1) develop human capital, 2) engage with the private sector, 3) engage with other African countries and 4) build South African and United Kingdom research partnerships. The GIPD Division was responsible for establishing a health programme under this Newton Fund Partnership and to engage with the UK-based Newton Fund research partners.

The SAMRC has worked with several UK funding partners – UKMRC, ESRC, GSK and Innovate UK (now called UKRI) to fund a portfolio of more than 25 cutting edge research projects in non-communicable diseases, TB implementation science, mental health and anti-microbial resistance. Several of these projects involve collaborators in other African countries. A notable feature of this partnership has been the research focus as all of the projects selected for funding seek to understand and address the disease burden of (South) Africa. The research exchange has been truly bilateral as both South African and UK scientists have benefited from the partnership. Not only scientists have benefited as a number of the GIPD team attended workshops in the UK in July 2018 to learn the UKRI grant making practices, while the UK reciprocated in December 2018. The goal was to exchange best practices and learn how others manage grants.

1


2


3

1: *Pictures from the Official Launch of the DIMAMO Population Health Research Centre on 10 December 2018 at the University of Limpopo*
2: *Professor Jeffrey Mphahlele, SAMRC Vice President for Research representing the SAMRC at the launch*
3: *Professor Mahlo Mokgalong (Vice-Chancellor and Principal of University of Limpopo) and Professor Marianne Alberts (Director of the DIMAMO Population Health Research Centre) receiving the building from Dr Thomas Auf der Heyde (Deputy-Director General at the Department of Science and Technology)*

THE GATES FOUNDATION

GIPD has engaged with the Gates Foundation on several programmes and projects. Apart from the Grand Challenges South Africa programme, the Division continues to manage a number of very successful grants through SHIP using funds from the Foundation to support cutting edge research and development in the HIV and TB research arenas. These have resulted in a number of high impact publications as well as scientific advancements that are changing some of the fundamental assumptions on TB and HIV disease and immunology. The Foundation is an important co-funder on SHIP's drug discovery programmes and has renewed its commitment to these in the current reporting period. A grant from the Foundation to the GHIA programme of GIPD has seen an acceleration of this joint initiative with PATH in the last two years, with three new innovation staff members being employed and trained, a doubling of the programme's project portfolio, substantial progress on three of the GHIA projects towards commercialization and tripling of the Foundation investment to date through funds raised for GHIA projects and activities.

The SAGC ran a world leading call for surveillance in AMR. This was a joint call with the African Academy of Sciences, Grand Challenges Brazil and Grand Challenges India. This unprecedented call has each country managed their review process independently and then decide on the projects jointly. Selected projects, in three continents (and more than eight countries) were encouraged to collaborate and standardise data collection so outcomes could be directly compared. This was a world first!

THE SAMRC GENOMICS CENTRE

The SAMRC Genomics Centre is a collaborative partnership with the Beijing Genomics Institute, that was signed on 16 February 2018 and the establishment of a National Sequencing facility is currently underway. The initial objectives are to transfer skills in utilizing the MGI sequencing equipment and establish our local Bioinformatics pipelines in South Africa. The Construction phase is complete, the current team has been trained in China and we are currently setting up the local facility.

NOVARTIS

In 2017 the SAMRC, Novartis and the DST entered into a MoU. Under the MoU the parties agreed to conduct research joint projects and capacity development initiatives. The flagship programme was a grant writing workshop. The first workshop was held in December 2017, with the second workshop was held in November 2018. More than 50 post graduate students from Historically Disadvantaged Institutions were trained in how to write grants, budget, manage IP and prepare reports. GIPD offered three awards to the best proposals from the first workshop – these were awarded to Ms Asive Myataza, Ms Hlengwa Nokulunga and Ms Sangweni Nonhlakanipho.

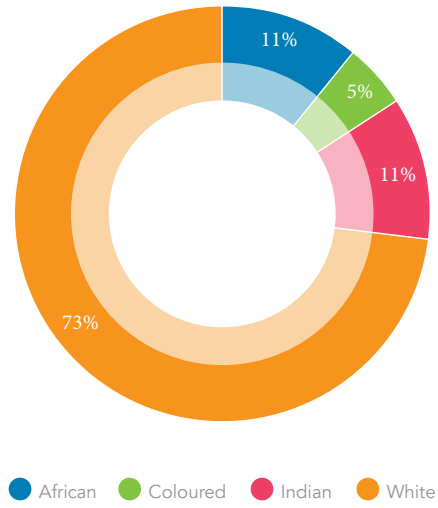
SELF-INITIATED RESEARCH GRANTS (SIR): TRANSFORMING OUR RESEARCH FUNDING STREAMS

There was an imbalance in the allocation of Self-Initiated Research Grants until the 2013/14 financial year. To make the allocation of SIR grants more representative new guidelines were applied that included separating the researchers according to experience and taking into account the historic under-resourcing of selected universities. This resulted in a shift over the years, see the graphs below for the allocation of SIR grants during the 2013/14 in contrast to the 2018/19 financial period.

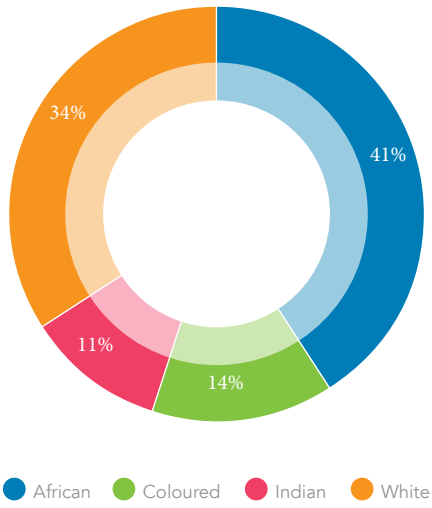
The SAMRC coordinated and participated in the South African pavillion at Bio 2018, Boston, 4-7 June.

RESEARCH FUNDING STREAMS

2013/14



2018/19



Over 1,100 biotechnology companies, academic institutions, state biotechnology centers attended Bio 2018.

STRATEGIC RESEARCH INITIATIVES (SRI)

The following key partnership programmes are managed:

THE SAMRC FLAGSHIP PROGRAMME

- Evaluating a new drug regimen for patients with drug-resistant TB – a randomised controlled trial (NExT)
- Understanding the SHARED ROOTS of Neuropsychiatric Disorders and Modifiable Risk Factors for Cardiovascular Disease (SHARED ROOTS)
- Investigation of the Management of Pericarditis Trial II: A Randomized Comparison of Complete Percutaneous Pericardiocentesis plus Interferon Gamma Testing Versus Empiric Treatment Without Pericardiocentesis in Suspected Tuberculous Pericarditis (IMPI-2 Trial)
- Effectiveness of an alcohol-focused intervention in improving adherence to antiretroviral therapy (ART) and HIV treatment outcomes (AlcoholHIV)
- 2nd South African Comparative Risk Assessment (SA CRA 2)
- The impact of rape in women on HIV acquisition and retention linkages to care: a longitudinal study (RICE)

Contact Details:
Richard Gordon
Email: richard.gordon@mrc.ac.za

RESEARCH CAPACITY DEVELOPMENT

BUILDING HUMAN CAPACITY IN HEALTH

OVERVIEW

The SAMRC receives funding from the South African National Treasury to strengthen research and capacity development in the field of medical health sciences in South Africa. The SAMRC through its Division of Research Capacity Development (RCD) aims to build health research capacity by providing and administering scholarships to South African citizens studying towards their Masters and Doctoral (PhD) degrees in Medical and Health Sciences. Additionally, RCD provides and administers research grants to early career investigators, mid-career investigators and researchers with evidence of potential of excellence if supported financially and otherwise.

Exceptional performance has been evidenced in almost all the funding vehicles. Of note is the above national average throughput of PhD graduates in the National Health Scholars Programme, a privately funded PhD development programme which is the brain child of the Minister of Health, Dr Aaron Motsoaledi and the late Professor Bongani Mayosi.

The Division has also shown that there is excellence of scientific work that happens in the previously under resourced institutions, also known as the Historically Disadvantaged Institutions. To date, at least 30 million ZAR has been put towards extracting this excellence and there is a healthy return on investment by way of publications and the broadening of research areas that the SAMRC can now claim to be involved in. Investing in promising, but underfunded potential in Mid-career scientists is proving to be a winning formula. Scientists funded in this programme can now have the freedom to grow their research teams and expand activities within their research nodes.

The Division is also expanding its international portfolio by partnership with universities abroad to galvanize training in scarce skills areas - such as the ongoing training of Masters candidates in the field of Vaccinology with the University of Lausanne, Switzerland; and the recently launched training of PhDs in Biostatistics with the university of Hasselt in Belgium.

SAMRC FUNDED MASTERS AND PHDs IN 2018/19

AMOUNT FUNDED
R1,356,204.00
8 MSCS

AMOUNT FUNDED
R27,478,635.20
45 PHDs

MSC AND PHDS JOINTLY FUNDED BY THE SAMRC IN 2018/19

AMOUNT FUNDED
R1,550,000.00
6 MSCS

AMOUNT FUNDED
R1,660,000.00
4 PHDs

Scientists and programmes in 2018/19

BENEFICIARY	AMOUNT INVESTED	NAME OF PROGRAMME
14 PIs	R8,000,000.00	SAMRC Research Capacity Development Initiative (RCDI)
15 Intramural Postdocs	R5,250,000.00	SAMRC Intramural Postdoctoral fellowship Programme
5 Career Development Awards	R1,500,000.00	Career Development Award
5 Mid-Career Scientists	R6,100,000.00	Mid-Career Scientist

SHAPING A BETTER HEALTHCARE SYSTEM FOR ALL

The Public Health Enhancement Fund with the National Department of Health on Tuesday 30 April at Emperors Palace, Johannesburg, celebrated their joint efforts in building new human capacity for healthcare. The event presided by the Minister of Health Dr Aaron Motsoaledi, members of the Public Health Enhancement Fund, Dr Stavros Nicolaou and Dr Ayanda Ntsaluba, Professors Mike Sathekge and Glenda Gray from the South African Medical Research Council, marked 25 years of health in South Africa.

This celebration also recognised the vision of Minister Motsoaledi and the late Professor Bongani Mayosi's contributions by renaming a flagship PhD programme to the Bongani Mayosi National Health Scholars Programme. Professor Nonhlanhla Khumalo, Mayosi's wife and the family, the Director-General of Health, Ms Precious Matsoso, and beneficiaries of the Public Health Enhancement Fund (PHEF), were among some of the distinguished guests.

South Africa faces a quadruple burden of disease: Maternal, new-born and child health, HIV/AIDS and TB, non-communicable diseases, and violence and injury. No single sector, the public or private, can successfully tackle these major epidemics. To realise the vision of a 'long and healthy life for all South Africans', the combined efforts, shared vision and commitment to work together, is needed from all sectors. "I am absolutely convinced that this challenge in South Africa is bigger than the public sector and private sector working on their own," says Dr Ayanda Ntsaluba, PHEF member and a guest speaker at the event.

"There is a public health care system that is underfunded, under resourced and under capacitated in many respects," asserts Dr Stavros Nicolaou, PHEF Chairperson. These challenges saw a number of private health sector companies approaching Minister Motsoaledi to discuss the concept of the private sector assisting the public sector in a number of initiatives. The Minister decided that these initiatives should be coordinated and proposed a Social Compact Forum, and a mechanism to assist government in priority programmes.
The Forum constitutes the CEOs of the participating companies to engage with and strategically assist the Minister and the Department of Health with initiatives that: address the challenges facing the health sector, to pursue shared goals and a sustainable future by ensuring higher levels of cooperation and collaborative action for the collective benefit of the health of all South Africans.

The compact was entered into by the Minister with 22 private sector healthcare companies on 8 November 2012. The compact contributes towards enhanced human capital and resourcing in the South African healthcare system. A particular focus of the compact, was enhancing human capital in underdeveloped and resource constrained communities and to support research and innovation capacity and capability in South Africa.

"At that time (and currently), some in the private sector were very antagonistic towards National Health Insurance. At the meeting I told the CEOs that rather than fight about NHI and its implications for the private sector, we should rather focus on building human capital in our country. I am pleased that the CEOs agreed and we designed the Public Health Enhancement Fund with an initial investment of R40m," said Motsoaledi in his keynote address at Emperors Palace.

The Forum meets with the Minister of Health and his delegation at least two times a year to discuss: progress, monitoring of initiatives, new areas of cooperation and support, facilitate the development of a common vision of the health care sector as a whole, including the creation of an enabling environment to achieve that vision.

To this end three programmes were mutually agreed between the National Department of Health and the 22 private companies, who set up a vehicle called the Public Health Enhancement Fund (PHEF), which would fund the programmes. Since the initial 22 companies, two other companies joined the PHEF and two other companies merged. Contributions to the fund commenced in 2013 and up to 2018 approximately R200million has been contributed to the fund by the PHEF.

The objectives of the PHEF straddles across three critical healthcare focus areas: training hospital CEOs, recruiting and training PhDs, especially in HIV and TB research, to encourage innovation and build research capacity, while increasing the number of medical students from rural areas.

The collaboration between the National Department of Health, the PHEF and South African Medical Research Council (SAMRC) has been catalytic. PHEF, a non-profit entity created to leverage and contribute to strengthening the health sector, shows private sector's commitment to building the healthcare system. Through the Bongani Mayosi National Health Scholars Programme, administered by the SAMRC, the Programme has produced 47 graduates (87% of which are PhDs) in various health professions.

Among the guest speakers were the beneficiaries of the PHEF, two MBChB graduates Dr Mukelani Cele and Dr Nangamso Malashe, and Dr Zamasomi Luvuno from UKZN

Minister Motsoaledi officiating the launch of the Bongani Mayosi National Health Scholars Programme

and Dr Jean Paul Fouche from University of Cape Town, who both attained their PhD. Dr Luvuno shared some insight from her ethnographic study of transgendered people's access and management of sexual reproduction conducted in KwaZulu-Natal. Dr Fouche also discussed his work on structural brain connectivity of HIV positive children.

Over the past five years there has been significant progress with two of the three programmes and the event on the 30th April 2019, in part, celebrated the success of the two programmes, which demonstrates what can be achieved when the public and private sectors collaborate.

The two projects include funding the total costs of 100 medical students, all of whom are previously disadvantaged and have been selected and drawn from resource constrained, rural communities. At the end of last year 60 of these students qualified from seven different medical schools and are now serving as interns in the healthcare system. Many of these are likely to one day return and service these rural, resource constrained communities. The PHEF will ensure that the target of 100 doctors is achieved, with a further 20 expected to graduate in 2019.

The second programme involved the funding of post graduate students from the various healthcare disciplines, who would contribute to the overall research and innovation capacity of our country and contribute to addressing some of the key public health issues that face our society. The PHEF, through four different cohorts is funding 75 post graduate students. This is the now Bongani Mayosi National Health Scholars Programme. The Programme is a national asset and flagship programme for advancing the next generation of African health and clinical scientists. The Chair of the programme was the late Professor Bongani Mayosi, who championed the scholarship programme together with Minister Motsoaledi.

According to Professor Glenda Gray, President and CEO of the SAMRC, the event celebrated the advancement of scholars in Africa and the Council's concerted efforts in growing the knowledge economy of South Africa. "This Programme is a critical asset to us, reiterating our passion and commitment to to accelerating progress towards equity in research capacity development and building a critical mass of clinical researchers with PhDs in health," said Gray.

"Professor Mayosi's vision was to develop the capacity of the next generation of South African scientists and leaders through the NHSP. He wanted to train clinical and health PhDs who will have significant impact in clinical and health sciences in South Africa and the rest of Africa," says Division Manager at the SAMRC's Research Capacity Development Division, Dr Thabi Maitin.

In his keynote address, Minister Motsoaledi iterated the importance of the public-private partnership. He said that: "It is therefore crystal clear that we must build human capital to ensure that we are not left behind and I am pleased that the Public Health Enhancement Fund has been very productive and that today we can announce what we have achieved to date. I want to acknowledge the contribution of Prof Mayosi who was the first chair of the selection committee."

SAMRC STRATEGIC RESEARCH PROGRAMMES

PROGRAMME 1:
HEALTH PROMOTION & DISEASE PREVENTION

PURPOSE OF THE PROGRAMME

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

UNITS THAT CONSTITUTE THIS PROGRAMME

- Alcohol, Tobacco and Other Drug Research Unit
- SAMRC/UCT Risk and resilience in mental disorders Research Unit
- Non-Communicable Diseases Research Unit
- Environment and Health Research Unit
- SAMRC/Wits Rural Public Health and Health Transition Research Unit
- SAMRC/Unisa Violence, Injury and Peace Research Unit
- SAMRC/NWU Hypertension and Cardiovascular Disease Research Unit
- SAMRC/UFH Microbial Water Quality Monitoring Research Unit

PROGRAMME STRATEGIC OBJECTIVES

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

RESEARCH HIGHLIGHTS UNDER THIS PROGRAMME

ALCOHOL, TOBACCO AND OTHER DRUG RESEARCH UNIT

Unit Director: Charles Parry

OVERVIEW

Alcohol and smoking are among the highest risk factors for death and disability in South Africa, ranking 5th and 6th out of 79 risk factors since 2015. Alcohol, tobacco and other drugs (ATODs) contribute to and complicate infectious diseases, chronic diseases of lifestyle, violence, injury, and mental health problems.

Through its cutting-edge research, ATODRU supports the SAMRC's quest to build the knowledge of tomorrow by developing and testing ways to prevent and reduce substance use and associated harms - we do this by among other things conducting clinical trials.

The work of the ATODRU seeks to change individual behaviours and the health system by way of translation of generated knowledge into policy and other interventions.

The Unit's research also aims to provide a better understanding of substance use behaviour and how it is changing over time and identifies linkages between substance use and infectious diseases (such as HIV and tuberculosis), mental disorders (such as depression) and other non-communicable diseases (such as diabetes), and violence and injury.

Because the use of substances affects individuals, families and society at large, ATODRU's conducts its research across all levels of society - national, provincial, in local communities and special populations.

SCIENTIFIC GAPS FILLED IN 2018/19

In 2018/2019 ATODRU contributed to two strands of research furthering our understanding of the detrimental effects of social inequalities in health.

- The first study used statistical modelling techniques to compare mortality risks attributed to alcohol use among different socioeconomic groups in South Africa (Probst et al., 2018: BMC Medicine).
- The second study (Lund et al., 2018: Lancet) synthesised evidence on the social determinants of mental disorders, including substance use disorders.

Together these two studies present policies and interventions that could reduce social inequalities in health. This has implications for improving health outcomes by reducing mortality and morbidity and reducing health inequalities in our increasingly unequal South African society.

As part of ATODRU's work on the South African component of the International Alcohol Control Study (a cross-national study involving countries in high income countries, such as New Zealand, England and Scotland) and other middle-income countries (such as Thailand, Vietnam and South Africa) two important pieces of research were published in 2018/19.

- The first one, Morojele et al. (2018: SAMJ), examined exposure to alcohol marketing and advertisements in predicting use of alcohol in the past six months among adolescents aged 16 and 17 years in Tshwane. The number of modes of alcohol brand/product advertising to which the adolescents were exposed was positively associated with alcohol use. For each additional mode of alcohol brand/product exposure the odds of alcohol use increased by 13%. The findings have implications for limiting the exposure of adolescents under 18 to alcohol advertisements.
- In the second, Trangenstein et al. (2018: Substance Abuse, Treatment, Prevention & Policy) found that there is greater focus needed in monitoring and preventing heavy drinking because it may foreshadow needs for use of chronic health services.

ATODRU also contributed to the development of novel methodology underpinning Health for All, an evidence-based toolkit of health promotion interventions (Siegfried et al., 2018: SAMJ). The project was led by the National Department of Health and funded by USAID. This toolkit is

the first national guideline in the world to focus specifically on non-pharmacological interventions in the primary care setting. Recommendations address five risk factors, including alcohol and tobacco, and 22 conditions. Health for All is currently being rolled out countrywide across the Department of Health primary care facilities.

RESEARCH TRANSLATION

While it can take many years for research evidence to reach clinical practice, the SAMRC aims to accelerate the transfer of research into policy and practice through several translational initiatives.

In line with this, ATODRU has been involved in several research translation activities:

- Via the six-monthly report back meetings of the South African Community Epidemiology Network on Drug Use project, ATODRU staff facilitated a broad range of presentations to stakeholders from government, academic institutions and non-governmental organisations.
- Professor Bronwyn Myers, Chief Specialist, provided information from project MIND's experience of training and supervising HIV adherence counsellors to provide mental health counselling in order to guide the Western Cape Department of Health's policy discussions around the role of lay counsellors and other community health workers in mental health and the primary care system.
- Prof Bronwyn Myers and Dr Tara Carney, Specialist Scientist, were involved in the newly-formed South African HIV Addiction Technology Transfer Centre (ATTC). Prof Myers is part of the ATTC management team and is the senior technical expert on substance use disorders. Dr Carney led the development of material on motivational interviewing and Screening and Brief Intervention (SBIRT) for substance use, and how this links to HIV, TB and other mental health issues, and led training on this to a number of stakeholders including KZN department of health directorate of substance use and mental health. Both were involved in a scale-up of the SBIRT meeting with national and provincial department of health in August 2018.
- Prof Neo Morojele and ATODRU staff in Pretoria gave numerous presentations to stakeholders at HIV clinics on the role of alcohol in ART adherence and HIV infection as part of their Flagship study dissemination efforts.
- Prof Bronwyn Myers was part of an Academy of Science of South Africa expert panel tasked with identifying core competencies and scope of practice for all levels of health providers dealing with mental, neurological and substance use disorders to inform training programmes for health providers and service provision.

CAPACITY DEVELOPMENT

Staff in ATODRU are involved in several capacity development activities including but not limited to:

- Supervising nine PhD and 12 Masters' students at various universities inside and outside South Africa.
- Training tobacco control advocates from 10 African countries on qualitative research methodology and how to use NVivo and Endnote software and training in statistical methods at Sefako Makgatho University.
- We have hosted an NRF-funded intern, Warren Lucas, who has now registered for his PhD.
- We have hosted an SAMRC-funded postdoctoral fellow, Dr Carrie Brooke-Sumner, who has worked on various activities relating to the implementation of mental health counselling in primary care facilities as part of a larger study in the unit. During this period, Dr Brooke-Sumner has successfully obtained a competitive Newton Fund grant to examine the effects of psychosocial rehabilitation programmes on the recovery of people with severe mental illness and substance use.
- Several ATODRU staff are supervising students as part of the African Mental Health Research Initiative (AMARI) programme that aims to build capacity for mental health and substance use research in a variety of African countries.

PARTNERSHIPS AND COLLABORATIONS

Mwanza Intervention Trials Unit/London School of Hygiene and Tropical Medicine. This collaboration has among others, enabled the Unit to participate in a study funded by the UK MRC, focusing on the development of a complex alcohol-reduction intervention for people living with HIV who drink alcohol at harmful and hazardous levels.

The Unit collaborated and partnered with various institutions of higher learning in and around South Africa, including:

- University of Cape Town (Psychiatry & Mental Health and Centre for Public Mental Health)
- Kings College London, Implementation Science and Institute for Psychology and Psychiatry
- York University, Centre for Health Economics
- Boston University, Department of Medicine
- University of Maryland
- Sefako Makgatho Health Sciences University, African Tobacco Industry Monitoring Institute
- Walter Sisulu University

ATODRU has also collaborated on an intervention study (Newton Fund) focusing on improving TB treatment outcomes by lifestyle factors such alcohol and tobacco use.

Contact Details:
Charles Parry
charles.parry@mrc.ac.za

NON-COMMUNICABLE DISEASES RESEARCH UNIT

Unit Director: Andre Kengne

OVERVIEW

The Non-Communicable Diseases Research Unit (NCDRU) is the youngest intramural research unit of the South African Medical Research Council (SAMRC), with its purpose aligned to the organisation's strategic goal 2, which is to "build capacity for the long-term sustainability of the country's health research".

The Unit formulates and applies an integrated programme of research and capacity development to improve the understanding, detection, prevention and management of non-communicable diseases (NCDs), with a major initial focus on cardiovascular and metabolic disorders in South Africa.

NCDRU's research aims to generate reliable knowledge to improve the understanding of the burden and drivers of those conditions, adapt existing knowledge or develop context-appropriate solutions to improve the prevention, detection and control of those conditions in South Africa, and other countries confronted by similar challenges.

One example of such research activity is the ongoing NCDRU programme of research to develop a model of community-based diabetes prevention that uses trained community health workers (CHW) to identify at high future risk of diabetes in the community, and then implementing socio-behavioral counselling to reduce this risk. NCDRU is also working on a programme of research to improve the detection and management of common risk factors for NCDs in people with HIV who receive care for their infection at primary healthcare facilities.

Research efforts of NCDRU go in line with research dissemination activities. These include among other, publications of research finding in peer-reviewed scientific journals; and presentations a scientific conferences, workshops and seminars. Beside research, NCDRU also invests significant efforts on capacity development.

Non-communicable diseases (NCDs) are currently the leading cause of deaths worldwide, disproportionately affecting developing countries. According to the World Health Organization (WHO), the burden of chronic non-communicable diseases (NCDs) in South Africa is two to three times higher than in other developing countries; with about two in five deaths in South Africa occurring through NCDs. Research conducted at the Burden of Disease (BoD) research unit of SAMRC further indicates that NCDs in South Africa significantly affect both rural and urban populations, and across the ethnic diversity of the country. The importance of NCDs is such that action on NCDs has been adopted as one of the United Nations' Sustainable Development Goals target. The importance of this action on NCDs is further articulated in the South African National Development Plan (NDP) 2030 vision. Currently however, there is a lack of country relevant scientific evidence to establish effective disease prevention programmes to address the ever-increasing burden of NCDs in South Africa and other developing countries. NCDRU was therefore formed by the SAMRC in response to this need of ongoing research to inform the response of the country to the growing NCDs. The work NCDRU does is therefore a direct response of SAMRC to one of the major health priorities in South Africa; while new knowledge generated by NCDRU has relevance for other countries in the region and to the global community at large.

SCIENTIFIC GAP FILLED IN 2018/19

A major publication with impact on policy, to which NCRU contributed in 2018/19 is the NCD Countdown 2030 report for 2018. NCD Countdown 2030 is an independent, inclusive and collaborative effort to inform and track progress towards reducing the worldwide burden of NCDs, both as measured by Sustainable Development Goal (SDG) target 3.4 and by expanding to NCD outcomes and age groups beyond what is included in this target.

The research found that about 40.5 million (71%) of the 56.9 million worldwide deaths in 2016 were from NCDs. Of these NCD-related deaths, 4% were recorded in people younger than 30 years of age, 38% in people aged between 30 years and 70 years, and 58% in people aged 70 years and older. About 80% of NCD deaths were due to cancers, cardiovascular diseases, chronic respiratory diseases, and diabetes. Globally, the lowest risks of NCD mortality in 2016 were seen in high-income countries in Asia-Pacific, western Europe, and Australasia, and in Canada. The highest risks of dying from NCDs were observed in low-income and middle-income countries, including those in sub-Saharan Africa.

RESEARCH TRANSLATION

Two important research translation activities were led by NCDRU during this reporting period:
A team of 10 NCDRU staff members organised a three hour health promotion session on diabetes and NCDs at large in Belhar. The session was attended by over 150 parishioners who followed the talks on NCDs and risk factors, and had their anthropometric measurements done by NCDRU staff members. Belhar is a community in which NCDRU and collaborators from Cape Peninsula University of Technology and Stellenbosch University, have ongoing research activities.

A meeting was held with the Nutrition Directorate of the National Department of Health on 24 April 2018. The purpose of this meeting was to share results of a NCDRU-led project evaluating liver vitamin A stores in under-five children in the Northern Cape province who are exposed to multiple vitamin A interventions (viz. high dose vitamin A supplementation and food fortification), as well as additional vitamin A from sheep liver, a rich source of vitamin A. Results showed that 64% of these children had excessive liver vitamin A stores, which increased to 72% after been given a high-dose vitamin A supplement. Too much vitamin A can be harmful, particularly in terms of bone development. Scaling back of the national vitamin A supplementation programme for under-five children to the age of three years was discussed, particularly in areas where sheep farming is prevalent and the children regularly consume liver. It was also suggested that the dose in such areas is halved.

A follow-up meeting will be scheduled as soon as results from a provincial-wide survey on liver intake in the Northern Cape province becomes available. This will enable the Department of Health to take an informed decision regarding the vitamin A supplementation programme in this province. The meeting was attended by the Cluster Manager of Health Promotion and Nutrition, nine representatives from the Nutrition and the Child Health, Youth and School Health Directorate, as well the two SAMRC researchers on this project (Dr Lize van Stuijvenberg and Dr Ali Dhansay), and an international collaborator from the University of Wisconsin-Madison, USA (prof Sherry Tanumihardjo).

CAPACITY DEVELOPMENT

During the reporting period, NCDRU staff members were involved in the mentoring of 20 PhD students across universities in South Africa. Furthermore, eight Masters students were trained, two post-doctoral fellows mentored and two NRF interns hosted by the Unit. Prof Mieke Faber gave lectures on aspects of dietetics and nutrition to undergraduates and masters students at three universities in the country (North-West University, Stellenbosch University and University of Cape Town). Prof Kengne lectured the NCDs module to Masters of Global Health students at the Barcelona University in Spain.

Capacity development activities of NCDRU contribute to SAMRC research agenda in a number of ways: In the context of limited resources (both financial and human resources), research projects of interns, masters and PhD students mentored by NCDRU staff are generally nested within major research projects of the Unit. This approach allows the Unit through complementary formulation of research projects of students, to drive with limited resources, major research agenda which would otherwise require substantial investment to be completed. Therefore students are mentored by NCDRU staff through direct involvement in ongoing SAMRC research projects. Students trained by NCDRU staff go on for some to increase the pool of NCD investigators at SAMRC, and for others to increase the research skill of other research groups working in the area of NCDs. Therefore, NCDRU capacity development activities are also contributing to training of new research leaders who will take forward the SAMRC research agenda.

PARTNERSHIPS AND COLLABORATIONS

Collaborations NCDRU has started or rekindled in 2018/19 include those with the Copenhagen University (Denmark), and those with George Institute for Global Health. With competitive funding received from the Danish Agency for Science and Higher Education in response to their call an International Network Programme, bilateral collaborative visits between NCDRU team (and partners in South Africa) and the team of A/prof Dirk Lund Christensen have occurred between May 2018 and March 2019. The purpose of these visits was to explore areas of mutual research interest and develop collaborative research proposals, to seek additional funding to move the collaboration forward.

With competitive funding received from the Africa Oxford Initiative (AfOx), collaborative visits initiated between NCDRU and the Oxford office of the George Institute for Global Health in 2017, have continued in 2018, with Prof Mark Woodward visiting NCDRU in April. This revived collaboration is supporting the development of the African Chronic Kidney Disease (CKD) Collaboration, which is an initiative of NCDRU to generate reliable data to improve the understanding of the epidemiology of CKD in Africa.

NCDRU has been successful at positioning itself as a frontline NCD research unit in the region and a good platform for training and mentoring. Accordingly, the Unit accommodates an increasing number of students and postdoctoral fellows for training and mentoring. The government also recognises that the work done by NCDRU is relevant, while acknowledging that the scope is not broad enough (both in terms of disease and country coverage), to provide all the evidence they need to support their policy formulation on NCDs.

Contact details:
Andre Pascal Kengne
andre.kengne@mrc.ac.za

ENVIRONMENT & HEALTH RESEARCH UNIT

Unit Director: Angela Mathee

OVERVIEW

Primarily, the work done by the Environment and Health Research Unit (E&HRU) of the SAMRC supports Goal 2 of the organisation's strategic goals i.e. "to lead the generation of new knowledge and facilitate its translation into policies and practices to improve health".

To achieve our main objectives of investigating and delivering new knowledge on the environmental hazards to the betterment of the health of South Africans, our research focuses on the following priority areas:

- climate change, adaptation and public health
- housing and health
- identification of groups at risk of exposure to toxic substances, and investigation of the associated health implications.

Cognisant of the fact that it is the poorest people or those living in under-developed environments who often suffer the most from the health effects from exposures to environmental hazards, the knowledge we generate seeks to support a shift towards the prevention rather than treatment of disease through the creation of safe and healthy living environments. At the heart of the SAMRC's work is to conduct research that impacts positively in the lives of ordinary citizens. At the E&HRU we publish and use the knowledge generated to lobby for policies, projects and actions that make the South African environment cleaner and safer, for this and tomorrow's generations.

Notably, we have played an instrumental role in the drafting of the Department of Health's ***National Climate Change and Health Adaptation Plan: 2014 to 2019,*** in which preparedness for heat extremes is a key focus.

ADAPTING TO LIFE IN A RAPIDLY ALTERED CLIMATE AND HELPING PREPARE S.A. FOR HEAT WAVES

During the 2019 State of the Nation Address, President Cyril Ramaphosa acknowledged that South Africa is in a climate change hotspot and urged all South Africans to be more kind to their environment.

"Because of environmentally insensitive human action, the forces of nature conspired to set in motion the dramatic process of climate change," said President Ramaphosa.

Currently, the chances of heat extremes and lower rainfall, are higher than elsewhere on the globe with the rate that is twice as high as the global average. Extreme events associated with climate change have already occurred, causing hardship, ill health and death in South Africa.

"Because of its location, poverty and inequality, South Africa counts among a group of countries particularly vulnerable to the impacts of climate change"
Professor Caradee Wright, Senior Specialist Scientist, E&HRU.

WEATHER-BASED EARLY WARNING SYSTEMS FOR INFECTIOUS DISEASES

With the average temperature increase in southern Africa predicted to be greater than elsewhere in the world, there is a real concern about altered patterns and outbreaks of infectious diseases such as malaria, diarrhoea and pneumonia in the country.

In the past year we completed the SAMRC's role in a five-year project to evaluate a sophisticated model that combines climate and environmental data to predict outbreaks of malaria, diarrheal disease and pneumonia months in advance. The project, which was undertaken in the Giyani area (Limpopo Province), was made possible through a partnership of researchers, statutory climate services and health service institutions in South Africa and Japan. In the first trial, climate scientists were able to predict an outbreak of malaria to which the local health department responded with earlier than usual anti-malaria spraying in high risk areas.

WHO GUIDELINES

Last year, the World Health Organization (WHO) released new housing and health guidelines. These guidelines were issued to support countries to develop tools and strategies for translating normative housing standards into national action. Professor Angela Mathee, the Director of the E&HRU, was part of the WHO Guideline Development Group. A publication from the E&HRU was referenced in the guidelines, which also used images from SAMRC photographic stocks to illustrate the final report.

In response to growing concern around the role of air pollution in health especially in the burden of death and disease from non-communicable conditions, the Organisation also set up a new Air Quality Guidelines Committee which includes Professor Caradee Wright, a Senior Specialist Scientist from the E&HRU.

WE PARTNER, COLLABORATE, IMPART KNOWLEDGE AND BUILD RESEARCH CAPACITY

- In a partnership with the National Institute for Occupational Health, the E&HRU has been undertaking research on exposure to toxic metals and respiratory health in communities living near mine tailing's dumps, as well as studies of the health of waste pickers working on major landfill sites.
- On request from the National Institute for Communicable Diseases, scientists in the Unit are facilitating the strengthening of the systems for environmental notifiable medical conditions: mercury, lead and pesticides.
- In response to recent poisonous plant outbreaks, which often occur where traditional medicine usage is more prevalent, we are preparing public education messages in partnership with the Poisons Information Centre at Red Cross Children's Hospital. To ensure the safe use of traditional medicines, particularly in children, we are collaborating with Karolinska Institute to answer important questions on traditional medicine in primary health care.
- Professor Angela Mathee is a member of the Technical Working Group (TWG) established by the National Department of Health to strengthen and extend the application of regulations to control the use of lead-based paint in South Africa. The TWG has been working for the past two years, and the Unit has hosted meetings of the TWG on two occasions over the past year.

CAPACITY DEVELOPMENT

- A total of 14 masters and 13 doctoral students from various universities are under the supervision by five of our scientists in the Unit. We have also continued to help to build environment and health awareness and research capacity by giving lectures or offering courses at a number of institutions of higher learning in the country.
- At international level we have established partnerships with the University of Graz, Austria (to investigate the health implications of cooking in artisanal cookware crafted from recycled scrap metal), Princeton University and Emory University (investigating climate change and mortality in South Africa), Fudan University, China (air pollution and health), University of Reunion (health implications of exposure to ultraviolet radiation).

PUBLIC ENGAGEMENT

Our scientists have increasingly been converting their scientific publications to articles in formats more amenable to general media publications. Two recent articles focused on the role of environmental health workers in adaptation to climate change *(https://theconversation.com/how-environmental-health-workers-can-help-climate-change-mitigation-111389)* and the folly in treating people for housing-related illnesses, such as diarrhoea and pneumonia, only to send them back to the conditions that caused their illness in the first place: *(https://www.dailymaverick.co.za/article/2018-10-31-location-location-location-rings-true-for-public-health-and-safety/)*.

THE GOOD GREEN DEEDS PROGRAMME

The programme was announced by President Ramaphosa during SONA and we were invited to its launch in March 2019. Our role in the programme is to focus on considerable body of work on lead contamination of the environment, with particular emphasis on its role in reducing permissible levels of lead in paint in South Africa.

Contact Details:
Angela Mathee
amathee@mrc.ac.za

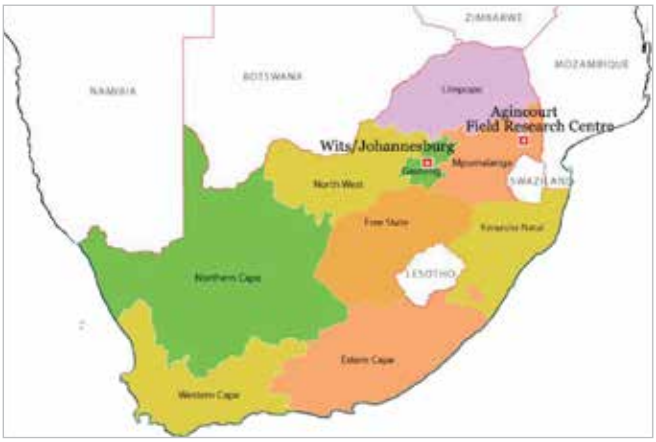
SAMRC/WITS RURAL PUBLIC HEALTH AND HEALTH TRANSITION RESEARCH UNIT

Unit Director: Stephen Tollman

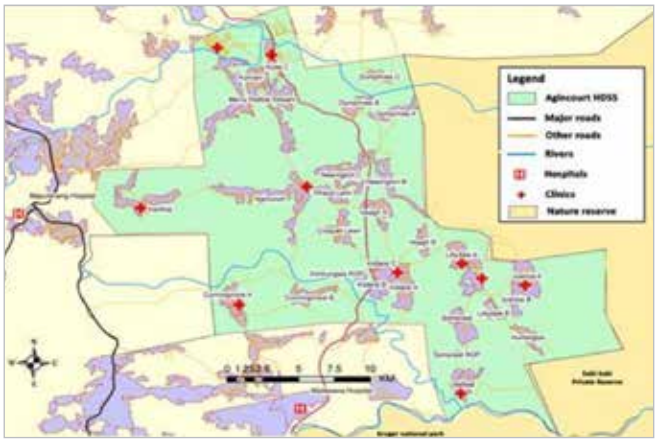
OVERVIEW

The SAMRC/Wits-Agincourt Unit focuses on vulnerable rural communities in Bushbuckridge with wide relevance to Mpumalanga and beyond (see location of Unit in Figure 1). The Unit gained SAMRC status in 2004, and is the SAMRC's lead contributor to rural health research. Founded on respectful engagement with host communities, the SAMRC/Wits-Agincourt Unit aims to understand the dynamics of health, population and social transitions, generating evidence to mount effective public health and societal responses. Following stringent external review every five years, SAMRC status was renewed in 2018 to 2024.

Location of Field Research Centres in South Africa



Map of Agincourt HDSS, South Africa



Introduced in 1992/3, thus spanning socio-political change and the HIV/AIDS epidemic, a robust, health and socio-demographic surveillance system (HDSS) covers a whole population cohort of ~120,000 persons in 31 villages. 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, behaviour change) and older adults (multi-morbidity, cognitive change). Focus on socio-environmental exposures (education, labour migration, socioeconomic status) interacts with emphasis on behaviour and physiological risk.

As well as Wits and SAMRC, the platform is supported by the Dept. of Science and Technology as one of three nodes of the South African Population Research Infrastructure Network (SAPRIN) . This seeks to make a major local, provincial and national contribution to health and development through supporting the Department of Health and other ministries, as well as Statistics-South Africa and the Department of Planning, Monitoring and Evaluation.

The SAMRC/Wits-Agincourt Unit values respectful, long-term public engagement (a research focus in its own right). Ensuring our 300+ field staff are employed from local villages contributes to livelihoods, while providing a disciplined environment to gain the skills suited to a modern economy.

The Unit's primary base is in a typical rural setting 500km northeast of Johannesburg. Providing a counterpoint to South Africa's urban bias, the Unit endeavors to bring the best science to bear in a context where populations carry much of the national burden of disease. Furthermore, the Unit harnesses the best science, contributes vital evidence, provides leadership to sub-Saharan research networks, and partners with leading African, UK and US institutions. Making well-characterised data available to research and policy communities is a priority. Altogether, the Unit contributes unique, population-oriented insight to support health and development in rural South and southern Africa; while providing advanced research training and career development opportunities.

Longitudinal population-based health research requires sustained respectful relationships with communities that are directed towards a greater goal. Investing in relationships has ensured high participation rates in Agincourt cohort and trials research, limiting loss-to-follow up, maintaining balance in trial arms and largely avoiding selection bias in findings.

SCIENTIFIC GAP FILLED IN 2018/19

An HDSS provides a platform for generating extremely high resolution data leading to new knowledge, and presents opportunities for testing innovative methodology using the latest technology. HDSS data present an opportunity to calibrate sub-district findings with large district or provincial scale analyses. Such initiatives are underway in collaboration with the Mpumalanga Province and Statistics-South Africa.

The HDSS is a platform for a range of diverse studies. The following cover some of the new and on-going research undertaken to address knowledge gaps and generate evidence:

1. Is 'integrated chronic care' a feasible and effective health systems strategy in response to the complex interacting epidemics of infectious and non-communicable disease? The SAMRC/Wits-Agincourt Unit has a track-record of **decentralised health systems R&D** informed by rigorous data on population structure, all-cause mortality and probable cause-of-death. A system linking clinic data with the HDSS system provides a rare opportunity for linking population data to health data.
2. Work highlighting high prevalence of **depression in adolescents,** has led to new work to develop and pilot a scalable digital platform, to deliver a culturally adapted version of Behavioural Activation as part of a broader system of social and psychological support.
3. The **African Research in Kidney disease (ARK**) aims to determine prevalence and characterise the profile of chronic kidney disease and co-morbidity, and collaborates with partner studies in Uganda and Malawi.
4. Several **cohort studies** are underway, sampled from and articulating with the Agincourt HDSS platform, and focusing on special populations or groups **along the life** course including **adolescents, young adults, middle-aged and older persons, and temporary / labour migrants.**
   a. The **Migrant Health Follow-up Study (MHFUS**), funded by the National Institutes of Health, USA, conducted its first of five rounds of data collection on a cohort of 3800 migrants and permanent residents of the Agincourt HDSS. The research investigates how migration and urbanisation change risk factors for health conditions and access to treatment, and any barriers to care created by migration. This study investigates the effects of migration on rural origin households, which is an aspect often overlooked or infeasible in studies of mobile people.
   b. The **Health and Aging in Africa (HAALSI)** cohort supports work on HIV- cardiometabolic disease interactions at cellular level; validation studies of the HbA1c biomarker; harmonization of cognitive assessment instruments; and anthropological enquiry into caring and care-giving for the frail and elderly. Amongst other aims this study seeks to provide evidence on cognitive function and emerging dementia in middle aged and older adults.
   c. The cohort of **young women arising from the Conditional Cash Transfer trial (HPTN 068**) continues work on risk behaviours and HIV acquisition, as well as depression and cognitive/ executive function, and their association with HIV and markers of reproductive health.
4. **Patient-oriented research** includes multiple patient

cohorts under development – diabetes, thyroid dysfunction, osteoporosis, chronic kidney disease, dementia, HIV, hypertension – and the establishment of a genetic/genomic platform.

RESEARCH TRANSLATION

RESEARCH-TO-POLICY

Impact of research on policy and programmes occurs at different levels as illustrated in the selected examples below:

Population level	Modelling lives saved and cost savings from reduced salt content in foods led to government regulations restricting salt in designated foods (2016, 2019)
Health care system	National pilot site for evaluation of integrated chronic care systems
Social services	Data led to government intervention to improve access to official documents resulting in much improved uptake of child support grants
National data	Triangulation and interpretation of national census data on migration patterns; and calibration of Statistics-SA mortality registration and cause-of-death data
Global	Development of automated verbal autopsy tool for routine vital registration, including circumstances of death (open access)

PUBLIC ENGAGEMENT

The Public Engagement Office (PEO) organises knowledge dissemination interventions, key to which are feedback and discussion of research findings at village meetings with regular production of tailored knowledge products such as village 'fact sheets' to support local development initiatives. Annually, more targeted meetings are held with local service providers to discuss research results and their implications for programmes and service provision.

Key to the work of the PEO is ongoing networking with service providers, decision makers and policy implementers in the study area to ensure that study participants are referred to appropriate care when needed, and that relevant stakeholders are consulted during community entry and feedback. The PEO has established a Community Advisory Group (CAG) with representatives from each village in the study area. CAG members have ongoing training and meet monthly to discuss research projects. Project-specific advisory are established for large studies. PIs and project managers work with the PEO on accessing the experimental public and disseminating project results.

Contact Details
Stephen Tollman
Email: Stephen.Tollman@wits.ac.za

CAPACITY DEVELOPMENT

Next-generation scientists: mentoring and career paths. Nesting doctoral students, fellows and emerging scientists in Agincourt research teams and strong research environment, offers mentoring by role models, contrasting approaches to research leadership, experience with community and public sector stakeholders, and exposure to policy translation.

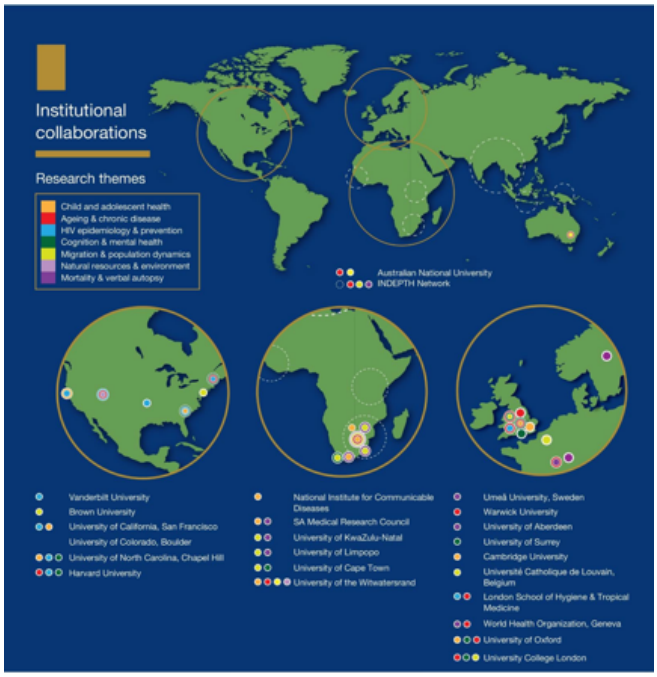
During the reporting period, the Unit had one Masters and three PhD graduates, and two post-doctoral fellows completed their fellowships. The Unit has 50 postgraduate students who currently enrolled, 58% of whom are undertaking PhDs and 10% postdocs. Of the students currently enrolled for higher degrees, 64% are female and 54% are from South Africa or other African Countries. Two emerging scientists received an NRF rating and another had her rating renewed.

LOCAL CAPACITY DEVELOPMENT

The Unit continues to run a successful internship programme for junior data managers, and has introduced internship opportunities for local youth interested in research management and administration. The Unit employs some 300 staff from local communities contributing to their skills development, household livelihoods and the Bushbuckridge economy; while ensuring that purchasing favours local entrepreneurs and businesses in fields such as catering, vehicle maintenance, construction and security.

PARTNERSHIPS AND COLLABORATIONS

The Unit partners with leading scientists from institutions in Africa, Europe/UK and North America. The figure below lists major partnerships and key areas of research collaboration.



SAMRC-UNISA VIOLENCE, INJURY AND PEACE RESERCH UNIT

Unit Director: Mohamed Seedat

OVERVIEW

Despite South Africa's peaceful transition and demonstrative political transformation, the country's healthcare apparatus has continued to contend with the psycho-social and economic burden of morbidity and mortality arising from astonishing levels of violence and injury. The extent of disability and suffering due to injuries is enormous, with an estimated 1.75 million South Africans treated for violent injuries annually.

Accidents and violence directly and indirectly affect the health and wellbeing of individuals in both the short and long-term. At a psycho-social level, the continued threat and occurrence of violence and exposure to harmful road, environmental and recreational spaces, undermines social cohesion. The Violence, Injury and Peace Research Unit, or VIPRU, thus serves as a national research and development hub that centres and shapes the research agenda on violence and injury prevention, and safety and peace promotion. VIPRU is a hybrid unit co-directed and co-funded by SAMRC and Unisa. It is focused on several strategic prevention research niche areas and seeks to contribute to the much-needed development of the multi-disciplinary South African science of intervention implementation and evaluation; maintain multi-sectoral groupings required for implementing prevention; and accelerate the development of a cadre of the next generation of researchers and interventionists in this field. VIPRU's key objectives are to:

- Conduct trans-disciplinary, community-engaged research in violence, injury and peace;
- Undertake demonstration and public engagement initiatives that contribute to contextually-sensitive and empirically-based prevention and promotive practices;
- Provide post-graduate training and internship opportunities for next-generation scholars and change agents;
- Promote the use, reach and influence of research and specialist advice to champion prevention, containment, advocacy and policy; and
- Grow partnerships and collaborations for research, training and public engagement.

RESEARCH IMPACT

The SAMRC-Unisa VIPRU has maintained an ongoing involvement in the development of data collection systems, evaluation tools and analytic strategies to support violence and injury prevention, and safety promotion research and programme activities at community, city, provincial, and national levels. The work is organised in three strands.

The Innovative Methodologies and Technologies Strand is directed at the following overall questions:

(i) what are the methodological and technological innovations required to support prevention;

(ii) what is the epidemiology of fatal and non-fatal injuries; and

(iii) what are indicators of safety and peace?

In 2018, the work in this Strand was led by the National Injury Mortality Surveillance System, or NIMSS, which built on its preceding work, and consolidated the institutional and system arrangements required for the implementation and roll out of this system. This has included the consolidation of strategic partnerships between Unisa, SAMRC and the FPS, especially in Mpumalanga and Gauteng; refining operational requirements (especially the Standard Operating Procedures); ongoing training engagements required at FPS sites; and the public and academic dissemination and use of the system by national and provincial collaborators.

The Determinants-Based and Intervention Studies Strand was directed at the following overarching research questions:

(i) what are the determinants of violence and unintentional injuries?

(ii) how do we develop and implement community-engaged approaches to prevention; and what determinant-based interventions work for violence and injury prevention, as well as safety and peace promotion?

The 2018 work involved prevention studies structured primarily within three Demonstration Programmes: (i) Demonstration Programme One - Thembelihle: Demonstrating Community-Building and Safety and Peace Promotion (ii) Demonstration Programme Two - Erijaville: Demonstrating Community-Based Participatory Research Prevention; and (iii) Demonstration Programme Three: Studies on Unintentional Injuries Shaping a Child Centred Multi-Injury and Multi-System Intervention. Collectively, these contribute to the identification of the determinants of violence (through Demonstration Programmes One and Two, with emphases on direct, epistemic and structural violence, and on male youth violence, respectively) and unintentional injuries (Demonstration Programme Three, with its focus on all child injuries, but especially burns and traffic injuries).

These Programmes in 2018 served to deepen understandings of the complex etiologies of community and youth violence, pediatric burns and child pedestrian exposure, with innovative approaches to building and implementing interventions, including home and Early Childhood Development support engagements, digital and oral stories, and technologies to reduce energy impoverishment. The development of these Demonstration Programmes have been located within theoretically grounded community-engagement approaches and models that involve multiple engagement and support pathways. An initial evaluation of the impact of these Programmes in the Johannesburg South communities was enabled by the development of a conceptual and analytic approach that accommodates multiple, multi-level interventions implemented within community partnership and participation in programme implementation.

A Cross-Cutting Policy Support and Institutional Engagement Strand is directed at producing empirical resources in support of responsive policies, strategic frameworks and enabling environments for safety promotion. In 2017-2018, VIPRU led the translation of water safety research findings that culminated in the Strategic Framework for Drowning Prevention and Water Safety for the Western Cape. This Strategic Framework highlights seven intervention priorities. The Western Cape Department of Local Government adopted the Framework and has supported the immediate prioritisation of a barrier policy for pools and dams. In 2018, an epidemiological analysis of drowning incidents and trends, demographics, and the circumstances of occurrence was published in support of the implementation of this Framework.

The influence and reach of VIPRU is indicated in international and nationally recognised publications, the large number and range of requests received to conduct peer reviews on journal submissions, examination of dissertations, staff appointments to specialist committees and expert panels, and the provision of expert and technical advice.

In 2018, the contributions on special committees by Professors Ratele (Ministerial Oversight Committee on the Transformation in the South African Public Universities) and Dr David Kimemia (Eskom Air Quality Off-sets Committee) enabled the group to make contributions to national sector-specific decision-making structures. VIPRU staff were invited by several higher education institutions, in the region and beyond, to contribute to curriculum review and design in community psychology (e.g., Kyambogo University, Uganda; Universitas Ahmad Dahlan, Indonesia) and strategic research programming (e.g., Universidade Eduardo Mondlane, Mozambique).

HIGHLIGHTS

The publication highlights for this period include Professor Sandy Lazarus's provocative book Power and Identity in the Struggle for Social Justice: Reflections on Community Psychology Practice (2018). Professor Kopano Ratele co-edited a recently published a well-received volume with Professors Shefer, Hearn and Boonzaier on Engaging Youth in Activism, Research and Pedagogical Praxis: Transnational

and Intersectional Perspectives on Gender, Sex, and Race, published by Routledge (2018). VIPRU graduated two PhD students in the last year.

RESEARCH TRANSLATION

VIPRU staff have actively responded to media requests across multiple platforms; Professors Ratele and van Niekerk have been sought-after social commenters on violence and masculinities, and burn injuries, respectively.

- In 2018 Prof van Niekerk was featured in the video: "Fire from the dragon: Smoke alarms save lives.
- Professor Ratele co-hosted a weekly talk show "CapeTalk Dads" dealing with current issues faced by fathers on the Cape Talk radio station. Topics included, for example, Being labelled as a babysitter to your kids and Are you discussing the political climate with your kids?
- The VIPRU social media platforms have had extensive reach. For instance, for the period June 2017-October 2018, the African Psychologies YouTube channel registered 9570 views; for the period May 2017-October 2018, its top Facebook post reached 1718 people; and its Tweets earned 2600 impressions in October 2018.

CAPACITY DEVELOPMENT

- The VIPRU senior team supported an internally located cohort of two post-doctoral fellows and 10 post-graduate students (two masters; eight doctoral), as well as an externally located cohort of 12 post-graduate students (four masters; eight doctoral). There was also a group of four psychology research masters interns working in VIPRU.
- Post-graduate training and development has included the provision of dedicated support through an Annual Interdisciplinary Academy for post-graduate students and post-doctoral fellows, writing retreats, and conceptual and methodological training.
- VIPRU also provided a range of training courses to diverse stakeholders, intended to grow and deepen national violence and injury prevention platforms, and safety and peace promotion intervention, policy and research capacities.

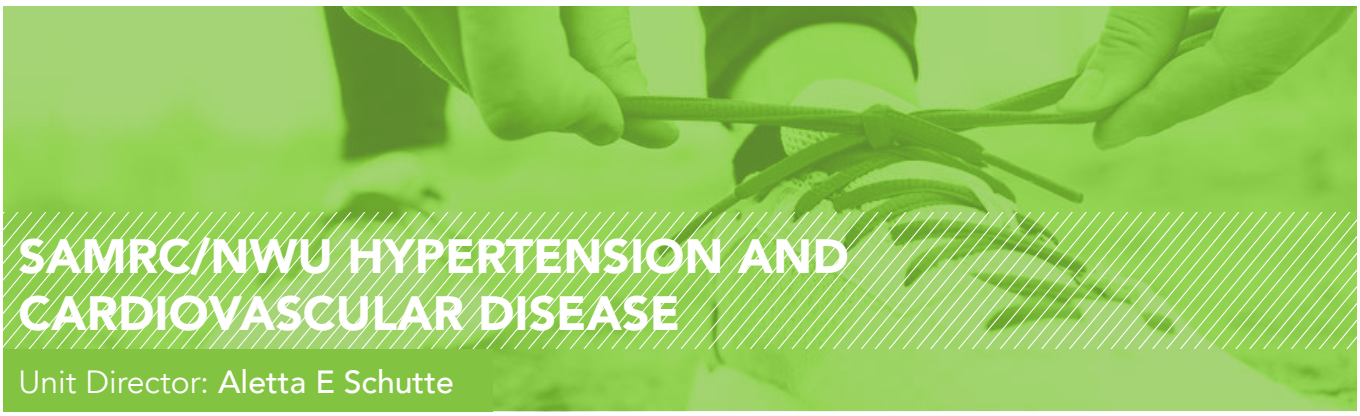
PARTNERSHIPS AND COLLABORATIONS

There have been a number of local and international partnerships and collaborations that were deepened in 2018, including with: the Division of Public Health at Karolinska Institutet Sweden); the University of Johannesburg's Energy Studies Department; Open University (UK); Nelson Mandela University; University of the Free State; and a signed Memorandum of Understanding between University of South Africa and Kyambogo University, Uganda.

Furthermore, VIPRU hosted a number of Academic Associates and Visiting Research Fellows. This Programme provided opportunities for VIPRU senior researchers to grow their international research collaboration and publications, and strengthen their research competencies and scientific leadership, and overall organisational management capacities. Both academic associates and visiting research fellows provide advanced mentorship and facilitate opportunities for collaborations. This programme aims to increase the global visibility and reach of the research. The visiting fellows serve as peer advisers to the senior staff and hold expertise in public health; violence and injury prevention; injury statistics; community psychology; safety and peace promotion; men and masculinities, gender justice; ethics; human rights; and social policy.

A further highlight was VIPRU's collaboration with various institutions to host a Colloquia Series. The first was in collaboration with the University of the Western Cape and focused on the question of who is supervising and mentoring black students and to what end. The second event was a collaboration with the Hub for Decolonial Feminist Psychologies in Africa, located at the University of Cape Town, with questions that focused on what does an African-centred decolonial feminist psychology look like in practice, what can it offer students, and what demands does it make on researchers, university teachers and administrators? The third event, billed as a roundtable, was led by one of our doctoral students, tying in with her research study ("Is it possible to have a feminist marriage that begins with lobolo? African feminism, femininities, masculinities, and lobola"). The fourth event, held in a township and as a collaboration with community organisations, was a conversation on the complexities and contradictions young men face in contemporary society characterised by massive joblessness, as well as consumer capitalist values and economic inequality.

Contact:
Ashley van Niekerk
Email: ashley.vanniekerk@mrc.ac.za



SAMRC/NWU HYPERTENSION AND CARDIOVASCULAR DISEASE

Unit Director: Aletta E Schutte

OVERVIEW

The SAMRC/NWU Hypertension and Cardiovascular Disease Research Unit has at its core focused to generate new knowledge to impact on reducing blood pressure of South Africans, but also Africans and the global community. This is done through several innovative and transdisciplinary research projects. By using the latest technological advancements to study especially the early phases of cardiovascular disease development, we are able to pin-point specific and unique profiles in black individuals. This population is priority due to a clear predisposition to develop raised blood pressure early in life, with consequences of hypertensive heart disease, heart failure and stroke – if no intervention is made.

Our research projects cover the full age spectrum of hypertension development, with recent projects having prominent focus on the youth.

- The African Prospective study on the Early Detection and Identification of Cardiovascular disease and Hypertension (African-PREDICT) has a long term focus to intervene in the youth to prevent or delay hypertension development. By using big data, including metabolomics, proteomics and transcriptomics, along with a highly detailed phenotype of the 1200 young adults included, we are implementing the latest technology to distinguish between those at early lifetime risk.
- The Exercise, Arterial modulation and Nutrition in Youth (ExAMIN Youth) study evaluates specific behaviours and biomarkers that may contribute to increased aortic stiffness and raised blood pressure in six-eight year old children.
- Populations at advanced stages in life are targeted with the Prospective Urban Rural Epidemiology (PURE) study where we have tracked 2000 adults for the past 14 years and highlighted behaviours such as alcohol intake predicting heart attacks and strokes.
- And our collaboration with the World Health Organization's Study on Global Ageing and Adult Health (WHO SAGE) is evaluating the effectiveness of South Africa's implementation of legislation to lower salt intake in processed foods.
- Finally our realisation of South Africa's unique risk distribution in terms of communicable and non-communicable diseases resulted in the EndoAfrica study investigating vascular endothelial function and better understanding of cardiovascular risk in HIV-infected adults. New knowledge on their risk will lead to better therapeutic strategies to ensure longevity for a large proportion of South Africans.

Globally raised blood pressure is the leading cause of death, resulting in 10.6 million adults dying each year. Also in South Africa, with HIV being treated very effectively, non-communicable diseases and in particular hypertension, has overtaken infectious diseases as the main cause of death. It is now well established that black ethnicity is accompanied by a significantly higher risk for hypertension than other populations. In African populations, high blood pressure (BP) or hypertension develops at a younger age and is often more severe in terms of BP levels than in the white population, potentially due to the process known as early vascular ageing. Higher proportions of black individuals are also sensitive to the BP raising effects of dietary salt, and due to ethnic-specific physiological mechanisms black individuals respond differently to antihypertensive medication than whites. Multiple factors such as poor health systems in Africa, poverty, socio-economic status and related health behaviours, result in a significant burden of hypertension in South Africa, resulting in stroke, chronic kidney disease, and cardiovascular mortality. Our Unit is uniquely placed to investigate all of these aspects, and thus the work from our Unit covers all of these aspects, to benefit all black populations in the future.
South Africa is uniquely placed, being the first country to legislate the mandatory reduction of sodium in processed foods in 2016. Although salt intake is long known to contribute to increased blood pressure, recent studies showed for the first time novel findings on sodium handling, e.g. salt being stored in the skin, having a profound effect on blood pressure control. Novel biomarkers were also discovered.

Our Unit has shown for the first time [1-8] in humans that a new biomarker of salt intake, namely the cardiotonic steroid marinobufagenin, which inhibits the Na+K+ATPase,

is significantly associated with increased blood pressure, arterial stiffness and left ventricular mass in young healthy adults with increased salt intake. These effects were shown to be independent of salt. With recent debate on whether salt intake is indeed detrimental to health, our findings strongly support South Africa's initiative to lower population salt intake.

RESEARCH TRANSLATION

Globally and within South Africa one of the biggest constraints in managing hypertension is that more than 50% of patients with hypertension are unaware of their condition. The situation is even worse in low- and middle-income countries. Together with International Society of Hypertension (of which the Unit Director is currently the President), and initiative was launched in 2017, and repeated with greater success in 2018, namely May Measurement Month (MMM). During this month over 1.5 million blood pressures were measured globally to increase public awareness of the importance of blood pressure measurement.

In South Africa we also drove this initiative and over 3,000 blood pressures were measured. This now gained the attention of the Department of Health and it is planned that the Department of Health will also be involved nationally to contribute to MMM in 2019. Several media campaigns globally and in South Africa took place, where the Unit Director spoke on radio stations, though newspaper articles and on social media.

- *During 2018 the impact of MMM 2017 was also published in the Lancet Global Health, and the country-specific data for South Africa are under consideration for publication in European Heart Journal Supplements.*

CAPACITY DEVELOPMENT

Within the Unit, five BHSc Honours students registered and completed their studies, six MHSc students registered and completed, and 15 PhD students were registered of whom one graduated, where two submitted for examination with favourable outcomes and another two will submit for examination in March 2019; 88% of students are female.

Students got the opportunity to present results at scientific meetings in South Africa and abroad, with continuous scientific activities in the Unit such as journal clubs. Young staff members in the Unit also benefit from mentorship activities and exposure to international laboratories for postdoctoral work.

PARTNERSHIPS AND COLLABORATIONS

- Collaborative networks form an essential part of the Unit's work. Continuous activities include work with Prof. Christian Delles (University of Glasgow) on proteomic analyses and biomarker multiplexing in the African-PREDICT study [co-funded through the Newton Fund] with the first paper published in Feb 2019 on – omics data: *(https://www.ncbi.nlm.nih.gov/pubmed/30801385)*
- Dr. Olga Fedorova (National Institutes of Ageing, USA) on the salt biomarker, marinobufagenin, resulting in several publications as listed at point 3
- Prof. Jan Staessen (Katholieke Universiteit Leuven, Belgium) on global consortium on ambulatory blood pressure and large arteries. We are in the early phases with several publications ongoing
- Prof. Karen Charlton (University of Wollongong, Australia) working on the WHO-SAGE study on South Africa's salt legislation. The study's follow-up data collection is ongoing but several papers were published, and engagement made with Department of Health;
- Prof. Edzard Schwedhelm (University of Hamburg, Germany) working on plasma biomarkers relating to nitric oxide involved in blood pressure control with samples analysed in Hamburg, and includes our PhD student (Ms. Cleo Mokhaneli) spending six months in Hannover to learn these techniques and perform analyses; Prof. Hans Strijdom (University of Stellenbosch) as co-investigator of the EndoAfrica study on HIV infection and endothelial function – with main data collection continuing for this study.

The Unit Director, Professor Schutte, has received recognition for the work performed by the Unit. This includes the recent award from the African Union, namely the Kwame Nkrumah Regional Award for Scientific Excellence for 2018, awarded in 2019 in Addis Ababa for the scientific contributions towards a better understanding, prevention and management of hypertension in Africa.

In 2018 the Unit Director became the first President of the International Society of Hypertension from Africa, serving from 2018-2019. She was recognised in 2018 as the highest cited researcher at the North-West University (for the year 2017), and received formal Feedback Reports from the National Research Foundation's rating panel.

Contact details:
Aletta Schutte
Email: alta.schutte@nwu.ac.za

SAMRC/UFH MICROBIAL WATER QUALITY MONITORING RESEARCH UNIT

Unit Director: Al Okoh

The Unit strives to be a highly profitable Centre of Excellence for the development of the next generation of microbial water resource and sanitation specialists within the domain of public health, and to be a leader in proffering solutions to the myriad of water and sanitation challenges in South Africa and beyond, with particular emphasis on water/wastewater quality and genomics including related infectious diseases and survival of the pathogens; emerging chemical pollutants and their health implications; reservoirs of antibiotic resistance; and new bioactive compounds of health importance.

Our mandate is particularly driven by the serious problem of shortage of skilled manpower in the water and sanitation sector, especially amongst previously disadvantaged demographic groups in South Africa, and the need to finding solutions to this reality using the instrumentalities of our research initiatives as vehicles for skills and capacity development in the water and sanitation sector, especially amongst the designated demographic groups in South Africa.

During this reporting cycle, the Unit had students at the honours, masters, doctoral and postdoctoral levels conducting their research within the precincts of several projects under the following niches:

- Quality indices of water resources in and outside of the Eastern Cape Province (ECP). This included water resources used for drinking, recreational, aquaculture and irrigation purposes as well as wastewater treatment effluents.
- Assessment of waterborne and water related microbial pathogens including emerging and re-emerging pathogens and their responsiveness to current antimicrobials regimens.
- Emerging pollutants in the aquatic environment and development of innovative nanomaterials for use in their removal from water/wastewater; Cross-Sectional analysis of emerging choleragenic Vibrio cholerae (Non O1 and Non O139) and Vibrio cholerae O1 and O139 in Municipal and surface waters of the ECP, and the development of a cholera monitoring and response guidelines.
- Antimicrobial resistance in the water-plant-food public health interface.
- New bioactive compounds of health and biotechnology importance; and animal and human viruses.

NATIONAL AND INTERNATIONAL IMPERATIVES

At a national level, the Unit has contributed to the development of the much needed skills and capacity in science and technology. The training of postgraduate students in this project speaks to this. Also, the policy imperatives as articulated in the White Paper on Science and Technology, and the National Research and Development

Strategy recognises that South Africa is in a state of "frozen demographics" requiring priority attention in the area of skills and capacity development especially amongst previously disadvantaged demographic groups in the country. Our work in the Eastern Cape Province, which is mainly rural, and that our students are mainly from the previously disadvantaged demographic groups speaks to this. Also, is the government's goal of addressing the triple challenges of reduction of poverty, unemployment and inequality. Several students have been trained and attained higher degree qualifications from projects in the Unit, which makes them competitive in the job market. All the graduates have gained employment or pursuing higher degrees and thus have assisted in breaking the shackles of poverty in their families.

At a global level, the work is consistent with goals 3 (Good health and wellbeing) and 6 (Clean water and sanitation) of the United Nations Sustainable Development Goals.

MAKING SCIENTIFIC IMPACT IN THE EASTERN CAPE PROVINCE

1. ***Quality indices of water resources in and outside of the Eastern Cape Province (ECP). This included water resources used for drinking, recreational, aquaculture and irrigation purposes as well as wastewater treatment effluents.***

2. ***Assessment of waterborne and water related microbial pathogens including emerging and re-emerging pathogens in the Eastern Cape Province and their responsiveness to current antimicrobials regimens.***

- The ECP is mostly non-urban, poor and without adequate infrastructure, with a significant proportion of its rural communities relying heavily on available surface waters which are often impacted by inadequately treated effluents from municipal wastewater treatment plants (WWTPs). To ascertain the extent of these impacts and the survival of microbial pathogens in treatment processes, we carried out extensive studies on this subject and concluded as follows:
  (i) Production of final effluents of acceptable qualities remains a challenge in the ECP;
  (ii) WWTPs in the province irrespective of their location are still struggling to produce effluents of acceptable qualities; and
  (iii) there is increasing evidence of chlorine disinfectant resistant pathogens, suggesting the need for review of current dosing regimens. Also, we assessed the quality indices of some freshwater resources in the ECP including Nahoon beach and canal, Kidd's beach, Buffalo and Kat Rivers. These studies also served as vehicles for skills and capacity development in the water science sector among previously disadvantaged demographic groups in the Province and concluded that:
  (i) Anthropogenic activities still play a role in compromising the quality of our water resources occasioned by inadequate sanitary infrastructure; and
  (ii) the quality status of these water resources mostly fell short of acceptably standards and consequently are threats to public health in many cases.

3. ***Emerging chemical pollutants in the aquatic environment of the ECP and development of innovative nanomaterials for use in their removal from water/wastewater.***
   - This project which is a continuation, is a detailed study on fingerprinting key chemical pollutants in the aquatic resources in the ECP, and development of novel nanomaterials for their removal. During the reporting cycle, the target pollutants included hydrocarbons, metals ions and endocrine disruptor compounds including organochlorine pesticides and phenolic compounds amongst others. The findings revealed significant TPH, PAHs, PBDEs and OCPs pollution of Algoa bay and Buffalo River and estuary. Also, novel nanomaterials synthesized in the laboratory showed promise for the removal of metal ions pollutants in water treatment processes. Several articles were published from this project during the reporting cycle.

4. ***Cross-Sectional analysis of emerging choleragenic Vibrio cholerae (Non O1 and Non O139) and Vibrio cholerae O1 and O139 in Municipal and Surface Waters of the Eastern Cape Province of South Africa, and the development of a cholera monitoring and response guidelines.***
   - This was a detailed study commissioned by the Water Research Commission of South Africa in 2015 and completed during this reporting cycle (2018). The study assessed the incidence of cholera and non-cholera causing Vibrio species in the aquatic environments of the ECP and included aquatic animals and vegetables as possible reservoirs of these pathogens.
   - The overall aim of this research is the development of a cholera monitoring programme for inclusion in the water resource monitoring programme. During the reporting cycle, this exciting study produced five PhD graduates; a product entitled "A manual for the monitoring of cholera and non-cholera causing vibrio pathogens in water, vegetables and aquatic animals"; and two articles. The manual is currently being considered for inclusion in the national water resources monitoring programme.

5. ***Antimicrobial resistance in the water-plant-food public health interface.***
   - The rising incidence of antibiotic resistance has become a major health concern worldwide, and this is being exacerbated by the interactions between pollution, resistant bacteria and aquatic environments with horizontal gene transfer playing important roles

in the spread of resistance determinants. Hence, we assessed some aquatic resources in the ECP as possible sources of antibiotic resistance determinants in the environment using viable bacteria isolates recovered from these niches for antibiogram fingerprinting. Our reports in 2018 showed increasing trend in multiple antimicrobial resistance in different bacterial species even against the Carbapenems. We also conclude that:

(i) Wastewater treatment plants (WWTPs) are important reservoirs of antibiotic resistance determinants in the South African environment;

(ii) There are no guidelines for nucleic acids in water quality, and considering the possibilities of horizontal gene transfers and the inherent consequences of multidrug resistant pathogens the need to establish guidelines for nucleic acids in final effluents becomes imperative and was proposed.

This therefore suggest the need for more work on development of innovative materials for the removal of nucleic acids from wastewater effluents before discharge into the environment and this is a subject on ongoing investigation in our group. Four articles were published from this project during the reporting cycle.

6. ***New bioactive compounds of health and biotechnology importance***

The bioactive compounds research continued into the current reporting cycle during which we focused on the following:

- **Plants:** Syzygium paniculatum which exhibited significant antixoxidant properties and published as one paper in 2018; Moringa oleifera which proved to have potentials as functional foods and published as one paper in 2018; and active evaluation of some plants with promising hepatoprotective potentials.
- **Seaweeds:** We have identified some seaweeds that have shown good promise for the management of Alzheimer's disease. These include Chlorella sorokiniana, Chlorella minutissima, Gracilaria gracilis and Ulva lactuca. Two papers have been published from this during this cycle, and further studies are ongoing including characterization of the active principle(s).
- **Valorization of organic wastes:** We are actively involved in the exploration for novel bioactive compounds from microbial resources for the Valorization of organic waste as part of an effort to protect environmental and public health from the menace of waste pileup. We have isolated and characterized some important organisms in this regard including Achromobacter xylosoxidans, Bordetella bronchiseptica and Raoultella ornithinolytica and further investigations on these organisms are ongoing. Seven papers have been published from this study in this reporting cycle.

7. ***Animal and human viruses***

- **Animal virus:** During the reporting cycle two important articles were published on porcine parvoviruses and porcine circovirus both of which are pathogens of swine herds. Our report on the porcine parvoviruses (Afolabi et al, 2019) was the first epidemiological survey and molecular characterisation of the classical and emerging porcine parvoviruses in South African swine herds; while the one on porcine circovirus (Afolabi et al, 2018) was the first complete genome sequences of PCV2b, PCV2d and PCV2-IM2 in pigs from South Africa, and it gives possible insight into the genetic characteristics and variability of the viral strains presently in circulation within the country.
- Human viruses: Our HIV studies during the reporting period investigated the socio-demographic and clinical determinants of late presentation among patients that were newly diagnosed with HIV in the Eastern Cape, South Africa. The study concluded that the majority of newly diagnosed HIV-infected individuals were late presenters, and to maximize the impact of the 'test and treat' policy aimed at reducing new HIV transmissions and preventing the morbidity and mortality associated with HIV, there is a need for programmes to improve early detection of HIV in the study settings. This work was published in one part (Sogbanmu et al, 2019). Another study evaluated HIV-1 drug resistance among parturient women on anti-retroviral therapy in the ECP, while the third is a cross-sectional study on Diabetes mellitus in newly diagnosed HIV-positive patients in Buffalo City Municipality, East London. We are currently writing up our findings of the last two studies for publication.

COLLABORATIONS

Antimicrobial resistance projects with Prof Lise Korsten of University of Pretoria through our joint project funded by USAID and DST (PEER programme). Five Masters students are involved in this project at Fort Hare and two of them will be graduating in May 2019.

Contact details:
Name: AI Okoh
Email: aokoh@ufh.ac.za

SAMRC/UCT RISK AND RESILIENCE IN MENTAL DISORDERS RESEARCH UNIT

Unit Director: Dan Stein

OVERVIEW

There is growing awareness of the high prevalence and costs of mental disorders; these conditions contribute to a significant proportion of the global and local burden of disease. As we address infectious diseases, so we can expect that the contribution of non-communicable diseases, including mental disorders will continue to increase.

The work of the Unit ranges from basic neuroscience, on to clinical research, and from there to community studies; that is from bench to bedside to communities, and back again. 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 the complexity of mental disorders.

We are aiming for a better understanding of mental disorders and for better interventions. We are also aiming to use neuroimaging and neurogenetics to improve personalized medicine. We constantly strive to provide innovative mental health solutions that are relevant to our local context, and that have global importance.

MENTAL DISORDERS A GLOBAL HEALTH PROBLEM

The rationale for a SAMRC Unit on mental disorders lies on a number of key assertions. First, mental disorders are a major contributor to the local and global burden of disease; they are highly prevalent across the globe and yet they remain under-diagnosed and under-treated in comparison to physical illness – indeed they contribute disproportionately to the disease burden in low- and middle-income countries, and this burden

is predicted to grow in future decades. Secondly, despite advances in our understanding of the neurobiology of mental disorders much remains to be understood about risk factors for and resilience to mental disorders. Thirdly, understanding the pathogenesis and management of mental disorders has become increasingly tractable, given advances in methods such as brain imaging and neurogenetics, and given opportunities provided by local cohorts and international collaborations. Fourthly, collection and analysis of "big data" from (mostly longitudinal) cohorts locally, and from (mostly cross-sectional) international collaborations, contributes to our ability to make real advances in our understanding of risk for and reliance to mental disorders, and so ultimately to their prevention and treatment.

The work of the Unit is consistent with national priorities, with the SAMRC goals, and with systematic international research priority setting exercises. For example, our projects advance the SAMRC strategic goal of leading the generation of new knowledge and facilitating its translation into policies and practices to improve health; we have produced and disseminated new scientific findings and knowledge on health, we have promoted scientific excellence and the reputation of South African health research; and we have provided leadership in the generation of new knowledge in health; we have facilitated the translation of SAMRC research findings into health policies and practices. Furthermore, our projects support innovation and technology development to improve health, and have built capacity for the long-term sustainability of the country's health research, other key SAMRC strategic goals. The country's national Medium Term Strategic Framework prioritizes activities that can lead to a "healthy life for all South Africans"; these must include mental health efforts.

SCIENTIFIC GAP FILLED IN 2018/19

During the reporting period, the Unit continued to contribute to the latest revision of the World Health Organization's International Classification of Diseases (ICD), the ICD-11, which was released to countries for comment this past year, and which will go to the WHO Assembly for sign off in the next reporting period. While the Unit has made particular contributions to the classification of obsessive-compulsive disorders, we also participated in a range of collaborative ICD-11 scientific publications, co-produced by leading Units around the world, which provide the scientific basis of the revision.

During the reporting period, the Unit continued to contribute to international collaborations on brain imaging and neurogenetics. We played a leading role in the largest imaging studies of Obsessive-Compulsive Disorder (OCD) to date, in the largest genome wide association study of Post-traumatic stress disorder (PTSD) to date, as well as in novel work on the overlap of genes that increase risk for OCD/anxiety, and genes that increase risk for changes in neural circuitry. We contributed to work on how trauma and HIV alter the genome (via intergeneral gene expression changes and epigenetic acceleration).

The Unit continued to publish findings that range from basic science through to community health, and including work on clinical interventions in the local setting. A publication in Cell provided new insights into the brain basis of responses to threat. The Unit Director played a key role in two edited volumes produced by the World Mental Health Survey consortium; one a snapshot of the prevalence and burden of mental disorders around the world, and one on PTSD.

RESEARCH TRANSLATION

The Unit is particularly interested in African collaborations and during the reporting period, the Director convened the annual African College of Neuropsychopharmacology meeting in Cape Town.

The Unit has played a key role in the SA HIV Addiction Technology Transfer Centre, which provided training to hundreds of clinicians around the country on SBIRT (screening and brief interventions) for substance use disorders.

The Mental Health Information Centre of the Unit is dedicated to community engagement activities in the area of mental health.

CAPACITY DEVELOPMENT

The Unit hosts a number of postgraduate students, post-doctoral fellows, and early career researchers. We continue to build capacity in key areas including brain imaging, neurogenetics, psychiatric epidemiology, and clinical trials research. All of these are in line with the SAMRC research agenda.

PARTNERSHIPS AND COLLABORATIONS

The Unit has a wide range of collaborations in the Western Cape (the Unit straddles two local universities), in South Africa, in Africa, and across the world. We lead key international brain imaging collaborations (as part of the ENIGMA study), as well as a number of African neurogenetic efforts (as part of H3Africa and Neuro-GAP). The Unit participates in the World Mental Health Surveys Consortium, the largest epidemiological survey in the world. We participate in the international field trials of the World Health Organization, which provided a key scientific foundation for the ICD-11 (see above under Scientific gap filled in 2018/19).

Contact details:
Dan J Stein
Email: dan.stein@uct.ac.za

PROGRAMME 2:
MATERNAL, CHILD AND WOMENS'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

- Gender and Health Research Unit
- SAMRC/UP Maternal and Infant Health Care Strategies Research Unit
- SAMRC/Wits Development Pathways Research Unit
- SAMRC/UCT Child and Adolescent Lung Health Research Unit

PROGRAMME STRATEGIC OBJECTIVES

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

RESEARCH HIGHLIGHTS UNDER THIS PROGRAMME

GENDER AND HEALTH RESEARCH UNIT

Unit Director: Naeemah Abrahams

The Gender and Health Research Unit (GHRU) is a world class policy relevant research programme on violence against women and children (VAWC) that advances and generates knowledge for improved programming and policy to enable countries to respond to the Sustain Development Goals.

In the country as a whole, we recognised that VAWC is part of interpersonal violence, which has been identified as one of the four colliding epidemics which comprise the bulk of the burden of disease in the country. Child abuse is a cross-cutting risk factor for all the four major epidemics in the country. In some parts of South Africa, one third of women disclose having been raped and two-thirds have experienced intimate partner violence (IPV) at some time in the past year. Our research shows that 58% of women killed (intimate femicide) cases are perpetrated by intimate partners and 45% of child homicide cases are due to child abuse.

Our Unit has generated knowledge to inform the new National Strategic Plan on violence against women and femicide and its implementation. We are nationally recognised as the go to source of information on VAW and femicide, and a major focus of our research translation work include media engagement to bring an evidence-informed perspective to current events. Our research covers all nine provinces and we have multiple stakeholder engagements including parliament, government and communities. We also work with Historically Disadvantage Institutions (HDIs), particularly with Walter Sisulu University.

CLOSING THE GAP ON VAWC

The Unit has 46 active research projects which span the causes, prevention of, response to and health impacts of VAWC. We have generated knowledge on the intersections of VAW and violence against children (VAC), particularly through the **What Works global programme**, analysis of the UN-Multi-country-study on Men and Violence, and the collaboration with kNOw Violence in Childhood Initiative. This information is used to inform the development of interventions to prevent VAWG and VAC.

The Unit hosts two global programmes: the **Sexual Violence Research Initiative (SVRI)** and the R300 million **DFID Flagship** What Works to Prevent VAWG Global Programme (WW). The What Works Programme has led and supported sixteen projects with research and intervention evaluations in 13 countries in Africa and Asia which include some of the world's most fragile settings.

In eThekwini, we worked with young men and women in a project that combined a livelihood strengthening intervention (Creating Futures) and with a gender transformative intervention, **Stepping Stones**. We have shown the combined intervention increased economic empowerment, particularly increased savings, and also higher levels of income for both women and men. For men, it also reduced **perpetration of VAWG, as well as reducing their engagement in crime.** What Works has also focused on violence against women and girls with disabilities. We have shown that these women and girls are four times more likely to experience violence.

We extended our research in the education sector on violence amongst women and girls in higher education such as colleges and Technical and Vocational Education and Training (TVET) colleges. We are leading the development of training materials for the prevention of violence which meets a demand from the President at the Presidential Gender Based Violence and Femicide Summit.

In 2018, the SVRI in partnership with the World Bank Group (WBG) awarded US$1.1 million to 11 research teams from around the world for innovations to prevent and respond to gender-based violence (GBV). Grants awarded in 2018 through the SVRI WBG Development Marketplace Award include a team evaluating a 'walking school bus' — a group of children walking to school with one or more adults — as a school-related GBV intervention in KwaZulu-Natal; a team looking at how monks and devotees can intervene to reduce GBV in communities in Cambodia; and a team working with young boys and girls in Papua New Guinea to train future leaders devoted to ending inequality and preventing GBV.

RESEARCH TRANSLATION

Over the last year the Unit has published an impressive number of peer reviewed journal articles (24), and evidence briefs (15). We also engaged in extensive dissemination of our evidence-based research through events targeted at multiple audiences globally, regionally and nationally.

In a major highlight, GHRU's research informed the planning of the **National Gender-based Violence and Femicide Summit (GBVF)**. In his keynote address at this event in November 2018, **South Africa's President Cyril Ramaphosa** drew on the background document prepared by a team led by GHRU's Dr Nwabisa Shai. The President asserted "studies that were conducted in South Africa show that where interventions are linked to the economic and social empowerment of women, IPV is decreased. We need to invest more in research that develops evidence-based interventions to end gender-based violence… We must seriously re-examine how we talk about violence against women and children and how our discourse reflects societal norms." Subsequently, President Ramaphosa's 2019 **State of the Nation Address** reaffirmed his support for the development of a National Strategic Plan on GBV and Femicide, a commitment to implement decisions of the Summit, and to make Government funds available for these.

CAPACITY DEVELOPMENT

The Unit's scientific staff advanced their degrees in the last year. The unit produced three new PhDs in Public Health and one new MSc in Biostatistics; two additional PhDs have been submitted for examination and two staff members have newly enrolled for a PhD. We also added a postdoctoral fellow and an NRF intern to the Unit. Eight staff members collectively supervised 10 masters' students and 13 PhDs.

PARTNERSHIPS, COLLABORATIONS AND IMPACT

The Unit researchers have extensive collaborations with Universities in South Africa. In the past year, we started research within historically disadvantaged institutions of higher learning and TVET colleges, training researchers on GBV. Dr Yandisa Sikweyiya started a collaboration as a Co-PI on a NIH funded study with the School of Public Health, UCT and Brown University (USA) on projects related to linking and retaining men in HIV care services.

Another collaboration is with the University of Ghana to set up an online gender-based analysis course for cross cutting topics including tropical diseases. Among our global collaborations is work with the Australian National University on Individual Deprivation Measures also led by Dr Sikweyiya. We also have sustained partnerships with the London School of Hygiene and Tropical Medicine, GBV Hub of the Joint Learning Initiative for Faith and Local Communities, and the kNOw Violence in Childhood Initiative.

Locally, the value and application of the Unit's work could be seen widely with the most recent example (February 2019) found in the sentencing judgement of Justin Rohde for the murder of his wife by High Court Judge Salie-Hhlope where she states "Dr Naeemah Abrahams , Acting Director of the Gender & Health Research Unit of the South African Medical Research Council, testified in aggravation of the sentence. She testified on national and international studies that she did as well as research on female murder and intimate femicide…" The accused was sentenced to 20 years of direct imprisonment.

Currently, the Unit is involved in the writing of the national strategic plans for violence against women and femicide and have contributed to the Femicide strategic plan.

Globally SAMRC is also associated with our global programmes. An implementing partner in Pakistan stated:

"… we gratefully acknowledge SAMRC and What Works support to Right To Play for this RCT research program which opened further opportunities for the organization to introduce its program with a wide range of the different audiences nationally and internationally."

Contact Details
Name: Naeemah Abrahams
Email: naeemah.abrahams@mrc.ac.za

WHAT WORKS GLOBAL PROGRAMME

WhatWorks
TO PREVENT VIOLENCE
A Global Programme to Prevent Voilence Against Women and Girls

WhatWorks
TO PREVENT VIOLENCE
Voilence Against Women and Girls in Conflict and Humanitarian Crises

WhatWorks
TO PREVENT VIOLENCE
Economic and Social Costs of Violence Against Women and Girls

MAKING IMPACT IN VIOLENCE AGAINST WOMEN AND GIRLS

Violence against women and girls (VAWG) is the most widespread form of abuse globally with one in three women beaten or sexually abused by an intimate partner in her lifetime. In the context of South Africa, violence and injury is one of the major epidemics facing the country. The DFID-funded What Works to Prevent Violence against Women and Girls? Global Programme is designed to address critical evidence gaps and establish the effectiveness of interventions to address VAWG. It is a six year programme (ending December 2019), managed by an international consortium led by the Gender and Health Research Unit of the SAMRC and including the London School of Hygiene and Tropical Medicine and Social Development Direct. What Works? operates in 13 countries across Sub-Saharan Africa, and Central and South Asia, including in several conflict and fragile settings, and it has been generating new knowledge on the drivers of VAWG, what works in prevention and the costs of violence prevention in low-middle income settings. It has worked through a major programme of activities to ensure that new knowledge impact policies and programmes, and has engaged in building a sustainable footprint of VAWG researchers across its programmes. A notable feature of its work has included a focus on advancing understanding of exposure to violence against women and girls with disabilities.

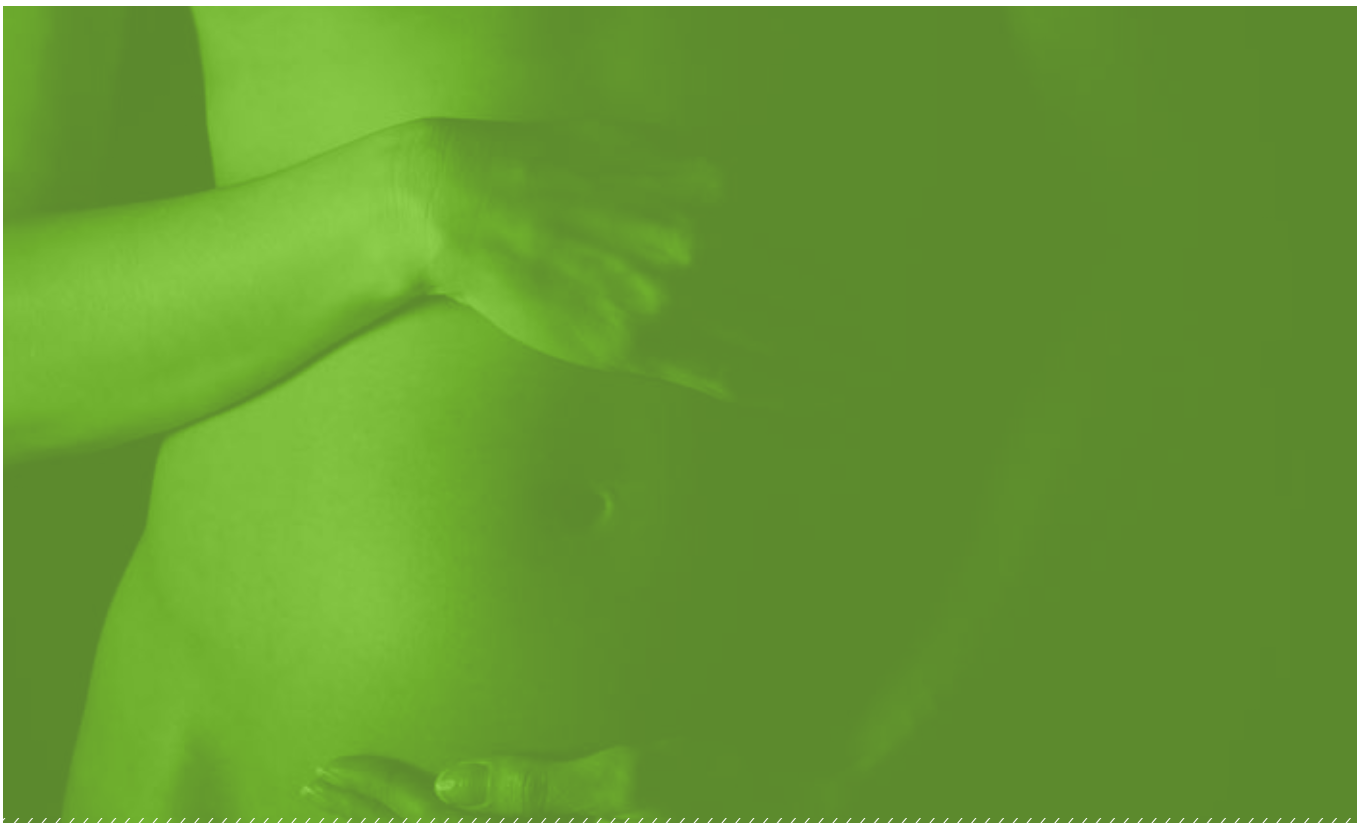
The What Works? approach has been to develop and strengthen theory and research-based interventions for VAWG prevention, and to implement and evaluate these. The research has been conducted through nine randomized controlled trials, two quasi-experimental studies, four expanded M&E designs and qualitative research. The interventions have included community activism approaches to shift harmful gender attitudes, roles and social norms, these use teams of trained and equipped volunteers, who mobilise the communities to shift beliefs and norms about gender equality and violence and provide support and counselling for couples experiencing violence and survivors. Several of the interventions have tested models that include both gender transformative elements and economic empowerment. Some have provided workshops for couples and special groups, including sex workers. A last group of interventions has focused on prevention of violence experienced and perpetrated by school students. The findings have been synthesised into a range of products which summarise learnings across the field and these are very widely disseminated locally, regionally and to global stakeholders.

"The What Works consortium includes some of the most widely cited researchers in the field. …No other donor has invested comparable resources into VAWG research… this is a highly respected initiative with the potential to make a major contribution to knowledge in the field."
UK Independent Commission for Aid Impact (2016), DFID's efforts to eliminate violence against women and girls: A learning review, pp15: 3.2

In South Africa, the ground work for developing the National Strategic Plan (NSP) on Gender-based Violence and Femicide (GBVF) has been laid and What Works? has been providing expert advice through working groups which is shaping the prevention sections, data and information and the theory of change.

On 28 March 2019 President Ramaphosa launched the Declaration of the 2018 Summit on Gender-based Violence and Femicide and Professor Rachel Jewkes, SAMRC's Executive Director for Research Strategy and Director of What Works? contributed to his speech on prevention.

In his State of the Nation Address (SONA) for the 6th parliament, President Ramaphosa's remarks were as follows: "Following intensive consultations and engagements, we are working towards the establishment of the Gender Based Violence and Femicide Council and a National Strategic Plan that will guide all of us, wherever we are, in our efforts to eradicate this national scourge."



SAMRC/UP MATERNAL AND INFANT HEALTH CARE STRATEGIES RESEARCH UNIT

Unit Director: Robert C Pattinson

BACKGROUND

The Unit aims to develop and test strategies to improve the maternal and infant health care in the primary and secondary levels of care by seeking saleable and sustainable solutions.

The Unit runs three health care audit programmes:

(i) Maternal Morbidity and Mortality audit system (MaMMAS) on which the Saving Mothers reports for the confidential enquiries into maternal deaths are based;

(ii) the Perinatal Problem Identification Programme (PPIP) which is used by the National Perinatal Morbidity and Mortality Committee to write the Saving Babies reports; and

(iii) the Child Health Care Problem Identification Programme, which is used by the Committee for Morbidity and Mortality in Children for its Saving Children reports.

The audit systems are world renowned and used in many African countries.

Problems identified by the audit systems are solved by means of research and the solutions are then implemented in a controlled fashion to analyse their impact. One example of this was the identification of poor obstetric emergency care as a problem leading to the development of the Essential Steps in Managing Obstetric Emergencies (ESMOE). This was tested in 12 districts by the Unit and was associated with a 29,7% reduction in maternal deaths in the 12 districts. The programme has been adopted nationally. Another programme which was developed by the Unit was the implementation of Kangaroo Mother Care and this programme has been adopted nationally and also in many African countries.

SCIENTIFIC GAP FILLED IN 2018/19

Placental Insufficiency has been identified by the Unit as the largest cause of perinatal death in South Africa. This has been achieved by detailed analysis of the PPIP database. The Unit has worked with the SAMRC and CSIR on the UmbiFlow apparatus.

The UmbiFlow apparatus is a locally developed continuous wave doppler system that can be used to screen pregnant populations with low level health care providers for placental insufficiency. **We tested the system first in Mamelodi**

Township and its introduction was associated with a 60% reduction in antenatal stillbirths.

In a follow-up study, which is ongoing, UmbiFlow was introduced in nine sites throughout the country and the prevalence of abnormal placental function has been found similar to that in Mamelodi. At the same time the unit is running an international study with the WHO examining the prevalence of abnormal placental function using an UmbiFlow apparatus in five countries: Ghana, Rwanda, Kenya, India and South Africa. This is in preparation implementing UmbiFlow on a large scale. If UmbiFlow is implemented on a large scale in South Africa and there are adequate resources to manage the foetuses identified as being at risk of stillbirth, then about 4000 antenatal stillbirths can be prevented per year (this is 20% of all stillbirths per year in the country).

The development and testing of UmbiFlow is a good example of how through knowledge, technology and innovation the unit with the SAMRC and CSIR is significantly improving the health of South Africans.

Infants of mothers living with HIV are at risk of various adverse health outcomes, including the risk of HIV transmission, suboptimal birth outcomes as well as poor growth and developmental outcomes. The Unit has been integrally involved in the process of updating the South African National Prevention of Mother-to-Child Transmission (PMTCT) guideline (2019) to be released imminently, providing technical expertise and two lead authors to the guideline development process.

In addition the Unit is running the Siyakhula research project, a longitudinal cohort study, which seeks to better understand the impact of maternal HIV-infection on the growth, development and immune status of the developing fetus and infant. In addition the Unit is involved in a national and international level towards improving the health programme response to the additional health and developmental needs of HIV-exposed-but-uninfected children.

RESEARCH TRANSLATION

The Unit has run Essential Steps in Managing Obstetric Emergencies (ESMOE) refresher courses in all the health districts in South Africa, highlighting the new Hypertensive Disorders in Pregnancy (HDP) Guidelines, respectful care of women in labour and the new WHO Intrapartum Care Guidelines. The Unit developed the HDP Guidelines in collaboration with all the relevant stakeholders which have now been accepted by the National Department of Health. The Unit has also updated the South African Intrapartum Care Guidelines in light of the new recommendations of the WHO; again, this was done in collaboration with all the relevant stakeholders.

The Unit is also involved in the training and dissemination process of the updated National PMTCT guidelines. In addition the National Department of Health is being supported in doing country-wide workshops to improve District Health Planning processes as well as Quality Improvement projects in Maternal and Newborn Health in various districts in South Africa.

CAPACITY DEVELOPMENT

The Unit has two people enrolled in PhDs, and three that finished their PhDs in the last year.

The Unit has galvanized very strong working relationships with colleagues from the Basic Medical Sciences at the University of Pretoria, thereby establishing a clinical-laboratory platform for joint research activities. This has opened the research environment for multiple postgraduate research projects, with four doctoral and six Masters projects in the protocol development phase. In addition the work done on prevention of mother-to-child transmission (PMTCT) and data systems at district level has attracted two additional doctoral students who are in the protocol development phase.

The Unit has run workshops on ESMOE and Perinatal Problem Identification Program (PPIP) in Lesotho. These workshops covered all the hospitals in Lesotho. This was done as part of testing the Performance Based Funding the World Bank has implemented in Lesotho. The research is to test whether the system actually improves care.

PARTNERSHIPS AND COLLABORATIONS

In developing South African HDP and Intrapartum Care Guidelines we involved all the relevant stakeholders namely all medical schools, the Colleges of Obstetrics and Gynaecology, Paediatrics, Anaesthesia, Family Medicine, the Society of Midwives in South Africa, the nursing colleges, the national Department of Health, the district clinical specialists, the professional Societies of Obstetrics and Gynaecology, Paediatrics, Anaesthesia and Family Medicine. We also have worked with all the district managers and their hospitals to ensure the various guidelines are implemented. Similarly wide consultation was undertaken by the two lead authors to the PMTCT guideline development process.

Internationally the Unit is involved in the WHO recommendations for a positive pregnancy experience (which deals with antenatal care) and the WHO recommendations for a positive childbirth experience (which deals with intrapartum care). The Unit has run PPIP training workshops for UNICEF and UNFPA for African countries (Ethiopia, Chad, Kenya, Malawi, Zambia, Zimbabwe, Swaziland, Rwanda) and worked with the World Bank in Lesotho. The Unit also runs an international trial with WHO on UmbiFlow in Ghana, Rwanda, Kenya and India.

Contact details:
Robert Pattinson
Email: robert.pattinson@up.ac.za

SAMRC/WITS DEVELOPMENTAL PATHWAYS FOR HEALTH RESEARCH UNIT

Unit Director: Shane Norris

The only unit within the SAMRC group that tackles developmental origins of health and disease and has demonstrated the importance of how the early life period not only influences morbidity in early life but also impacts adult disease risk.

The Unit investigates genetic, physiological, psychosocial and lifestyle determinants of growth and development, risk of metabolic disease, and healthy ageing through innovative multi-disciplinary methodologies across the life-course so as to improve health in South Africa.

The research streams are as follows:

(i) maternal and child health and nutrition

(ii) growth, psychosocial and physical development, and

(iii) obesity and metabolic disease risk in South Africa.

RESEARCH TRANSLATION

a. We have been engaging with South African multi-stakeholders (Government, NGOs, UNICEF, WHO, academics, civil society) around the importance of the first 1000 Days Plus and the preconception health period. These discussions have been identifying partnerships whereby we can address some of the evidence gaps and examining policy

b. In addition, we have been engaging health professionals around the emergence of gestational diabetes in South Africa as a critical concern and how best in resource constrained conditions to screen, diagnose and manage the condition.

c. Dr Catherine Draper, a Senior Researcher within the Unit, led and launched the SA Movement Guidelines for Birth to Five years, describes how much physical activity, sitting, screen time and sleep babies, toddlers and children between 0 - 5 should be getting. The Guide is a significant research translation activity as South Africa is the first middle-income country to launch these type of guidelines, focusing specifically at this age cohort between 0 - 5.

CAPACITY DEVELOPMENT

Working with University of Southampton, the Unit has developed capacity of healthy conversation techniques to engage with participants around behaviour change. We have trained six trainers within the SAMRC /Wits Developmental Pathways for Health Research Unit (DPHRU) and subsequently have trained over 12 community health workers.

PARTNERSHIPS AND COLLABORATIONS

The most significant collaboration is through the Healthy Life Trajectories Initiative that is a partnership with four funding councils (including SAMRC) and three other countries (Canada, China and India). This is the first global health trial to examine the impact of preconception intervention on child obesity

The communities we are working with often express their gratitude for including them in research that they perceive will make a difference in terms of both maternal and child and population health. DPHRU has developed a reputation and recognition for pioneering lifecourse epidemiology in South Africa, and in particular, advancing the field of developmental origins of health and disease in Africa.

Contact details:
Shane Norris
Email: shane.norris@wits.ac.za

SAMRC/UCT UNIT ON CHILD AND ADOLESCENT HEALTH RESEARCH UNIT

Unit Director: Heather Zar

The SAMRC/UCT Child and Adolescent Health Research Unit focuses on some of the most pressing issues affecting children and adolescents in South Africa, sub-Saharan Africa, and globally. Key areas include childhood pneumonia, tuberculosis (TB), HIV-associated illness, developmental origins of child health or disease including lung health, neurodevelopment, growth and non-communicable diseases and asthma. Studies aim to better define the burden of disease, generate new knowledge on the causes and factors leading to illness or to more severe disease and to develop better diagnostic, preventive and treatment options. Research sites are located at the Red Cross Children's Hospital, in community peri-urban settings outside Cape Town and in the Eastern Cape.

During this reporting year, members of the Unit, participated in presenting data at national and international congresses and obtained several additional grants from international and national funding agencies.

The Unit operates the following main ongoing research projects which have yielded local and global advancement of knowledge and improvement in care for children in the communities in which we operate:

- **Childhood tuberculosis:** The Unit has continued to recruit patients into ongoing diagnostic cohorts undertaking evaluation of new diagnostics to improve diagnosis and treatment of childhood TB. The results of some of our research have gone on to inform the World Health Organization guidelines on microbiological confirmation and diagnosis in children. The Unit has provided the first data on the performance of new diagnostics including Xpert Ultra through current studies and utility of the use of different specimens and have provided key data that has informed WHO and national policy.
- **The Cape Town Adolescent Antiretroviral Cohort:** Data collected as part of the long-running cohort

has contributed to advancing the knowledge of the mechanisms and spectrum of disease in perinatally HIV-infected adolescents on antiretroviral therapy. In November 2018, the Neurocognitive Assessment App (NASA) study, a collaboration enrolling a subset of the Cape Town Adolescent Antiretroviral Cohort (CTAAC) participants, began. The purpose of NASA is to improve the assessment for neurocognitive impairment among adolescents perinatally infected with HIV using an innovative, minimally invasive, brief, highly automated and easy-to-use neurocognitive testing tablet app.

- **The Drakenstein Childhood Health Study:** This birth cohort study has provided novel data in the causes, risk factors and burden of childhood illness and the long-term impact of early infectious exposures. Specific areas include delineating the burden and aetiology of early life pneumonia as well as wheezing illness; identifying new exposures in the environment that lead to child illness such as toluene from paraffin burners.
- **Childhood pneumonia:** Clinical research studies in childhood pneumonia including surveillance studies, studies of new diagnostics and participating in multicentre studies for new Respiratory Syncytial Virus (RSV) prevention initiatives including maternal vaccination and long acting monoclonal antibodies.

RESEARCH TRANSLATION

The Unit is committed to translational research activities, including active engagement with local stakeholders and policy makers. The Drakenstein Child Health Study (DCHS) site continues to engage with the Department of Health (DoH) through meetings and development of campaigns (e.g. First 1000 days; *https://www.westerncape.gov.za/first-1000-days/,* disseminating results at DoH research meetings). Partnerships with DoH staff in Audiology and Ear, Nose and Throat (ENT) departments at Red Cross Hospital have resulted in including hearing screening in the DCHS study. Regular meetings with Paarl Hospital and local stakeholders continue to share research findings strengthen care and receive feedback that informs practices and future research endeavours.

Unit staff provide ongoing support of the tuberculosis cohort satellite site operating in the Eastern Cape across the clinical, data management, and laboratory areas. The Unit's staff have provided critical expertise guiding the initiation of sites across sub-Saharan Africa as part of a multi-country tuberculosis consortium project in Malawi, Mozambique, and Tanzania. Capacity development activities were conducted during the period to improve diagnosis of childhood tuberculosis and management.

CAPACITY DEVELOPMENT

Many students from several different areas have been supported within the Unit over this period, with good throughput and capacity development. During the reporting period, capacity development activities related to strengthening diagnosis of paediatric tuberculosis through training programmes on diagnosis and management. Seventeen classroom-learning and hands-on trainings led by our study staff took place in the Eastern Cape for healthcare workers, registered nurses and medical officers in the following settings: Dora Nginza Hospital, paediatric ward, at local tuberculosis clinics, at a nurses training centre, at district health clinics, and at two provincial drug-resistant TB workshops. Staff conducted additional trainings at collaborating sites in Mozambique, Malawi and Tanzania, including didactic learning and hands on application of procedures such as induced sputum.

The Unit supports the African Fellowship Programme (AFP) that hosts visiting clinicians and supports a clinical training research tract related to a specialisation in paediatrics from over 22 partnership academic centres across Africa. Further, the Unit has established and maintained ongoing links with overseas academic institutions from the UK and USA hosting students enrolled in a variety of undergraduate, graduate, and post-graduate programmes and from disciplines spanning engineering and medicine. The collaborations aim to facilitate the development of cutting-edge technology to improve current specimen collection and testing methodology for childhood tuberculosis.

The DCHS has developed multiple partnerships during the reporting period. A partnership with the STELAR consortium aims to develop capacity in longitudinal statistical analyses methods to address key questions on child lung health. Key partnerships in the psychosocial arm of the study include: a book sharing collaboration with Reading University, a collaboration with the University of Tampere on the maternal and toddler eye tracking data, the PACE stress working group, and ENIGMA (Enhancing Neuro Imaging Genetics through Meta-Analysis) depression and suicide working groups. Genetic, Epigenetic, and Gene Expression collaborators include Broad Institute, Emory University, University of British Columbia, University of Manitoba, Emory University, Harvard University/McLean Hospital, and Mt Sinai, with consortium participation in Psychiatric Genomics Consortium (PGC) and H3Africa.

Collaboration with the Sanger Genome Institute and Imperial College London has been established to investigate the population structure of common respiratory commensals and how their interactions predispose to respiratory illness. Whole-genome re-sequencing of organisms will be applied to understand the relevant strain features and interactions. Partnerships linked to infant and child lung function have been established with Prof Graham Hall (University of Western Australia) and Prof Hantos (University of Szeged), to support site capacity for testing procedures and longitudinal analysis of lung function data. Collaboration with Prof Peter Sly, (University of Queensland, Australia have focused on environmental exposures to investigate the contribution of pollutants or other exposures to child health.

During the reporting year, the Drakenstein Child Health Study (DCHS) engaged with the Mbwekweni Langabuya Primary school to construct and staff a library facility and implement a literacy improvement programme. In planning the library construction and an opening event on Mandela Day (18th July 2018), the DCHS had around 20 meetings with the school, the Western Cape Education Department library advisor, and numerous other local and international organisations involved in the initiative (i.e. Val de Vie Foundation, Solomon Schechter Day School, Breadline Africa, Biblionef, West End United Methodist Church).

CONTRIBUTION TO THE SAMRC RESEARCH AGENDA

Providing ongoing capacity development support to our satellite site in the Eastern Cape ensures that our site takes a responsibility to continuously improve the rate of paediatric tuberculosis diagnosis while providing standardized methodology and training to support staff in lower resourced settings. Expanding our training across sub-Saharan Africa ensures that this methodology extends to collaborating institutions and sites as they work towards a common goal. Ongoing community outreach and provision of capacity development activities to the communities DCHS works in, is key to ensuring we are feeding back key research findings to the community and that we are positively supporting the community in which our participants reside. It allows pathways for dialogue, health promotion, and ensures social responsibility of the study.

PARTNERSHIPS AND COLLABORATIONS

The Unit has many collaborations with research and academic institutions locally, in Africa and internationally varying from financial support and student internships, to expertise from overseas organisations and full collaborative multi-year projects. These partnerships have been key to the outputs and translation of our research into practice. Twenty-two research projects are ongoing, which have been fostered by institutional partnerships including, but not limited to the following:

- Validation of Biomarkers of Paediatric TB and further development for use in diagnosis of childhood TB (Imperial College, UK)
- Host RNA expression for diagnosis and monitoring of Pediatric TB in Africa and India (Imperial College, UK; Johns Hopkins BJMC Clinical Research, Byramjee Jeejeebhoy Medical College; National Institute of Research in Tuberculosis, Chennai, India)
- Non-invasive Tuberculosis Diagnosis (University of Washington, USA)
- Breath tests for assessing a patient's TB infection status using patient breath (Dartmouth College, USA)
- Rapid and Accurate Diagnosis of Paediatric TB – An AIDA (Assessment of Innovative Diagnostics and Algorithms for Early and Sensitive Detection of Acute TB) platform study (Ludwig Maximilian University of Munich, Germany; National Institute for Medical Research, Tanzania; Instituto Nacional de Saude, Mozambique; University of Malawi College of Medicine, Malawi; Stellenbosch University, South Africa)

During this reporting period, the Unit also partnered with Langabuya Primary School (serving children enrolled in the DCHS study) and other stakeholders to open a library at the school to promote literacy and learning.

CLINICAL TRIALS

Notably, in August 2018, the Unit began a new multi-country collaboration study entitled "Rapid and Accurate Diagnosis of Paediatric (RaPaed) TB" with partnering institutions in Germany, Mozambique, Malawi and Tanzania centred around creating a multi-country paediatric tuberculosis cohort that uses standardized methodology for patient enrolment, recruitment, specimen collection and data capture. Additionally, the consortium allows for the contribution of samples towards a biobank of samples that has been collected across a consistent platform that can be generalizable across sub-regions of sub-Saharan Africa.

FAVOURABLE STAKEHOLDER VOICE

Our work is perceived favourably across a spectrum of stakeholders. Through the Unit's work, several collaborations with stakeholders nationally and internationally have been developed, promoting novel, cutting-edge and interdisciplinary research. The outputs, including publications, post graduate student throughput and many additional grants to expand research have increased substantially over this period.

In our clinical trial of the RSV monoclonal antibody vaccine trial, maternal feedback was excellent, and we had a retention rate of 100 percent across the 12 months of the study and mothers formed a support group with one another during which they shared their experiences of participation with each other and then with the clinical staff.

During this period the Unit Director received the L'Oreal UNESCO award for a women scientist in Africa / Arabia – this brought much attention to the Unit's work including much media coverage, television interviews and articles locally and internationally. As part of this, the Unit Director gave a presentation on the work at the French Academy of Sciences and a public TED talk.

Contact details:
Heather Zar
Email: heather.zar@uct.ac.za

PROGRAMME 3:
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

- HIV Prevention Research Unit
- Centre for Tuberculosis Research Unit
- Office of Malaria Research
- SAMRC/CAPRISA/UKZN HIV-TB Pathogenesis and Treatment Research Unit
- SAMRC/NHLS/UCT Molecular Mycobacteriology Research Unit
- SAMRC/NHLS/Wits Respiratory and Meningeal Pathogens Research Unit

PROGRAMME STRATEGIC OBJECTIVES

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

RESEARCH HIGHLIGHTS UNDER THIS PROGRAMME

HIV PREVENTION RESEARCH UNIT

Unit Director: Gita Ramjee

The HIV Prevention Research Unit (HPRU) conducts basic science research to address the biological risk of HIV in men and women. The Unit also tests new vaccine concepts for addressing the HIV epidemic and other novel biomedical techniques such as oral PrEP for HIV prevention in women. The above work conducted by the Unit increases our knowledge base, testing new technologies for tomorrow; and the biomedical interventions are innovative, cutting-edge research for the future.

HPRU is uniquely placed to address the quadruple burden of disease in South Africa. KwaZulu-Natal is also the epicentre of the global HIV epidemic leading to an enormous global and national interest to address the high HIV infection rates seen among men, women and adolescents in this region. Of the quadruple burden of disease in South Africa, HPRU aims to focus their research agenda on HIV prevention – a national priority area. The SAMRC, through our research, will provide evidence-based research for future policy and programmes for local and international impact on the HIV epidemic.

SCIENTIFIC GAP FILLED BY HPRU IN 2018/19

BENEFICIARY	AMOUNT INVESTED
MTN 025: A Phase 3B Open-Label Follow-on Trial to Assess the Continued Safety of and Adherence to a Vaginal Ring Containing Dapivirine in Women	The outcome of this study, which is in the process of analysis, will inform the registration of the dapivirine vaginal ring as a method for HIV prevention to reduce HIV infections in women. This will fulfil the current gap in addressing high infection rates among women.
HVTN 702: A pivotal phase 2b/3 multi-site, randomized, double-blind, placebo-controlled clinical trial to evaluate the safety and efficacy of ALVAC-HIV (vCP2438) and Bivalent Subtype C gp120/MF59 in preventing HIV-1 infection in adults in South Africa	This is an ongoing study aiming to prove vaccine efficacy and thereby reduce new HIV infections in the community. Currently, there are no vaccines for HIV. This will address the gap for future impact on health.

BENEFICIARY	AMOUNT INVESTED
HVTN 703: A phase 2b study to evaluate the safety and efficacy of VRC01 broadly neutralizing monoclonal antibody in reducing acquisition of HIV-1 infection in women in sub-Saharan Africa	This study is ongoing and one of the aims of the study is to evaluate if VRCO1 can prevent HIV infections and to estimate the efficacy. The eventual outcome of this study is to decrease the number of new HIV infections in the community. This is a novel study to better understand ways of developing vaccines.
HVTN 705: A multicenter, randomized, double-blind, placebo-controlled phase 2b efficacy study of a heterologous prime/boost vaccine regimen of Ad26.Mos4.HIV and aluminium phosphate-adjuvanted Clade C gp140 in preventing HIV-1 infection in women in sub-Saharan Africa	This study is ongoing and the aim of the study is to evaluate the vaccine efficiency against HIV. The eventual outcome of this study is to decrease the number of new HIV infections in the community, and will have future impact.
Hotspots: To describe in detail, the social economic, behavioural context of women residing within HIV 'hot spot' areas compared to women residing in HIV 'cold spots'	The epidemiological data gathered from this study will guide the development of a combination prevention package for targeted interventions by gaining insight into the drivers of the epidemic in this setting.
HPTN 084: A Phase 3 Double Blind Safety and Efficacy Study of Long-Acting Injectable Cabotegravir Compared to Daily Oral TDF/FTC for Pre-Exposure Prophylaxis in HIV-Uninfected Women	This is an ongoing study aiming to prove safety and efficacy of a long-acting injectable preparation of Cabotegravir to be used as PrEP (Pre-Exposure Prophylaxis). Injectable Cabotegravir is being compared to Oral preparation TDF/FTC which is currently available and in the process of roll-out. A long acting injectable preparation of PrEP will impact acceptability and adherence of PrEP as an HIV prevention tool and hence has progressive implications for HIV prevention efforts.

RESEARCH TRANSLATION

- HPRU Joint Community Working Group (CWG) Workshop held on 29 November 2018
- Joint stakeholder meeting on 08 Feb 2019
- Three CWG meetings held per site: Discussions included study updates (recruitment, enrolment, retention); community engagement, challenges, activities/events, co-enrolment.

The following meetings were attended by the community team:

- Monthly Ward Aids Committee meetings
- District Partners meeting
- Provincial Council of AIDS meeting
- Monthly Operation Sukuma Sakhe meetings - Quarterly Traditional Council Meetings

Other capacity development initiatives included the NIH Grant Writing Workshop; 06 and 27 September 2018, to capacitate staff on grant writing skills for income generation. The SAMRC October Writing retreat was also held in Cape Town, 22-25 October 2018, to improve the Unit's publications outcomes.

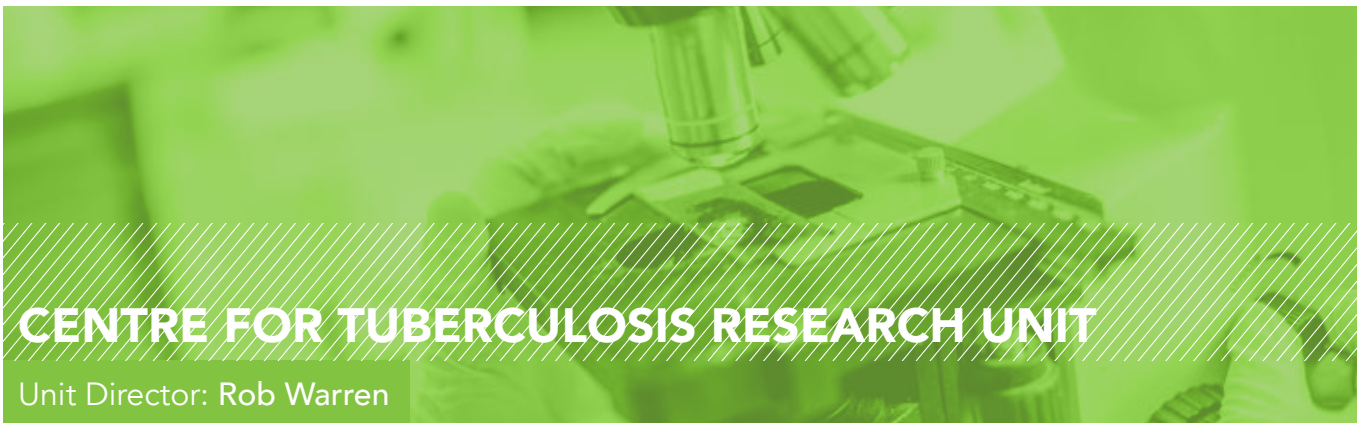
PARTNERSHIPS AND COLLABORATIONS

- International – AVAC, HVTN Behavioural Group – Capacity building and support, advocacy for HIV prevention
- Research South Africa - International Partnership for Microbicides, CAPRISA, MaTCH Research Unit, UNISA, UKZN – Research support & partnership
- NGOs- Info4Africa – Networking partner in identifying national and local partners, partnership in raising awareness in public health
- Government - Civil Society, District AIDS Council and Provincial AIDS Council
- Local - MoA Partners – Department of Health (DoH) – Facilitate participant referrals to DoH facilities for health care
- PrEPVacc – finalisation of protocol testing vaccine and PrEP

Contact Details:

Name: Gita Ramjee

Email: gita.ramjee@mrc.ac.za



CENTRE FOR TUBERCULOSIS RESEARCH UNIT

Unit Director: Rob Warren

OVERVIEW

The SAMRC's Centre for TB Research (CTR) conducts a spectrum of research focusing on TB infection and disease in humans and animals to provide knowledge and build capacity that informs the development of new diagnostics and treatment regimens. During the 2018/19 reporting period, the CTR published 90 peer-reviewed articles and has notably showed an outstanding H-index of 64 over the past five years.

The baseline funding from the SAMRC has allowed the CTR to leverage research funds (~R95m) on both national and international levels, allowing the facilitation and training of the next generation of scientists through higher degrees. The CTR, in collaboration with the Division of Molecular Biology and Human Genetics employs 230 members, including ten SAMRC employees, 18 senior scientists, and a number of research technicians, drivers and community healthcare workers. The Unit also hosts 28 postdoctoral fellows/ junior scientists and has 86 registered postgraduate students. Etched in the core values of Excellence, Accountability, Empathy, Inclusivity and Integrity with the vision to foster knowledge-based solutions to the health challenges facing Africa, the Unit's primary objective is to engage with the communities which are key stakeholders in the Unit.

The CTR operates in partnership with the Stellenbosch University, Division of Molecular Biology and Human Genetics within the Faculty of Medicine and Health Sciences and the DST-NRF Centre of Excellence for Biomedical TB Research. The Unit also houses two biosafety level 3 laboratories, which are accredited by the Department of Agriculture, Forestry and Fisheries (DAFF), as well as one biosafety level 3 animal facility for the in vivo study of infectious pathogens.

The research conducted at the CTR spans basic to translational and clinical research, largely focused on TB. Quality teaching, training and capacity development of postgraduate students from various economic and cultural backgrounds forms the central pillar of the CTR, underpinning all research conducted within the Centre. The CTR is comprised of various research teams each with its own research excellence and significant scientific and social contributions.

The CTR has had some significant highlights in TB research. The CTR addresses a number of the Sustainable Development Goals (SDGs). For example SDG1-No poverty, by reducing the disease burden, the centre aims to contribute to the alleviation of poverty.

Another goal of the CTR is to contribute to the discovery and development of new tools for the control of TB, aligning fully with SDG3-Good Health and Wellbeing. Research conducted by the Centre contributes to the integrated, patient-centered care and prevention pillar, as well as the intensified research and innovation component, set out by the WHO to accomplish the targets and milestones of the EndTB Strategy. The Centre's efforts in this regard include:

- Development of point-of-care TB diagnosis strategies for improved disease monitoring and systematic screening of high-risk groups
- Development and implementation of rapid drug-susceptibility testing for enhanced TB treatment regimens and effective disease management
- Investigation into the effects of comorbidities such as HIV and diabetes, to improve patient support and infection control
- Identification of the influence of various high-risk activities, such as smoking and substance abuse, on disease incidence, progression and treatment outcomes
- Identification of disease-causing mutations in patients with Primary Immunodeficiency diseases, particularly those mutations that increase susceptibility to TB
- The Centre is currently investigating the role of carbon particles from smoke and its effect on the lung pathology through the role of Myeloid Derived Suppressor Cells and in turn TB disease
- Evaluation of the effect of novel less-stigmatising forms of infection control on TB patient infectiousness; thereby cutting transmission.

THE CTR HAS IMPACTED ON POLICY DEVELOPMENT IN THE FOLLOWING WAYS:

Commercial products for preserving clinical specimens for the diagnosis of TB (WHO): A systematic review of available commercial transport products was commissioned by the WHO Global TB Programme. This assessment applied to products aimed at retaining viability for culture as well as to those aimed at improving molecular yield without the need to retain culture viability. This led to the formulation of a WHO policy.

Technical Manual for drug susceptibility testing of medicines used in the treatment of TB: Members of the CTR were major contributors to this technical guideline which set new parameters for routine drug susceptibility testing. This policy has implications for diagnosis globally.

The South African Tuberculosis Care Cascade: Estimated Losses and Methodological Challenges: Although the vast majority of individuals with TB engaged the public health system, just over half were successfully treated. This policy aims to address the urgent need to improve implementation of existing policies and protocols to close gaps in TB diagnosis, treatment initiation, and successful treatment completion. This cascade was a theme for the 5th SA TB conference, to find the missing cases.

Standardised WGS analysis: Members of the CTR have contributed to the global understanding of mutations conferring resistance. This global effort has provided an understanding of the relationship between genetic mutations and phenotypic resistance. This will inform the basis for genetic drug susceptibility testing, thereby replacing phenotypic drug susceptibility testing. This will have important implications for patient management as well as surveillance on a global scale. Department of Agriculture Foresting and Fisheries (DAFF): Accreditation with DAFF allows for the CTR's Animal TB Research Group to be involved in the One Health approach to TB which strongly ties in with the SDG15–Life on land.

Point of care (POC) Test development: Members of the CTR continue to work on the development of a field-friendly POC test for the diagnosis of active TB during the reporting period. This test is based on findings from previously published work, in which they identified a seven-marker serum protein biosignature that showed potential as a tool for the diagnosis of TB disease. The POC test under development is based on finger-prick blood and is currently undergoing field evaluation in five African countries, including South Africa.

Patent: Biomarkers for diagnosing tuberculous meningitis *(Cerebrospinal fluid and blood-based biomarkers for the diagnosis of tuberculosis meningitis)*. Inventors: Chegou, NN, Walzl, G, Solomons, R, Manyelo, MC, Applicant: Stellenbosch University, Application type: Provisional Patent Application, Country : South Africa, Application No: 2018/03410 Filling Date: 23 May 2018, Status: Filed

The CTR actively seeks to build capacity and train scientists in molecular and next generation diagnostic techniques for TB characterization in African countries. The centre currently has collaborations with scientists or trains, supervises and advises students from Zambia, Namibia, Botswana, Zimbabwe, Mozambique, Nigeria, Ethiopia and Kenya. To this end the CTR has recently been involved with drafting and signing a Memorandum of Understanding with key stakeholders in Namibia, including the Namibian Ministry of Health and Social Services and the Namibia University of Science and Technology, to facilitate capacity development of local students and scientists in TB Research. This newly formed consortium envisions to include all stakeholders involved in TB diagnostics and training in the country.

In November 2018, members of the CTR were involved in a comprehensive training at BGI in Shenzhen, China in preparation for the new sequencer and bioinformatics infrastructure at the SAMRC. Topics covered at the workshop included whole genome, exome and RNA sequencing as well as library preparation and data analysis for each of these different techniques.

Members of the CTR co-organised the "Bacterial Flow Cytometry: Guidance, Applications and Innovations" event. This three day conference and workshop was co-hosted by the SU and UCT, with two international keynote speakers (UK and Germany) and over 60 participants from UCT, SU, UWC and other institutions. A combination of lectures, networking activities and hands-on workshops provided participants with opportunities for skills development and networking.

Grant writing workshop at SAMRC: In September 2018, members of the CTR co-organised a two-day grant writing workshop together with SAMRC staff. Over 40 investigators from SAMRC, University of the Western Cape, University of Cape Town, and Stellenbosch University attended the workshop. The goal was to facilitate collaboration between investigators from different institutions and get them ready for the upcoming funding opportunity jointly sponsored by SAMRC and the NIH (USA).

Over the past years the number of black and coloured postgraduate students have increased significantly. Student retention for further degrees is high (2018-2019: Honours 93%). For the reporting period the centre graduated five PhDs, 15 MSc and 15 BSc Honours students. The centre also celebrated the promotion of four staff members to Associate Professors and one to Full Professor. In 2018, two new black African Specialists were welcomed to the Centre.

Contact details:
Rob Warren
Email: rw1@sun.ac.za

OFFICE OF MALARIA RESEARCH

Unit Director: Rajendra Maharaj

OVERVIEW

The Office of Malaria Research (OMR) recognises that despite the remarkable progress South Africa has made regarding the malaria elimination agenda, however believes that we should not lose sight that malaria remains a disease of poverty and a major public health concern.

The OMR works towards generating new knowledge and tools to further this cause and to develop a platform for malaria scientists in the country and sub-region to share research information that contributes to the National Department of Health's elimination agenda.

The Office understands that the generation of knowledge does not, of itself, lead to widespread implementation and positive impact on health, hence it concerns itself with generating the evidence that can be used to impact on policies and guidelines.

Since there is a paucity of malaria scientists in the region, the Office also works towards creating a pool of new scientists for malaria research. This is being achieved through linkages with historically disadvantages institutions in the country.

IMPROVING THE QUALITY OF LIFE OF PEOPLE IN MALARIA ENDEMIC AREAS

Undoubtedly, the OMR furthers the vision and mission of the SAMRC by striving towards improving the health and quality of life of people living in malaria endemic areas by testing new insecticide compounds and conducting research that could lead to innovative tools that would aid malaria elimination. South Africa initially targeted to eliminate malaria in 2018 but this goal was not realised due to the increase of malaria cases. Cross border malaria also has a major impact on South Africa's elimination efforts. Therefore, cross border collaboration is essential to achieve South Africa's elimination goals.

The Director of the Office is a member of the Elimination Eight Board (E8) which coordinates malaria elimination efforts in the SADC region thus enhancing the SAMRC's and South Africa's position.

According to the WHO Malaria Report, 2018, Africa continues to experience the highest number of malaria deaths. Even though transmission is low in South Africa, malaria remains a disease of the poor and 10% of the population live in a malaria risk area. In the past malaria seasons, over 20 000 cases of malaria have been reported in the country, mainly from the Limpopo Province, as well as KwaZulu-Natal and Mpumalanga.

The Office of Malaria Research is involved in essential operational research to fill the gaps in knowledge of parasite and vector biology as well as the impact of the environment on malaria transmission in the country. One of the main challenges preventing the attainment of elimination is resistance to insecticides by the mosquito vector. Also, as we move towards malaria elimination, understanding the role of climatic variables and weather patterns plays an important role in the development of early warning systems which is to help prepare for potential epidemics.

FIELD AND LABORATORY TRIALS ON INSECTICIDE - FLUDORA FUSION

These trials were conducted over a period of one year to determine the residual efficacy of a new Indoor Residual Spray (IRS) insecticide, FludoraTM Fusion WP-SB, developed

by Bayer. Fludora Fusion is a new two-way insecticide mixture that aims to overcome-insecticide resistance to pyrethroids whilst still being an effective control for the vector. Field trials conducted in northern KwaZulu-Natal have indicated that the new formula insecticide works well on the predominant wall surfaces and is an appropriate alternative insecticide to DDT for vector control.

RESEARCH TRANSLATION

The Director of the Office is an active member of the following:

- South African Malaria Elimination Committee – meets quarterly to advise on malaria elimination activities and progress in the country
- National Department of Health (NDoH) Vector Control Committee Meeting – meets quarterly to review vector control strategies for the elimination agenda
- NDoH Malaria Elimination Strategic Planning Meeting.
- Elimination 8 Board meetings – held quarterly to review progress of malaria elimination in the southern African region
- Plenary speaker at the 7th MIM Pan-African Malaria Conference in Senegal in April 2018
- Attended international meetings as part of an E8 delegation in May 2018 to leverage funding from the Gates Foundation
- LSDI2 board member – to advise on vector control and programme management of multi-country studies.
- Attended the 1st Malaria World Congress in June 2018 – develop network between African and South Pacific malaria researchers

The OMR hosted its annual Southern Africa Malaria Research Conference from 30 July – 1 August 2018. This was attended by over 150 delegates from 16 African, European and American organisations.

CAPACITY DEVELOPMENT

- The OMR works closely with communities living in the malaria affected areas of the country as well as with the Malaria Control Programmes of the provincial Department's of Health. Therefore, the staff from the KwaZulu-Natal Malaria Control Programme were trained in conducting field-based research techniques to facilitate monitoring and evaluation of the vector control programme.
- Furthermore, OMR graduated an MSc student whose research centred on novel methods of controlling malaria transmission.

PARTNERSHIPS AND COLLABORATIONS

- SA National Department of Health, Malaria Directorate. This partnership allows for ongoing discussions and projects that furthers the elimination agenda.
- KwaZulu-Natal (KZN) Provincial Department of Health. With the assistance and support of the Malaria Control Programme in KZN, the OMR is able to coordinate and implement its field work activities. This partnership also enables the provincial programme to utilise the resources of OMR insectary.
- LSDI2 and MoSaSwa collaborations facilitate cross border partnerships towards malaria elimination at the regional level between Mozambique, Eswatini and South Africa. These collaborations enhance funding applications.
- Working with the University of Zululand to develop a malaria research centre within the Department of Zoology.
- OMR is involved in a collaboration with the Universities of Nagasaki and Tokyo to determine the sympatry between malaria vectors and yellow fever vectors with the aim of designing and implementing an integrated vector control strategy.

A FORCE TO BE RECKONED WITH IN THE FIGHT AGAINST MALARIA

To eliminate malaria, partnerships and collaboration with various stakeholders play an important role. Stakeholders, both at national and international level view the work of the OMR as an essential complimentary aspect towards malaria elimination in the country and across southern Africa. The OMR is the preferred partner to work with in conducting community-based evaluations of new insecticides. The Office is also a repository for work conducted in the sub-region within the Elimination 8 initiative.

"Because our track record speaks for itself, we have become the primary agency to work with in implementing cross-border initiatives since it was the first institute in Africa to become a large-scale multi-country vector control programme to reduce malaria in the region and pave the way for elimination" - Prof Rajendra Maharaj.

Prof Maharaj is recognised as a global expert on malaria control and was appointed to the Board of the Elimination 8 initiative by the SADC Ministers in recognition of his expertise in cross-border malaria control, which was gained whilst working under the auspices of the SAMRC.

Contact Details:
Rajendra Maharaj
Email: rajendra.maharaj@mrc.ac.za

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

Unit Director: Salim S. Abdool Karim

OVERVIEW

Tuberculosis (TB) is a public health crisis responsible for an estimated 1.6 million deaths globally in 2017. South Africa has a TB incidence rate of 567 (406-754) per 100 000 population and an HIV prevalence of 60% (55%-64%) in incident TB cases. The impact of the expansion of the country's ART and TB programmes between 2010-2016 is the dramatic reduction in TB mortality rates, from 11.6% in 2010 to 6.5% in 2016.

Notwithstanding, the consistent and sustained decline in annual TB mortality rates, TB remains the main cause of death in people living with HIV (PLWH). Despite widespread access ART and Isoniazid Preventive Therapy (IPT), TB mortality rates in HIV positive TB cases remains 2.5 times higher than among HIV-negative TB cases [99 (68-135) per 100 000 population versus 39 (35-43) per 100 000 population. Given the scale of the TB and HIV epidemics and the magnitude of the impact of HIV-TB co-infection in South Africa, the SAMRC/CAPRISA/UKZN Pathogenesis and Treatment Research Unit is well positioned in KwaZulu-Natal to address the leading cause of death among PLWH, which is also among the highest research priorities in the current SAMRC's Strategic Plan.

RESEARCH FOCUS

The purpose of the SAMRC/CAPRISA/UKZN HIV-TB Pathogenesis and Treatment Research Unit is to undertake research to reduce morbidity and mortality from HIV-TB co-infection. The Unit addresses the primary cause of death among people living with HIV, in a setting where HIV and TB infection are the main contributors to South Africa's mortality burden. The research agenda for the Unit includes the disciplines of clinical medicine, epidemiology, biostatistics, immunology, microbiology and public health with five focus areas that target HIV-TB co-infection. The research mandate of the Unit is directed toward:

(i) Enhancing the translation of clinical trial evidence into effective integrated HIV-TB services through implementation science and thereby improve survival of HIV-TB co-infected patients

(ii) Improving the survival of HIV-TB co-infected patients by optimizing their treatment

(iii) Generating new knowledge on the pathogenesis and biological interaction between HIV and TB, specifically focusing on identifying immunological mechanisms

associated with the high risk of TB recurrence in HIV-infected patients

(iv) Impacting policies and practices aimed at reducing the burden of the dual epidemics in South Africa

(v) Building research capacity in South Africa

The Unit has been involved in a range of research programmes during the reporting period, from Implementation Science Strategies to strengthen health services and improve HIV-TB treatment outcomes, Clinical Research Developing shorter TB (including drug-resistant TB) re-treatment regimens, to Basic Science – Immunology: Immune correlates of TB recurrence in HIV infected patients, and building research capacity, as well as Impacting policy: Translating research evidence into policy and practice.

RESEARCH TRANSLATION

Despite guideline and policy endorsement, widespread training and leadership support for HIV-TB service integration, there is evidence of sub-optimal coverage of integrated services and poor clinical outcomes among co-infected patients attending public health facilities in South Africa. Integration and coordination of TB and HIV treatment and care programmes is a widely endorsed, best practice approach to treating the HIV-TB co-epidemic while optimally utilising scarce healthcare resources.

To this end, the CAPRISA-013 SUTHI study has been instrumental in employing Quality Improvement (QI) methods as a tool to upskill healthcare workers to use routine clinic data, identify process weaknesses and address gaps in clinic systems using simple, low cost solutions. As part of the CAPRISA-013 study, two Quality Improvement mentors have made fortnightly visits to 20 rural Primary Healthcare clinics in KwaZulu-Natal (KZN) over the last 18 months to mentor and coach Primary Health Care staff to improve their coverage and quality healthcare provided to HIV-TB co-infected patients. A total of 510 mentorship visits (face-to-face onsite meetings) were held and three large quality improvement workshops were offered to healthcare workers and District Management Team members in the Ugu and King Cetshwayo Districts of KZN.

Making Viral load monitoring routine: This project has been highlighted as a best practice by PEPFAR and SA NDoH. We have facilitated translation of this project through dissemination of key learnings. The translation activities have been facilitated by ongoing and regular interaction with key stakeholders at facility, district, provincial, national and regional levels, through conference (CQUIN Meeting in Swaziland 2017, PEPFAR best practice 2018-2019, KZN DOH 2018) and workshop presentations KZN and NW district and provincial HAST meetings, and through peer reviewed publications.

CAPACITY DEVELOPMENT

The unit places high priority on capacity development and has a well-developed training programme with the overall aim of strengthening scientific capacity in the fields of HIV and TB and more broadly, to contribute to developing the next generation of local South African scientific leadership. Developing the next generation of scientists is important to ensure that we have new researchers who will be able to address the challenges of the future. CAPRISA hosts and mentors Masters, PhD and Post-doctoral fellows. In the reporting period we have successfully graduated two Masters students (one Masters in Pharmacy, one Masters in Medical Science) and two PhD graduates. We also host a number of medical student trainees who are allocated to a mentor who meets with them on a regular basis as their academic programme allows and takes them through the basic steps of the research process. Supervisors are CAPRISA staff and fellows at Masters level and higher.

The CAPRISA Advanced Clinical Care programme has trained 196 South African Department of Health healthcare workers in advanced clinical care of TB and HIV. This training sought to enhance their clinical management skills in detection and management of treatment failure in adult HIV and TB patients.

Selected scientists from within the Unit have been identified for development as scientific leaders through mentoring and coaching over a five-year period. These individuals are mentored in developing independent grant applications to international funders, developing publications for high impact journals and stakeholder interaction, including communities, as well as input into policy development.

PARTNERSHIPS AND COLLABORATIONS

The CAPRISA, Advanced Clinical Care program has partnered with several stakeholders over the last year including:

- The South African Department of Health
  National level
  Provincial level (including Regional Training Centre); and
  District Level
- Pharmaceutical services and the HAST Unit
- Non-Governmental Organisations (NGOs)
- Including District Support Partners (e.g. MATCH), KRISP, Epicentre
- Parastatal organisations
- National Health Laboratory Service (NHLS)
- Academic institutions
- Adult and Paediatric Infectious Disease units

Contact Details:
Salim S. Abdool Karim
Email: salim.abdoolkarim@caprisa.org

SAMRC/NHLS/UCT MOLECULAR MYCOBACTERIOLOGY RESEARCH UNIT

Unit Director: Valerie Mizrahi

OVERVIEW

The research mandate of the SAMRC/NHLS/UCT Molecular Mycobacteriology Research Unit is to investigate aspects of the physiology and metabolism of Mycobacterium tuberculosis relevant to tuberculosis (TB) drug discovery, drug resistance, mycobacterial persistence and TB transmission. In 2018/19, the Unit comprised the Director (Valerie Mizrahi) and one other Full Professor (Digby Warner), both appointed on the permanent staff of the University of Cape Town (UCT). All other staff were grant-funded and comprised two research officers, one junior research fellow, three technicians and one administrative assistant. The cohort of trainees in the Unit comprised seven postdoctoral fellows, 10 PhD students, two Masters students and another two Honours students.

A major goal of TB research is to develop a short and effective treatment that provides durable cure of both drug-sensitive and drug-resistant disease. However, our ability to achieve this goal is limited by critical knowledge gaps. For example, the reasons underlying the slow response of M. tuberculosis to therapy with anti-tubercular drugs are poorly understood and are likely to be attributable to a variety of factors. However, it is not known whether the slow response to TB chemotherapy is related, in any way, to the rate of antibiotic-mediated kill of M. tuberculosis. Furthermore, it is only very recently that the ranking of new TB drug targets has begun to take into account the rate of kill of M. tuberculosis and the extent of sterilisation resulting from functional impairment of the target mediated either genetically (i.e., by knockout or knockdown of the gene encoding the target) or pharmacologically (i.e., with a drug-like molecule). This information is critical for decision-making in terms of resource allocation in an area of research and development that is notoriously underfunded. Studies underway in the Unit are aimed at using genetic approaches to identify bacterial factors that limit the rate of antibiotic-mediated kill in M. tuberculosis. In the longer term, this direction of scientific enquiry is expected to generate knowledge that will inform novel approaches to achieving treatment-shortening for TB.

THE AEROBIOLOGY OF TB

In an innovative study on the aerobiology of TB conducted in collaboration with Robin Wood from the Desmond Tutu HIV Centre at UCT, researchers in the Unit have applied new tools for detecting live, metabolically active organisms in the bioaerosol produced by TB patients through coughing or tidal breathing, and captured in the recently described Respiratory Aerosol Sampling Chamber (Patterson et al. Gates Open Res. 2017).

Using a chemical probe developed by collaborators at Stanford University, which fluoresces when incorporated into the mycolic acid layer of the cell envelope of M. tuberculosis and related bacteria, our researchers have used fluorescence microscopy to define the characteristics (size, shape, and probe staining pattern) of M. tuberculosis cells when sampled in different metabolic states and labelled with this probe. This novel staining and visualisation method is being used to screen and identify putative TB bacilli in the concentrated bioaerosol samples captured from positively diagnosed TB patients.

This work has its origins in addressing a fundamental question in TB biology that has profound implications for developing new interventions, namely, what is the physiological state of aerosolised tubercle bacilli that are transmitted to a new host? The basic science underlying this project has led to the development of innovative ways to capture and detect aerosol-borne bacilli with potential application in the clinical setting.

SCIENTIFIC IMPACT AND OUTCOMES

Motivated by the conviction that South Africa, a high-burden country with considerable scientific, technological and clinical resources at its disposal, has a special role to play in the discovery and development of new tools for the control of TB, the MMRU has focused effort on building a world-class programme in fundamental TB research. The knowledge

and expertise acquired through this programme created the platform to move into in two areas of need in the translational TB research space.

Firstly, the Unit is contributing significantly to early-stage TB drug discovery as a TB Biology partner in local and international TB drug discovery consortia. By harnessing the biological insight gained from fundamental research on mycobacterial metabolism – an area for which the Unit is internationally renowned – researchers in the Unit have contributed significantly to strengthening the front-end of the TB drug pipeline with high-quality "hit" compounds with novel mechanisms of action, as well as validated drug targets. Secondly, working together with colleagues from the Desmond Tutu HIV Centre, the Unit is leading the bacteriological component of an interdisciplinary study on the aerobiology of TB, which is aimed at understanding the biology of TB transmission and hence, intervening in this poorly understood and critically under-studied facet of the life cycle of M. tuberculosis. The ability to apply state-of-the-art molecular and imaging methods to analyse bioaerosol samples collected from TB patients recruited in Masiphumelele in Cape Town provides a compelling rationale for why this work should matter to the SAMRC, South Africa and the world.

SCIENTIFIC GAP FILLED IN 2018/19

A research highlight in the past year was the completion of a long-term study on the functional characterisation of the mycobacterial "mutasome" – a system comprising three proteins which mycobacteria over-produce and engage when these organisms sustain DNA damage. M. tuberculosis encounters environments during the course of infection and disease, some of which predispose the organism to potentially lethal DNA damage. The mutasome, discovered in the Unit several years ago, is a system that enables bacteria to tolerate the lethal effects of chromosomal DNA damage. However, a consequence of mutasome engagement is the acquisition of chromosomal mutations, which can include those that confer resistance to TB drugs. Employing a combination of mycobacterial genetics, biochemistry and advanced microscopy, a model for how the three components interact with one another and with other components of the DNA replication machinery in copying DNA across sites of damage, our researchers, working together with international collaborators, obtained exciting new insights into the functioning of this system. Importantly, a new TB drug candidate which acts by blocking the DNA replication machinery of M. tuberculosis, was also found to be effective at blocking mutasome function, thus offering the intriguing added benefit of arresting the evolution of TB drug resistance. The results of this study will be submitted for publication in early 2019.

Our researchers also made significant progress in developing and applying advanced imaging techniques to analyse bioaerosol samples collected from TB patients as part of an interdisciplinary study on the aerobiology of TB. The preliminary results from this highly innovative study were presented by Digby Warner at the 2019 Keystone Symposium on TB held in Canada in January 2019 have already attracted considerable interest internationally.

RESEARCH TRANSLATION

The director of the Unit, Valerie Mizrahi served on the organising committee of a symposium on Challenges and Opportunities of New Diagnostics and Prognosis Approaches for Tuberculosis organised by Institut Mérieux, which took place in Cape Town on 4-5 March 2019.

Valerie continued to serve as a TB Biology advisor to the TB Drug Accelerator (TBDA) of the Gates Foundation and participated in the biannual meetings of the TBDA held in Washington D.C. and London, respectively, in 2018.

CAPACITY DEVELOPMENT

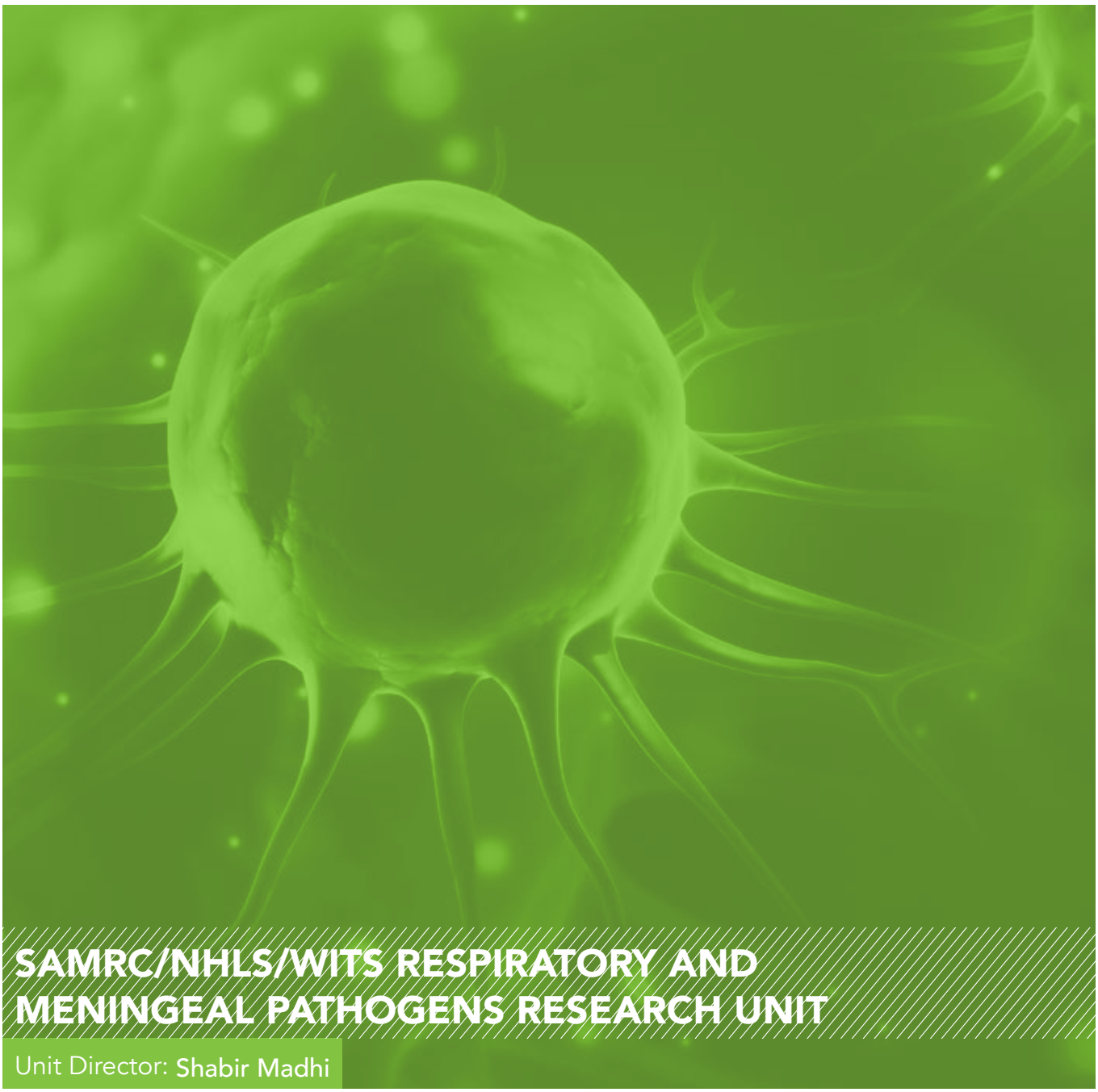
Of the cohort of seven postdoctoral fellows, 10 PhD students, two Masters Students and two Honours students, three postdoctoral fellows completed their training, one PhD student graduated in 2018, and one other graduated in April 2019 and a third PhD student's thesis is under examination. One Masters student has applied for an upgrade to PhD. One new Masters student and a new PhD student were recruited in 2019. Postdoctoral fellow Gabriel Mashabela left the Unit in mid-2018 to take up a faculty position in the SAMRC Centre for Tuberculosis at Stellenbosch University and PhD student Michael Reiche was awarded a prestigious fellowship in the Advanced Imaging Centre at the Janelia Farm Campus of the Howard Hughes Medical Institute. Most Unit trainees were supported by competitive fellowships or scholarships including Mandy Mason who was awarded a prestigious African Career Accelerator Award from the Crick African Network.

PARTNERSHIPS AND COLLABORATIONS

Members of the Unit participated in SHORTEN-TB, a TB drug discovery consortium funded by the TB Drug Accelerator programme of the Gates Foundation. This consortium comprises collaborators from the NIAID (NIH, USA), Cambridge University, the Helmholtz Institute for Pharmaceutical Research Saarland (Germany), and the University of Dundee.

Valerie Mizrahi also participated in the TB Gift Consortium led from the Broad Institute of MIT & Harvard. Senior Research Officer, Digby Warner led the bacteriology component of a TB aerobiology project led by Robin Wood of the Desmond Tutu HIV Centre and involving collaborators from a number of institutions in the USA.

Contact Details:
Valerie Mizrahi
Email: valerie.mizrahi@uct.ac.za



SAMRC/NHLS/WITS RESPIRATORY AND MENINGEAL PATHOGENS RESEARCH UNIT

Unit Director: Shabir Madhi

OVERVIEW

The Unit conducts epidemiological, clinical and basic science research on vaccine preventable diseases, aimed at enhancing the health and survival of African children. The SAMRC/NHLS/Wits Respiratory and Meningeal Pathogens Research Unit (RMPRU) was established in 1997, with an original research mandate to investigate pneumococcal diseases at the molecular, epidemiological, clinical and pharmacological levels. Over time, the Unit has evolved to include investigating the clinical and molecular epidemiology of other bacteria and respiratory viruses that are associated with pneumonia and meningitis.

The Unit has established itself to be a premier facility for clinical development of vaccines; and has undertaken pivotal studies on pneumococcal conjugate and rotavirus vaccines. The latter studies have helped inform World Health Organization recommendations for the utilization of these vaccines in low-to-middle-income countries. More recently, the Unit has established itself as an international leading facility in the field of clinical development of vaccines targeted at pregnant women aimed at protecting the women, their foetuses and their young infants. The research in this field includes discovery of common protein antigens of GBS that could be exploited as potential vaccine candidates. In addition, the Unit has led in the clinical development of the first vaccine

against respiratory syncytial virus (RSV) in pregnant women, aimed at protecting their young infants against the most common cause of pneumonia hospitalisation.

The research at RMPRU focuses on vaccine preventable diseases, and addresses the National and Global health priority areas of improving child survival. More recently, the research focus has expanded to address infectious causes of morbidity and mortality in pregnant women, to support health through pregnancy and during early-infancy. The research at RMPRU has been foundational in influencing policy within South Africa, leading it to being the first on the African continent to introduce the life-saving pneumococcal conjugate vaccine and rotavirus vaccine into the public immunisation programme. Furthermore, the research has influenced the WHO recommendation for the inclusion of these vaccines in the public immunisation programmes of all low-middle income countries with high under-five mortality rates.

THE CHILD HEALTH AND MORTALITY SURVEILLANCE PROGRAMME

The Child Health and Mortality Surveillance (CHAMPS) program is a multi-country surveillance programme aimed to use minimal invasive tissue sampling (MITS) to enhance our understanding on the causes of under-five childhood deaths and stillbirths. A pilot study undertaken by the Unit in 2015-6, was instrumental in the Gates Foundation's funding the establishment of the CHAMPS programme which is managed at Emory University. The importance of this programme is evident considering that current global burden of disease estimates for under-five childhood deaths and stillbirths is mainly based on verbal-autopsy data, which too is seldom done and lacks specificity. Furthermore, verbal-autopsies are unable to provide pathogen specific causes of death, resulting in need for further imputations on the number of deaths due to specific pathogens. In the precursor to the CHAMPS study, the RMPRU funded by the Gates Foundation piloted the cultural and social acceptability of undertaking MITS. The findings from this pilot study have provided the most granular data to date on the causes of under-five mortality and stillbirths from any low-middle income country.

The results from this study are currently under peer-review, and will report on the under-recognised role of hospital acquired infection from multi-drug resistant bacteria in causing neonatal deaths; as well as the largely under-recognised role of invasive bacterial disease in causing approximately one-fifth of all stillbirths.

SCIENTIFIC IMPACT AND OUTCOMES

Another focus of the Unit has been the clinical development of a vaccine against respiratory syncytial virus (RSV) which is now the leading cause of hospitalisation and death due to pneumonia in South Africa. The Director was the National Principal Investigator on this study, and his site enrolled the highest number of children globally. This vaccine was administered to pregnant women, with the objective of conferring passive immunity to their infants and protecting them during the first three-six months of life against RSV.

In South Africa, the vaccine was shown to reduce RSV lower respiratory tract infection associated with severe hypoxemia by 60%; and reduce all-cause lower respiratory tract infection (LRTI) hospitalisation by 40%. The future introduction of this vaccine into public immunisation programmes is expected to have a significant impact on reducing healthcare utilisation by preventing pneumonia related hospitalisations.

PARTNERSHIPS AND COLLABORATIONS

RMPRU organised and hosted the first International Symposium on Streptococcus Agalactiae Disease in Cape Town, South Africa in February 2018. This symposium brought together international experts and key stakeholders in the field of GBS and was aimed at progressing towards a GBS-free population. The Symposium had over 250 local and global attendees.

In 2016, RMPRU in partnership with NICD hosted the first Advanced Vaccinology course in Africa (Afro- ADVAC), which was ten days long and took place in Muldersdrift, South Africa. The Unit again hosted the second Afro- ADVAC in September 2018. The course involved presentations and workshops led by international and local experts in the field of vaccinology and immunology. Delegates from over 32 African and Asian low-to-middle-income countries participated in this course, which is planned to take place every second year. Funding for this course is from the Gates Foundation and Sanofi, with educational grants that fund the full participation of delegates across Africa working in the field of vaccinology.

In 2018, ten staff members of the RMRU were trained and in addition, the Director has supervised two MSc and two PhD students to completion in the same year.

"Prof Madhi is undoubtedly a globally-recognised leader in the field of paediatric infectious diseases, as well as a skilled and conscientious mentor of postgraduate research students and postdoctoral researchers."- Panellists at 5 yearly review

Contact Details:
Shabir A. Madhi
Email: madhis@rmpru.co.za

PROGRAMME 4:
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 policy-makers, 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, tile health, telemedicine, eLearning and mobile health) in strengthening health systems.

UNITS THAT CONSTITUTE THIS PROGRAMME

- Burden of Disease Research Unit
- Biostatistics Research Unit
- South African Cochrane Centre
- Health Systems Research Unit
- SAMRC/UWC Health Services to Systems Research Unit

PROGRAMME STRATEGIC OBJECTIVES

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

RESEARCH HIGHLIGHTS UNDER THIS PROGRAMME

BURDEN OF DISEASE RESEARCH UNIT

Unit Director: **Debbie Bradshaw**

OVERVIEW

The Burden of Disease Research Unit (BODRU) is the custodian of knowledge on health and health status that should be the bedrock of all decisions pertaining to the state of health in South Africa. The Unit describes causes of death and the effects of major disease in different parts of South Africa, which can assist in target interventions to prevent disease and reduce early loss of life.

South Africa is still faced with four major epidemics: 1) HIV/AIDS and TB, 2) maternal, child, nutritional and other infectious disease, 3) non-communicable disease and 4) injuries and violence. There has been progress since 1997 but the country continues to experience multiple health challenges. BODRU has a good understanding of the historical trends in health and this should guide South Africa towards meeting the Sustainable Development Goals.

SCIENTIFIC GAP FILLED IN 2018/19

- Our Second National Burden of Disease Study used routine data from Government, such as vital registration and Census data, and supplemented these with our own research data from our Injury Mortality Survey to generate best estimates using advanced quantitative methods.

- A complementary Comparative Risk Assessment study currently underway will provide estimates of the disease burden for 20 key risk factors that drive the disease burden. These include high blood pressure, high cholesterol, high body mass index, high fasting glucose, violence, tobacco and alcohol.
- Our ongoing work includes rapid mortality surveillance to provide real time monitoring of trends in death rates and tracking the incidence of different and types of cancers occurring in a rural area.
- We also conduct research to improve injury data that can monitor and inform policy interventions and we evaluate the quality of clinical data in public-sector hospitals to inform the health information requirement for the National Health Insurance.
- Our Linkage to care study is an ongoing effort to strengthen district-level capacity to enhance linkage to and retention in HIV care, through implementation of a combination of interventions and through strategic use of routine programmatic information.
- BODRU has currently established a strong working relationship with the uThukela district health management team in KZN to strengthen the routine health information system specially focusing on capacity development, which include health system strengthening activities to develop capacity of personnel working with the Health Patient Record System (HPRS).
- The unit is currently working with **WHO Strategic Advisory Group of Experts (SAGE) Working Group on Quality and Use of Immunisation and Surveillance Data** to assess factors that may cause and/or limit access to quality and use of immunisation and VPD-surveillance data for decision-making at different levels. Findings from our review has informed the write up of a chapter on "People: Building Workforce Capacity in the Generation and Use of Immunization Data" in the SAGE Report.
- The Unit has commenced with a study that utilizes data from the South African Demographic Household Survey 2016 and the HSRC survey on HIV and health 2016/17 to provide an understanding of drivers of the HIV epidemic among adolescent girls and young women. These findings will inform interventions for the social impact bond project.

RESEARCH TRANSLATION

NATIONAL ADVISORY COMMITTEES AND BOARDS		
Ministerial Advisory Committee (MAC)	Cancer Control	Ntuthu Somdyala
	Health Data Advisory and Coordination Committee (HDACC)	Prof Debbie Bradshaw (Deputy Chair)
	National Committee Perinatal Mortality and Morbidity Committee (NaPeMMCo)	Prof Debbie Bradshaw
Department Advisory Committee	National Health Information for South Africa (NHISSA)	Dr Lyn Hanmer / Dr Edward Nicol
	ICD-10 Task Team	Dr Lyn Hanmer
South African Journal of Clinical Nutrition (SAJCN)	SAJCN Managerial Board Member and SAJCN Editorial theme editor (Paediatrics)	Prof Ali Dhansay
National Science and Technology Forum (NSTF)	Forum of Science Councils, government agencies and private sector to promote science	Prof Ali Dhansay (Chair)
IUNS/IUFoST (International Union of Nutritional Sciences/ Food Science and Technology)	National (SA) Committee of IUNS/IUFoST membership, which represents nutrition and nutrition science through the Nutrition Society of South Africa, SAMRC, Association for Dietetics in South Africa, and Society for Parenteral and Enteral Nutrition	Prof Ali Dhansay (previous chairperson)
Nutrition Society of South Africa (NSSA)	Represents the interests of Nutrition Science	Prof Ali Dhansay (President; from October 2018, NSSA council member)
National Household Survey on HIV and Health	Scientific Advisory Committee member	Dr Victoria Pillay-van Wyk

PROVINCIAL		
Premier Advisory Committee	Member: WC Health Research Committee	Dr Victoria Pillay-van Wyk (Secundus since September 2018 – Dec 2018, Member 1 January 2019 ongoing)
Western Cape Government Dept of the Premier	Member: Alcohol Harm Reduction Policy Working Group (Oct 2014 – present)	Dr Richard Matzopoulos
Eastern Cape Department of Health – NCDs Directorate	Cancer Strategic Intervention Planning Committee Member	Ntuthu Somdyala
OTHER LOCAL ORGANISATIONS		
Private sector coding committee	PHISC	Dr Lyn Hanmer
ComaCARE - HeadsUP Board	Advocacy and support NPO for coma care	Dr Richard Matzopoulos
Gun Free South Africa Board	Advocacy for gun free society	Dr Richard Matzopoulos
SAMRC	SAMRC Human Research Ethics Committee	Dr Edward Nicol
INTERNATIONAL AGENCIES		
World Health Organization	Member: Strategic Advisory Group of Experts (SAGE) on Immunisation - Working Group on Quality and Use of Global Immunisation and Surveillance Data. (July 2017 – April 2019)	Dr Edward Nicol
International Union of Nutritional Sciences (IUNS)	IUNS Council (2017-2021)	Prof Ali Dhansay
International Collaborative Effort (ICE) on Injury Statistics and Methods	Steering Committee	Dr Richard Matzopoulos
International Violence Prevention Alliance	Focal point	Dr Richard Matzopoulos
WHO-FIC	Family Development Committee	Dr Lyn Hanmer
WHO-FIC	ICHI Committee	Dr Lyn Hanmer
WHO-FIC	ICF Committee	Prof Stefanus Snyman

PARTNERSHIPS AND COLLABORATIONS

The Unit partnered with the National Department of Health (NDoH) and Statistics South Africa Stats SA to conduct the South Africa Demographic and Health Survey. It also partnered with GeoSpace International who have experience with conducting national household surveys for the National Cause-of-Death Validation Study. Furthermore, the Unit has partnered with the Human Science Research Council to provide information on adolescent girls and young women from the South Africa Demographic and Health Survey and the national HIV and health survey for the Social Impact Bond project.

The Unit also houses the only WHO-FIC collaborating centre in the African region, which supports the development, implementation and maintenance of the WHO-FIC across the region, and through the international network of collaborating centres.

Contact Details:
Debbie Bradshaw
Email: debbie.bradshaw@mrc.ac.za

BIOSTATISTICS UNIT

Unit Director: Samuel Manda

OVERVIEW

The Biostatistics Unit (BU) is an interdisciplinary research unit with expertise in Biostatistics, Geographical Information Systems (GIS), Data Management and Food Science. The Unit supports SAMRC's network of medical and health researchers as well as government departments and national and international research bodies and these different but related research entities contribute to the clinical and health research conducted by the SAMRC.

ENSURING SCIENTIFIC VALIDITY OF HEALTH AND ALLIED RESEARCH STUDIES

Biostatistics is critical in ensuring and maintaining the scientific validity of health and allied research studies conducted within the SAMRC, South Africa and Africa. The application of geospatial methods and tools to priority public health research provides unique insights into the spatial heterogeneity of disease burden and risk, and the human and environmental and factors associated therewith, enabling informed intervention and response. The Food Composition Database and related research tools (Publications: Food Composition Tables, Food Quantities Manual and FoodFinder software programme) are key to all nutrition training, research

and practice in the country, as it lays the foundation for all dietary intake assessment, quantification, recipe analysis and labelling, menu planning, dietary prescriptions and related research.

ENHANCING SOUTH AFRICA'S BIOSTATICAL CAPACITY

SAMRC have recognised the critical shortage of Biostatistics capacity in the country and sub-Saharan Africa. It is well accepted that interdisciplinary local teams of researchers including biostatisticians are most likely to have results leading to cost effective interventions and policy adoption. The region experiences one of the highest burdens of communicable and rising non-communicable diseases including injury related morbidity and mortality, and the Unit is at the forefront of supporting the SAMRC and national Government in enhancing and supporting initiatives to develop biostatistics resource (with several postgraduate students in Biostatistics and Epidemiology) base to analyse a myriad of health data and formulate locally relevant scientific questions and manage and use existing high quality data in the context of Big Data in Health to inform public health policies, programmes and interventions.

The Unit provides statistical support to the chronic disease study from mass participation in sports events (Cape Town Cycle Tour, Comrades, Cape Epic, Two Oceans) and have hundreds of thousands of entrants each year. These data are huge including serious or life-threatening illness as well as injuries sustained during participation. The Unit is actively involved in supporting the Burden of Diseases studies on Comparative Risk Assessment and Assessment of Rapid Mortality Surveillance.

SCIENTIFIC GAP FILLED IN 2018/19

As part of the Unit's involvement with the sports study, a consensus document on the aggregated data from various events globally with millions of athletes taking part will permit the development of an informed athlete management protocol. The use of a well-researched protocol will make participation in mass sports events safer through the implementation of an effective intervention.

Our involvement on the Fifth South African National HIV Prevalence, Incidence, Behaviour and Communication Survey, (SABSSM V), analysis of the data has revealed crucial information on national and sub-national progress towards HIV epidemic control in the country.

The Unit also provided high level statistical support to the DREAMS Impact Evaluation study, whose results have identified gaps in the inadequacies of programmes aimed at reducing HIV incidence in adolescents and young girls in the country. The Unit also supported the design, data management and analysis of The Women's Health, Injectable Contraception and HIV RCT, which identify the need for evidence on which to advise women regarding the relative safety of contraceptive options. One of the unit's flagship support study is the Stepping Stones and Creating Futures, where by using state of the art statistics, identified which group of men (most violent to least violent) benefited the most from the intervention.

The Unit is also involved in projects that will shed light into new mutations of TB and provide new insights in the National Department of Health/WHO guidelines on the prevention of mother-to-child transmission (PMTCT).

There were gaps in the dynamics and exposure to factors affecting young people to alcohol and drug abuse. The support of the Unit was vital in the identification of the negative effects of alcohol and smoking advertisements especially in the youth in Tshwane. This was part of a larger study, the International Alcohol Control study (South Africa). The Unit supported the design and analysis of a learners' study across the Western Cape Province, which found that learners reporting high religiosity (attending religious services or activities at least one-two times a month) had a lower level of alcohol use as well as for other substances. The results from these two surveys provides evidence of interesting intervention strategies to limit alcohol use in young people.
The Health GIS Centre, in consultation with the South African Malaria Elimination Committee (SAMEC), is responsible for the periodic update of the national malaria risk map. The latest update approved in December 2018, now officially amends the national malaria treatment guidelines indicating where chemoprophylaxis and non-drug prevention measures are recommended across the country. The risk map is consulted by private and public health practitioners as well as pharmacists countrywide in the recommendation of appropriate prophylactic measures.

The geospatial classification and cluster analysis of malaria case data conducted annually by the Health GIS Centre on behalf of the National Department of Health and the provincial malaria control programmes provides the foundation for the national malaria foci clearing programme, adopted in four districts in 2017 as a fundamental strategy in the national elimination campaign.

RESEARCH TRANSLATION

The Unit has been involved in several research translation activities over the last year that have a bearing on local and national health policies. The National Department of Health (NDoH) invited the Unit to participate in assessment workshops on the relevance and readiness of the annual antenatal HIV surveillance surveys to PMTCT program-based HIV surveillance. The Unit contributed to two draft policy papers to these.

The NDoH also approached the Unit to represent them at a WHO workshop on the analysis of TB Prevalence surveys, where several countries that have conducted TB surveys (including South Africa) were to discuss initial and final results, case definition and possible analyses for local relevance.

The Unit makes an intellectual contribution to the scientific validity of the work of the International Olympics Committee (IOC). Through the IOC and publications resulting from the research wide exposure, results are achieved and the resulting policies influence the conduction and participation of IOC sanctioned events.

As part of opportunities that are developing from harnessing Big Data in Health, the Unit organised a think tank on Big Data in Health in Pretoria, which brought researchers from diverse backgrounds drawn from SAMRC, SANBI, SAPRIN, and others. We discussed several practical, methodological and application initiatives and how the SAMRC will contribute to the Big Data space.

The Unit supported the WHO Global Malaria Programme as external consultant on the WHO Evidence Review Group on mass drug administration (MDA) for malaria, the findings of which will serve to inform a revised position on MDA globally. The Unit sits on the technical and research committees of the Elimination Eight-country and MOSASWA three-country regional malaria initiatives, meeting biannually and the South African Malaria Elimination Committee and chairs the national malaria surveillance sub-committee, meeting biannually.

SAFOODS PROJECTS

SAFOODS have had both poster and oral presentations at the bi-annual National Dietetic and Nutrition Congress in September 2018. In addition, the team has hosted a successful exhibition in conjunction with the Corporate Communications Division of the SAMRC, where both the newly published Food Quantities Manual was launched and Foodfinder programme showcased.

Additionally, research translational activities include SAFOODS activities as a member on National Department of Health's: The National Food Legislation Advisory Group, and National Food Fortification Working Group. In addition, SAFOODS, acts as the Country member and Newsletter Editor for AFROFOODS, the guiding body for Food composition activities on the continent.

CAPACITY DEVELOPMENT

As part of supporting and enhancing Biostatistics capacity and resource base in the country and region, the Unit is supervising well over 30 postgraduate students in Biostatistics and Epidemiology in South Africa and the region.

The Unit is leading the scientific implementation of the National Treasury (IDC), Enabel (ex-Belgian Technical Cooperation) and the South African Medical Research Council (SAMRC) cooperation under Building Academic Partnerships for Economic Development (BAPED) to Biostatistics in South Africa. This has already seen several postgraduate students supported to attend conferences, workshops and training in South Africa and Belgium. The Unit is a member of the sub-Saharan African Consortium for Advanced Biostatistics, a Wellcome Trust funded programme that aims to develop biostatistics capacity in sub-Saharan Africa. The Unit also supports curriculum benchmarking, postgraduate supervision and teaching of advanced courses across the consortium.

PARTNERSHIPS AND COLLABORATIONS

The Unit is a partner of SSACAB (Sub-Saharan African Consortium for Advanced Biostatistics), is a Wellcome Trust funded programme, in partnership with the Alliance for Accelerating Excellence in Science in Africa (AESA). The consortium brings together eleven African universities and research institutions and four northern Universities with the overall aim of developing biostatistics capacity in SSA.

As part of the National Treasury (IDC), Enabel (ex-Belgian Technical Cooperation) and the South African Medical Research Council (SAMRC) cooperation, a new partnership has been created and enhanced with the Universities of Hasseltt and Leuven in Belgium. These will help exchange of research ideas and training opportunities for the Units staff.
Research collaborations with K-RITH and the Vanderbilt Institute for Global Health since 2015 have initiated investigation into the spatial distribution of paediatric tuberculosis in the eThekwini Metropolitan District, with a view to identifying high resolution clustering of recent infections for informed and targeted intervention. The Unit partnered with Emory State University on mapping XTB in KwaZulu-Natal province. This collaboration has led publications and presentations. The Unit has collaborated with HIV Prevention Research Unit of the SAMRC in KwaZulu-Natal, the University of KwaZulu-Natal and the Kirby Institute to pool and map HIV data.

Partnerships and collaborations within the National Department of Health: Division Nutrition's Working Group on Fortification has resulted in a research project on the nutritional composition of South African bread and flour, which will inform the National Food Composition Database and related tools. A multi-nation collaboration between SAFOODS, LUANAR University (Malawi) and TUFTS University (USA) has led to the development of a first version and edition of the Malawian Food Composition database and soon to be launched tables. This collaboration in addition, has resulted in a visit from the Ministry of Health: Department Nutrition, HIV and AIDS from Malawi to the SAMRC, to showcase the processes and procedures employed to institutionalise a National Food Data System.

Contact Details:
Samuel Manda
samuel.manda@mrc.ac.za

COCHRANE SOUTH AFRICA

Unit Director: Charles Shey Wiysonge

OVERVIEW

Cochrane South Africa (SA) is part of the global independent Cochrane network that prepares and disseminates information (in the form of reviews) on what works and what doesn't in healthcare. Cochrane SA contributes to evidence-informed decision making on vaccination, HIV and nutrition through synthesising findings from multiple research studies to draw definitive conclusions about what interventions work and ensuring that these findings inform policies and guidelines in South Africa and internationally.

Cochrane SA contributes to strengthening health systems through synthesising research on the effects of various options for governing and financing health systems, delivering effective interventions, and bringing about positive change in health systems of low and middle-income countries.

The Unit contributes to transparency in research conduct and strengthening the evidence-base for decision making by hosting both the Pan African Clinical Trials Registry and the South African Clinical Trials Registry and ensuring that information about planned and ongoing trials as well as findings of completed trials is in the public domain. In addition, Cochrane SA builds the capacity of researchers to do high-quality evidence syntheses and the capacity of decision makers to find and use high-quality research evidence to inform healthcare decision-making.

THE IMPACT OF SYSTEMATIC REVIEWS

Cochrane systematic reviews enable policy makers, healthcare providers, and the public to make informed decisions about health care, by providing the most authoritative evidence on the efficacy of preventive, therapeutic, and rehabilitative interventions; and are powerful tools to enhance healthcare knowledge and decision-making.

Cochrane SA bridges the gap between primary research and decision-making processes and reduces research waste by identifying saturated research areas and gaps in research. Thus, Cochrane SA ensures that discovery and explanation go hand in hand, making sure that when new facts are presented, their relation to old ones is pointed out. We ensure transparency in research conduct by hosting and managing two prospective clinical trial registries.

SCIENTIFIC GAP FILLED IN 2018/19

The Unit is a partner in the Collaboration for Evidence-Based Healthcare and Public Health in Africa (CEBHA+) project which aims to ensure that research questions are relevant and fill a real gap, through conducting robust research, and through overcoming the disconnect between primary research, evidence synthesis, and implementation into policy and practice.

During the reporting period, Cochrane SA staff published more than 40 articles on nutrition and at least five of the 10 issues identified by WHO as the greatest threats to global health in 2019. These include:

i. Non-communicable diseases, which are collectively responsible for 15 million people worldwide dying prematurely, aged between 30 and 69. Over 85% of these premature deaths are in low- and middle-income countries, including South Africa.
ii. Global influenza pandemic. The world will face another influenza pandemic. The only thing we don't know is when it will hit and how severe it will be.
iii. Ebola. Thirteen candidate Ebola vaccines have undergone or are currently undergoing clinical evaluation at different trial phases. Our work involves synthesising currently available evidence on the net benefit of these vaccines.
iv. Vaccine hesitancy, the reluctance or refusal to vaccinate despite the availability of vaccines. Vaccine hesitancy threatens to reverse progress made in tackling vaccine-preventable diseases. Our articles have highlighted the knowledge advances and gaps in the field of vaccine hesitancy, with a focus on (South) Africa, and have made novel proposals for how these gaps might be addressed.

Our work in this area is setting the tune for the development of tools for national immunisation programmes to boost the quality and use of data on vaccination acceptance and demand across global settings.

RESEARCH TRANSLATION

Cochrane SA staff actively participated in advisory committee meetings at the National Department of Health (NDoH), WHO, and other organisations; and presented research findings at numerous national and international conferences. The Unit also organised numerous meetings and educational workshops in the Western Cape, other parts of South Africa,

and other African countries. The Unit publishes a bi-annual newsletter, which includes technical and plain language summaries of Cochrane Reviews relevant to Africa.

Cochrane SA hosted the 3rd African Cochrane Indaba from 25 to 26 March 2019. The objectives of the indaba included facilitating advocacy for evidence-informed policy-making; creating opportunities for stakeholder engagement; sharing information about evidence synthesis networks; public engagement in evidence-based healthcare; and celebrating the 21st anniversary of the Unit.

Through the CEBHA+ project, we held several meetings with NDoH representatives to discuss ongoing research and how this could inform NDoH policies on non-communicable disease prevention and integration of care. Through the international Cochrane Nutrition field Cochrane SA disseminated evidence from nutrition reviews though social media (11 blogshots, two infographics, two newsletters).

In addition, Cochrane SA conducted a systematic review that informed WHO guidelines on total fat intake in children. Four Portuguese speaking researchers have been recruited to undertake translations of review summaries into Portuguese. The Cochrane Africa Network engaged with the Kenya Renal Association through a workshop to identify priorities for new reviews.

Through the South African Guidelines Excellence (SAGE) project, we explored South African primary care guideline development, implementation, and use; alongside a multi-pronged capacity development programme including a Masters' level course, workshops, postgraduate student support, and a valuable 'one-stop-shop' resource to support the clinical practice guideline (CPG) community - an online Guideline Toolkit (https://guidelinetoolkit.org.za/).

We also identified opportunities for better development and implementation for primary care CPGs, which are relevant to South Africa, as the country moves towards universal health coverage.

CAPACITY DEVELOPMENT

Cochrane SA was involved in student supervision, conducting educational workshops to various healthcare workers, and convening and facilitating modules in postgraduate programmes (four at Stellenbosch University and two at University of Cape Town).

Cochrane SA staff supervised 19 postgraduate students (three Postdocs, 10 PhDs, and six Masters) and graduated four students (two Masters, two PhDs). The Unit also hosted 10 webinars on various topics related to systematic review methods. In addition, unit staff facilitated six workshops on evidence-based health care in various African countries; including Zimbabwe (one workshop), South Africa (four workshops), and Mozambique (one workshop).
Unit staff mentor novice authors of Cochrane systematic reviews. In addition, the Unit runs a tailor-made mentorship programme known as the Aubrey Sheiham Evidence-based Health Care in Africa Leadership Award. This award is offered annually by Cochrane to an individual from an African country to support the conduct and dissemination of a high-impact Cochrane Review focusing on a topic relevant to resource-constrained settings. In addition to undertaking and disseminating the review findings, the awardee mentors a novice author from an African country while conducting the review.

The Unit also contributed to capacity building by providing support to staff to attend workshops and to apply for grants and scholarships. One staff member was awarded the NRF Thuthuka grant in the NRF Rating track, and an SAMRC scholarship to pursue an international Masters' degree in Vaccinology at the University of Lausanne, Switzerland.

PARTNERSHIPS AND COLLABORATIONS

Cochrane SA invested and/or participated in various partnerships in 2018. The Unit has established the Cochrane Africa Network; in partnership with Stellenbosch University's Centre for Evidence-Based Health Care, Cochrane Nigeria, and Cameroon's Centre for the Development of Best Practices in Health. Cochrane Africa is a network with a vision to increase the use of best evidence to inform healthcare decision making in the sub-Saharan African region.

Through the Collaboration for Evidence-Based Healthcare and Public Health in Africa (CEBHA+) project, we collaborated with partners in Uganda, Malawi, Rwanda, Ethiopia, South Africa and Germany. The project aims to ensure that the priority research questions are relevant and fill a real gap, through conducting robust research and through overcoming the disconnect between primary research, evidence synthesis and implementation into policy and practice.

In addition, Cochrane SA maintained active collaboration with the NDoH, WHO, Global Alliance for Vaccines and Immunisation, Clinical Research Initiative for Global Health, and other bodies; through joint projects and membership of advisory committees.

Contact Details:
Charles Shey Wiysonge
Email: charles.wiysonge@mrc.ac.za

HEALTH SYSTEMS RESEARCH UNIT

Unit Director: Catherine Mathews

OVERVIEW

The Health Systems Research Unit (HSRU) has engaged and partnered with government, communities and stakeholders to evaluate the effectiveness and efficiency of existing care delivery models in communities, schools, and health facilities. The evidence garnered by the Unit has the potential to strengthen solutions in easing the burden of the most prominent diseases on South Africans and consequently improve their lives.

In the 2018/19 financial period, the HSRU made significant headway in generating knowledge that will inform prevention strategies, specifically in the areas: maternal, family and child health; adolescent health and well-being; and rapid and refined knowledge generation for policy makers and stakeholders.

The Unit's work has shown the feasibility of a rapid response service – an innovative mechanism aimed at helping policy makers use evidence by producing evidence products rapidly in response to their needs. To date, the service has produced rapid responses for two Provincial Departments of Health on topics including utilising lay health workers and ways to enhance early tuberculosis detection.

"A key part of our work is supporting stakeholders in implementing evidence-informed decision making for health systems and promoting evidence use within government in South Africa," says Unit Director Professor Cathy Matthews.

INFORMING HEALTH CARE POLICY

The Unit's work also contributed to local and international evidence-informed policy making for health systems. For example, two qualitative evidence syntheses that were conducted by the Unit have fed into a new WHO guideline, to be published in 2019 in 'Digital Health for Health Systems Strengthening. The Unit also provided technical advice for development of the guideline.

Knowledge generated from an HSRU project showed that it would be possible to finance a universal Child Support Grant (CSG) using personal income tax and ultimately child poverty and inequality. This project, in collaboration with the Southern African Social Policy Research Institute (SASPRI), as in response to prior research by the same unit which proved that, despite evidence which points to the CSG as an important policy instrument for tackling childhood poverty and improving child health and wellbeing, about a fifth of children who meet the eligibility criteria for receipt do not receive it. As a result of this project, a lead scientist from the Unit was invited, by the International Labour Organisation (ILO) and UNICEF, to present the results at a closed invitation-only, high level conference titled "International Conference on Child Universal Grants" in Geneva in February 2019, to demonstrate the feasibility and sustainability of universalising child cash transfer programmes in low and middle-income countries. The scientist, along with the collaborators from SASPRI have authored a paper from this work which has been accepted for publication by the International Journal of Microsimulation.

In the area of adolescent health and wellbeing, the Unit collaborated with the University of Cape Town's Adolescent Health Research Unit and USA-based Brown University to conduct a systematic review which found that school-based condom availability programmes (CAPs) are an effective strategy for improving condom coverage and promoting positive sexual behavior and did not increase adolescent sexual activity. The HSRU systematic review has been cited as international best practice in a recent decision in a number of states and school districts in the USA to adopt such condom distribution initiatives. Policy makers in the USA used the HSRU review to influence the decision to offer condoms in high school health clinics in order to address a spike in sexually transmitted infections, which was a public health crisis.

The Health Systems Research Unit continues to conduct research in the following areas:

ADOLESCENT HEALTH AND WELLBEING

The HSRU evaluated the impact of large-scale HIV, sexual and reproductive health and mental health programmes on the health and well-being of adolescents. Through evaluating health systems reforms to improve adolescent health and wellbeing, the Unit builds knowledge about what works to enhance adolescent health and well-being and how to prioritize universal health care (UHC) for adolescents. In the 2018/19 reporting period HSRU collaborated with the Gender and Health Research Unit and Brown University in the US and developed and are presently evaluating Safe South Africa, an intervention for adolescent boys which aims to reduce the risk of HIV and perpetration of intimate partner violence (IPV). The Safe South Africa programme is designed to promote discussion around pressures boys face as they approach manhood, including dating, sex and violence Safe South Africa is a theory-driven, developmentally-tailored and gender-specific intervention designed for male adolescents 15-17 years of age.

SOCIAL POLICY

The social policy focal area in the HSRU, undertakes studies that examine the relationship between social protection interventions and policies, and health and well-being. The Unit evaluates and advocates for health and social policy reforms to improve UHC, including the child support grant and other forms of social protection.

PREVENTION AND TREATMENT OF TB

HSRU's TB focal area explores and evaluates strategies and models of care to improve the prevention and treatment of TB. The results provide guidance on the effectiveness of different strategies and models of care and how these can be improved to optimise patient management. Recently, this has included the management of pregnant women with drug-resistant TB in an attempt to optimise the outcomes of infants born to these mothers. These findings guide policy development and health reforms to achieve UHC.

NON-COMMUNICABLE DISEASES

The Unit's research aims to strengthen health systems through promoting a multi-sectoral response to effectively preventing and treating chronic disease. The Unit contributes a comprehensive understanding of the causal factors and potential solutions, including identifying the roles played by social determinants (such as poverty, education, nutrition) and health system challenges. HSRU evaluates the effectiveness and feasibility of current, new and innovative models of what works for health systems strengthening to provide care for people with non-communicable diseases. Researchers at the Unit evaluate the gaps between policies aimed at addressing the problem, and practice; and suggest health system-wide solutions to improve policy implementation.

HEALTH ECONOMICS

The HSRU conducts needs, demand, supply and cost assessments to assist with human resource planning with the goal of UHC. We develop costing tools to determine the cost of providing specified health care services using different delivery models to support health services and policy planning.

KNOWLEDGE SYNTHESIS FOR STRENGTHENING HEALTH SYSTEMS

The Unit conducts and provides training in methods for both policy relevant, full-length systematic reviews and rapid evidence syntheses. Such syntheses allow for decisions to be based on an overview of the full spectrum of information, rather than on individual studies or on personal experiences alone.

CAPACITY DEVELOPMENT

Prof Arvin Bhana, Chief Specialist Scientist, is involved in the Mental Health Integration: Sub-Saharan Africa Mental Health Integration Consortium (SMhINT), which is one of 12 NIMH HUBS. This initiative focuses on integrating mental health services into primary health care, and building capacity for this integration. Aside from scaling up mental health integration using implementation science methodology, SMhINT also focuses on capacity development (CD).

The HSRU had its first capacity building workshop involving all the mental health coordinators for the KwaZulu-Natal province, including the Director and Managers of Mental Health programmes around developing District Mental Health Care plans for each of four regions that covers KwaZulu-Natal. These trainees will receive training in implementation science, continuous quality improvement methodology, monitoring and evaluation over a period of two weeks. The Unit, together with the University of Washington's Global Health Department will also provide e-learning opportunities. Prof Arvin Bhana is involved in a second capacity initiative called SMART Africa focusing on vulnerable children and adolescents in an earlier NIMH HUB. As the capacity development lead for this HUB, Prof Bhana and his colleagues

have facilitated various capacity building workshops which include Child Mental Health Service programming using evidence-based interventions; Workshop on implementing and scaling up primary care mental health services using the findings from PRIME (Programme for Improving Mental Health Care) and facilitating a Theory of Change workshop, all of which took place in Kampala, Uganda.

The Knowledge translation focal area has conducted an evidence synthesis workshop for the National Department of Health and three provinces to build the skills of front-line managers and district specialists so that policies and programmes can be guided by the latest evidence.

PARTNERSHIPS AND COLLABORATIONS

Prof Tanya Doherty, Chief Specialist Scientist, was invited by the WHO to serve on a technical advisory group for a global strategic review of integrated management of childhood illness. She advised on study design and tool development and participated in several workshops to analyse the findings. The review culminated in a supplement in the British Medical Journal consisting of 12 articles. Tanya Doherty was first author of a paper focused on district health management teams[1] and was the senior author on a paper describing community strategies to enhance child health[2]. A report was also produced which prompted discussions between academics, WHO and UNICEF regarding the need for a Lancet commission on realigning child health for the sustainable development goal (SDG) era[3].

Tanya Doherty was also invited to serve on the commission as chair of the working group on data and information for action and accountability. This working group, consisting of scientists from across the globe has been reviewing Sustainable Development Goals (SDG) indicators relevant to children and analysing data availability, quality and flows. Case studies have also been developed with country examples where data has been used to spur action and accountability at local, sub-national and national levels within low- and middle-income countries. The commission report will be submitted to the Lancet in April 2019 and is due to be launched in several countries later in 2019.

Several members of the unit have been involved in important national collaborations and partnerships. For example, in the period under review Dr Marian Loveday and her team commenced an intervention study to explore opportunities and models for improved integration and health service delivery for communicable and non-communicable diseases. This work is being done in partnership with the KwaZulu-Natal Provincial Department of Health and the eThekweni municipality and two international organisations: 1) Interactive Research Development (IRD) and 2) Advance, Access and Delivery (AA&D) which is part of Partners in Health. Additionally, the Maternal, Family and Child Health Team in the Health Systems Research Unit collaborates with the National Department of Health, Clinton Health Access Initiative, University of Limpopo Trust, University of Pretoria, UNICEF, World Health Organization, Centers for Disease Control and Prevention, Harvard School of Public Health, ELMA Philanthropies, University of Montpellier and University of Bergen. With the latter two institutions we have secured two grants to close gaps in reducing vertical transmission of HIV – from the French Research Agency (ANRS) and the SAMRC SHIP HIV Cure Request for applications.

"It has been a pleasure to work with the MRC, and particularly with the Health Systems Research Unit. Recently we collaborated on an impact evaluation of a combination prevention program among adolescents girls and young women, the ANC-PMTCT (antenatal care – prevention of mother to child transmission) assessment and the PMTCT program process evaluation. MRC's activities have shaped the HIV landscape for these priority and vulnerable groups and contributed to the upward trend of the country to achieve epidemic control.

Working with these highly productive teams, we have been able to go through all phases of the projects from conceptualization, implementation, and dissemination planning. This unit is keen to contribute to the evidence needed for program improvement; and has produced a number of scientific outputs including abstracts, manuscripts, reports, and press releases to that effect. Their commitment and enthusiasm to making the information available is commendable. We are excited to collaborate with them and look forward to the results of these projects."
- Ms Mireille Cheyip and Dr Mary Mogashoa, Centres for Disease Control and Prevention

Contact Details:
Catherine Mathews
catherine.mathews@mrc.ac.za

SAMRC/UWC HEALTH SERVICES TO SYSTEMS RESEARCH UNIT

Unit Director: Helen Schneider

OVERVIEW

The Health Services to Systems Unit (HSSU) works to strengthen the capacity of health systems to address health priorities through research, by generating evidence, and building capacity to generate evidence, on health system strengthening relevant to South Africa's health system, whilst contributing to international knowledge and debates.

The HSSU is located within the field of health policy and systems research (HPSR) which "encompasses how societies plan, manage and finance health services as well as investigation of the role and interests of different actors in the health system. In particular, it focuses on 1) the contexts, mechanisms and processes through which initiatives to improve the access, quality and equity of health services become integrated into the everyday practices of the routine institutional environment ("real-world" settings), and achieve sustainable coverage and impacts at scale 2) building HPSR research capacity through doctoral and post-doctoral level training.

The work of the HSSU has focused on a number of core themes, including the strengthening of frontline health systems – from community based to primary health care (PHC) and district health systems (DHS); and on governance and accountability of health systems at macro, meso and micro levels.

HEALTH SYSTEMS AND UNIVERSAL HEALTH COVERAGE

Health systems are the vehicle through which effective interventions are delivered and made universally accessible. As SAMRC researchers develop breakthroughs in diagnostic and treatment modalities and develop and test interventions targeting particular diseases, understanding the processes through which these interventions are adopted and implemented in an equitable fashion becomes particularly relevant.

District health systems and primary health care are the most decentralized building blocks of South Africa's public health system. The functioning of these sub-systems is critical to the

attainment of universal health coverage (UHC), and will be a key component of future reforms in South Africa, such as the impending National Health Insurance.

These foundational elements of health systems are also regaining attention globally as central to the achievement of the Sustainable Development Goals.

SCIENTIFIC GAP FILLED IN 2018/19

Governance of national Community Health Workers (CHW) programmes: Drawing together analyses conducted over the last four years, the HSSU published a paper (International Journal of Health Policy and Management) outlining an empirically based governance framework for CHW programmes. The paper has been downloaded more than 1,000 times.

Ward Based Outreach Teams: PhD student Tumelo Assegaai first authored a paper on the impact of WBOTs in the North West Province, providing a novel methodology for using routine data in programme evaluation. A second paper, on policies and practices of CHW supportive supervision in South Africa, will shortly appear in the journal Human Resources for Health. This PhD aims to explore supportive supervision through the concept of "supervision ecosystems" and will result in the development of a framework for supportive supervision of CHWs at district level.

District health system strengthening for improved maternal, neonatal and child health outcomes: taking forward the programme of work evaluating the "3-feet initiative", begun in 2017, in 2018 the HSSU director led a team of local, provincial and national decision makers in documenting the health system factors behind significant reductions in incidence and mortality from severe acute malnutrition in one district (Gert Sibande). Through this process, we developed a "middle range theory" on the nature of enabling environments for nutrition in health districts - outlining three key health systems pathways: ways of thinking (evidence, information, knowledge); ways of governing (participation, leadership, accountability); and ways of resourcing (support, material, capacity).

Post-doctoral fellow, Nelisiwe Maleka, completed a series of analyses of authorship patterns and partnerships in the literature on CHW programmes, highlighting global inequities, but also documenting the increasingly significant role of South Africa and other middle income countries in shaping global research agendas. This is feeding into global debates on research partnerships and how to strengthen south-south partnerships in health systems and policy research.

RESEARCH TRANSLATION

The HSSU Director has participated in several meetings convened by the SAMRC to discuss the establishment of a national collaboration on UHC. She co-facilitated a national workshop of 25 researchers (in February 2019) to develop a list of key research priorities for UHC in South Africa.

Building on the 3-feet work, the HSSU has supported the development of a monitoring and evaluation framework for a major health system strengthening initiative to improve maternal, child and neonatal health outcomes in South Africa. This initiative is being led by the national Department of Health and involves a large partnership between several universities and SAMRC research units.

CAPACITY DEVELOPMENT

Two PhD students, Lungiswa Tsolekile and Ian Neethling, completed their doctoral theses, while a further five PhD students have made progress on their dissertations. The HSSU graduated two Masters Students.

PARTNERSHIPS AND COLLABORATIONS

The University of the Western Cape School of Public Health (UWC SOPH) has a collaboration with the Antwerp Institute of Tropical Medicine, which includes a large grant (from Belgian Cooperation) to support doctoral level training at the UWC SOPH. The HSSU Director is the PI of this grant.

As part of an NRF-STINT funded collaboration with Umeå University (Sweden), four country case studies of collaborative governance in community health system and primary health care, using a common framework, were completed. The countries were Zambia, India, Sweden and South Africa. This formed the basis of an organised session at the 5th Global Health Systems Research Symposium in Liverpool in October 2018.

The HSSU Director is on the steering committee of the WHO led Collaborative on Health Systems Governance, and in this regard led the development of a proposal for a South African case study on multi-sectoral governance to be conducted in the Western Cape in 2019. The HSSU Director is also a member of the Scientific and Technical Advisory Committee of the Alliance for Health Policy and Systems Research (AHPSR).

South African partners include the Health Systems and Policy division of the University of Cape Town School of Public Health and Family Medicine, and district, provincial and national decision makers.

Contact Details:
Helen Schneider
Email: hschneider@uwc.ac.za

PROGRAMME 5:
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

- SAMRC/UCT Drug Discovery and Development Research Unit
- Primate Unit and Delft Animal Centre
- The Biomedical Research and Innovation Platform
- SAMRC/TUT Herbal Drugs Research Unit

PROGRAMME STRATEGIC OBJECTIVES

- To establish key modern technology (enabling) platforms to facilitate generation of new drug discovery knowledge through world-class applied research
- To establish and manage research laboratories and facilities as state-of-the-art national research facilities for research and development
- To train and mentor a new generation of high-quality postgraduate students and Postdoctoral Fellows in multi-disciplinary research, and in so doing, equip them to compete in the science and/or education sectors nationally and internationally
- To strengthening research and development to build on and enhance public health innovation
- To increase the body of scientific knowledge through research translation into products, patents, research papers, policy, practice and health promotion (including to the general public)
- To increase the number of health-care innovations and to produce patents based on new discoveries and new research methodologies

RESEARCH HIGHLIGHTS UNDER THIS PROGRAMME

SAMRC/UCT DRUG DISCOVERY AND DEVELOPMENT RESEARCH UNIT

Unit Director: Kelly Chibale

OVERVIEW

The work undertaken in the Unit is positioned to contribute directly to health innovation, defined as the delivery of tangible outcomes useful to the improvement of health.

The Unit's work is specifically focused on translating basic science knowledge into potential innovative new medicines to treat malaria, tuberculosis and combating antimicrobial resistance caused by bacterial that has become resistant to conventional antibiotics.

FIGHTING DISEASES FROM INSIDE THE LAB

The world, including South Africa, is constantly being challenged by the rapid rise of new infectious diseases and many chronic, non-communicable diseases, as well as the resurgence of old killers, including tuberculosis and bacterial infections. With the impact that such diseases make on South Africa and the world both on health and socio-economic development, they remain a major challenge to South Africa's and the world's development. Malaria and tuberculosis have been recognised both as diseases of poverty. They cause poverty in households and communities from loss of income due to inability to work, treatment expenditure, disease-related hospitalizations and deaths. In South Africa this recognition culminated in the Department of Science and Technology Bio-Economy SA (2013), where proposed Health Innovation themes include new or improved therapeutics.

GAINS MADE IN THE FIGHT AGAINST MALARIA

Over the years, we have witnessed much success in the fight against malaria globally - malaria is no longer one of the leading causes of illness and death. However, despite the much evident progress made to fight malaria, millions of people continue to suffer every year, hence our Unit continues to help the course by researching drugs.

In the past reporting year, we have identified new promising drug leads with the potential to contribute to the elimination of malaria in South Africa as they were shown to kill the malaria parasite at all its life cycle stages in the human host,

thereby potentially offering protection, cure and blocking transmission all in a single drug. This is on the basis of the unique novel mechanism of action of the drug leads.

RESEARCH TRANSLATION AND IMPACT

The Unit hosted the Grand Challenges Africa Drug Discovery Sentinel Program Workshop on 5-6th December 2018 at the University of Cape Town. This program is a new partnership between the Unit, Gates Foundation, Medicines for Malaria Venture (MMV) and the African Academy of Sciences (AAS) to boost African led scientific innovation.

Following discussions with the Gates Foundation and MMV at the end of 2017, the Unit Director submitted a concept document to the foundation proposing to use the Unit as a focal point to lead a project-based network of partnerships (or virtual network) to facilitate drug discovery-related capacity-building in Africa.

CAPACITY DEVELOPMENT

The Unit boasts a fully-fledged Grown Our Own Timber (GOOT) initiative. In the past financial year, the GOOT has seen regular drug discovery seminars; seed funding to support internal innovation topics; enhancing the collaboration with academic groups; supporting and mentoring interns and students. One highlight of this is the Walter Sisulu University (WSU) capacity building pilot project to train and uplift postgraduate students from historically disadvantaged institutions in the South African context. Students from WSU were hosted within the Unit.

TAKING PRIVATE PUBLIC PARTNERSHIPS TO NEW HEIGHTS

In Africa, we are the only member of the Tuberculosis Drug Accelerator (TBDA) consortium. This consortium includes nine innovative pharmaceutical companies and 12 research institutions with support from the Gates Foundation. An additional separate collaboration in the field of TB was with the pharmaceutical company Celgene. Both the TBDA consortium and Celgene provided funding and access to specialised technologies not available within the Unit.

Still in pursuit to eliminate Malaria, the unit enjoyed partnerships and collaborations with Medicines for Malaria Venture (MMV), the pharmaceutical companies Merck and Celgene as well as the University of Pretoria, Council for Scientific and Industrial Research (CSIR) and the Swiss Tropical and Public Health Institute.

MMV, Merck and Celgene provided funding and access to specialised technologies not available within the Unit. On the other hand, the University of Pretoria, Council for Scientific and Industrial Research (CSIR) and the Swiss Tropical and Public Health Institute provided access to specialised technologies not available within the Unit.

In combating antimicrobial resistance, the Unit enjoyed partnerships and collaborations with the Universities of Oxford, Leeds and Warwick. These UK-based institutions provided access to specialised technologies not available within the Unit.

FROM THE LAB TO MAGAZINE COVERS

Recently, Unit Director, Prof Kelly Chibale was hailed as one of the World's 50 Greatest Leaders by two of the most publications: Fortune Magazine and financial Times and this what they say:

"In much of Africa, the infrastructure to support scientific research is sorely lacking. But Chibale is working to change that. The Zambian chemist has built H3D, Africa's first integrated drug discovery center, at the University of Cape Town. His team now includes more than 90 researchers; they work out of state-of-the-art facilities thanks to partnerships with the Gates Foundation, Novartis, and South Africa's government. H3D already has a potential drug for malaria in human trials" –
Fortune Magazine

Prof Chibale also featured in the Financial Times Special report under South Africa 'frontier vibe' still drives advances, a special feature on innovation in South Africa, 24 February 2019 "

"At UCT, Prof Chibale has marshalled public and private funding, including from Novartis, Celgene and the Bill & Melinda Gates Foundation, to create Africa's first integrated drug discovery and development unit. In another African breakthrough, H3D put an antimalarial drug into Phase II clinical trials in 2017, in what Prof Chibale hopes will be the first of many medicines it can push towards regulatory approval" - Financial Times

Contact Details:
Kelly Chibale
Email: Kelly.Chibale@uct.ac.za

PRIMATE UNIT AND DELFT ANIMAL CENTRE

Unit Director: Chesa Chauke

OVERVIEW

The Primate Unit and Delft Animal Centre (PUDAC) is a South African Veterinary Council (SAVC) registered research platform. The platform is part of the Grants, Innovation and Product Development Division of the SAMRC with its work stretched largely across two of our organisation's strategic goals:

- **Strategic Goal 2:** To lead the generation of new knowledge and facilitate its translation into policies and practices to improve health
- **Strategic Goal 4:** To build capacity for the long-term sustainability of the country's health research.

The primary mission of PUDAC is to provide leadership, service and support in the field of laboratory animal science through training, capacity development and collaborative involvement with selected academic institutions of higher learning (such as HDIs), while ensuring the highest standards of animal care and welfare; and maintaining high quality academic and research environment. The platform conducts pre-clinical research; scientific and technological research support; provides the infrastructure and capacity to maintain and utilise animal models (nonhuman primates, rodents and horses); animal management services; and research (collaborative and contract) for biomedical research and development.

PUDAC has not only streamlined its research focus on model validations, but also on a specialised field of non-communicable diseases (NCDs) and HIV/SHIV vaccine research.

The research focus of the platform is therefore on the following fields: NCDs; metabolic diseases (obesity/Type 2/3 Diabetes, cardiovascular and hypertension); environmental factors (diet/stress induced models); physiological factors (geriatric models); gene-environment interaction (epigenetics); reproductive toxicology and other emerging factors (gut microbiome and HIV/SHIV studies).

SCIENTIFIC GAP FILLED IN 2018/19

PUDAC is the only South African, and indeed southern African platform to provide captive bred primates for biomedical research. It is the only platform to maintain primates in any viable numbers with about 160 Vervet monkeys and 69 Rhesus monkeys. The animal models, services and infrastructure provided by this platform are not available anywhere else in South Africa. Additional to nonhuman primates, the platform

also maintains horses and rodents for biomedical research. The platform therefore makes a unique contribution to health research, drug and traditional medicine development as well as innovation which is aligned with the SAMRC broader strategy. This, together with the associated comprehensive scientific and technological services, as well as the appropriate infrastructure to use such primates, makes the platform akin to a national centre. Furthermore, this platform provides research support to national and international researchers, as well as assists scientists to achieve their research objectives.

Another priority of this platform is to generate new knowledge through research programmes with high impact on the broader community in South Africa and/or globally. The HIV/AIDS epidemic is a global problem and South Africa tops the countries most affected by the epidemic. No vaccine is currently available to stem this epidemic. Being the animal model of choice for HIV/AIDS research, the rhesus monkey challenge model was not available in South Africa until now, and thus, our research seeks to avail this important model to local HIV vaccine researchers in our attempt to accelerate the pace of HIV vaccine development in the country.

Concurrently, the number of deaths from non-communicable diseases (NCDs) has been rising globally, thereby placing a huge health and economic burden in many countries including South Africa. Therefore, early detection, prevention, and development of therapeutics against these disorders may significantly decrease their burden on the health system hence our research focus using nonhuman primate models aims to contribute in combating the burden of diseases affecting South Africans.

BRIDGING THE INNOVATION GAP BETWEEN EARLY DIAGNOSIS, INTERVENTION AND PREVENTION OF CHRONIC DISEASES

As a model for metabolic studies, the Vervet monkey has been used extensively in chronic diseases of lifestyles studies as well as preclinical drug development. One of PUDAC's metabolic research programme focus was on congenital cataract development in the captive-bred Vervet colony. The genetic findings accumulated from this study has recently been published in the Journal of Medical Primatology (Khoza et al., 2019); and two manuscripts are currently under review for publication. This work has shown to contribute towards early diagnosis which can be extrapolated to human studies and can be used to assist affected families and doctors to make informed decisions on therapeutic intervention as well as preventing the development of secondary diseases.

The other area of interest during the reporting period focused on the in vitro investigation of nonhuman primate sperm function, with the aim of evaluating and developing alternative sperm functional tests. Newly developed tests could assist in human male fertility/infertility and for the application in toxicology and contraceptive studies using NHP as a model.

RESEARCH TRANSLATION

We have been involved in the following research translation activities in the 2018/19 reporting period:

- UWC Regional Animal Housing Facility.
- NHREC annual meeting, Department of Health.
- Animal Research Ethics Committee (AREC) annual training.
- Literature review workshop, UWC.
- Ethics Workshop (UCT & SAMRC).
- Conference of Biomedical and Natural Sciences and Therapeutics (CoBNeST) 2018 conference.
- Keystone Symposium on Functional Cures and Eradication of HIV (X8-2019) conference.

CAPACITY DEVELOPMENT

As part of its mandate to build a research capacity within the field of biomedical research and its use of relevant animal models, PUDAC has enrolled six of its SAVC-authorised technicians for the International Animal Technology (IAT) Diploma course. This is aimed at assisting them in obtaining full SAVC registration as laboratory animal technologists. In addition, one senior scientific staff in possession of a foreign-obtained veterinary qualification obtained SAVC authorisation to perform the duties of a veterinarian under the supervision of the Scientific Veterinary Consulting in a process that is aimed at obtaining SAVC registration via competency-specific registration. Furthermore, strengthening capacity development and transformation is an important aspect of PUDAC strategic objectives which also feeds on the SAMRC research agenda. PUDAC aims to develop and empower young scientists with the specialised and scarce skills required to become well-trained scientists. Currently, we have two MSc students and one NRF intern who are being trained in the molecular laboratory.

"This model is unique to South Africa and available only at PUDAC, but we however would like to see it being optimized and made widely available for HIV-related research", a view shared by most of our collaborators who expressed excitement over the SHIV/rhesus monkey model.

However, with reference to the Vervet model, there were sentiments to have this primate model validated even further with reference compounds for preclinical studies. Proof of concept studies with known compounds are being planned to verify replication of the Vervet model.

Contact Details:
Chesa Chauke
Email: chesa.chauke@mrc.ac.za

BIOMEDICAL RESEARCH AND INNOVATION PLATFORM

Unit Director: Johan Louw

OVERVIEW

Research at the Biomedical Research and Innovation Platform (BRIP) is focused on studying metabolic conditions in the pancreas, muscle, liver, heart, intestines and adipose tissue. The unit also identifies new diagnostic and prognostic biomarkers for the metabolic conditions and further investigates the therapeutic potential of indigenous South African plants against metabolic disorders.

To date, BRIP has partly described how enriched extracts and nutraceutical products restrain obesity, type 2 diabetes and cardiovascular disease. The activation of thermogenesis is attracting considerable interest as an anti-obesity strategy, thus supporting the further exploration of this extract as a potential nutraceutical to treat obesity.

SCIENTIFIC GAP FILLED IN 2018/19

The Unit has also investigated the effect of herb-drug interactions (HDI) in patients who generally don't confess to using herbal medicines in conjunction with chronic medicine. It has been postulated that up to 60% of adverse drug reactions could be caused by HDI and researchers at BRIP investigated the underlying pharmacokinetic interactions between Rooibos (herb-drug) and aspalathin (compound-drug interactions) with these glucose and lipid lowering drugs. Significant interaction between Rooibos and atorvastatin were demonstrated.

Additionally, the effect of the immune boosting plants on estrogen-based contraceptives have also demonstrated the likelihood of HDI thus elevating the risk of contraceptive failure.

In addition, the group investigated the use of nutraceuticals (aspalathin and RA3) to decrease cardiotoxicity induced by either Doxorubicin (a first line anti-cancer drug) or exposure to chronic hyperglycaemia. Their findings suggested that aspalathin and RA3 can prevent oxidative stress and apoptosis and needs further assessment to confirm its therapeutic potential against cardiotoxicity.

Chronic inflammation and oxidative stress are known perpetuators of pancreatic beta cell dysfunction and apoptosis in the progression from insulin resistance to type 2 diabetes. Using an in vitro pathophysiological model of diabetes in immortalised beta cells, an aspalathin rich Rooibos extract ameliorated inflammation-induced cell stress at low concentrations, while higher concentrations have some regulation of BACE activity, a causal factor in pancreatic beta cell failure. The research has also contributed to understanding the molecular mechanisms that underlie insulin resistance and metabolic risk in a South African context. We showed ethnic and obesity related differential DNA methylation of genes associated with metabolic risk in adipose tissues of South African women. Epigenetic modifications are chemically and biologically stable and relatively inexpensive to study, thus tracking epigenetic changes in non-invasive tissues may be attractive and feasible tools for early diagnosis of diseases especially in developing countries with struggling health systems.

In innovation the Unit has profiled microRNAs in blood of individuals with Type 2 diabetes and Gestational diabetes and has demonstrated that these markers hold potential as biomarkers in a South African context. They say that these are the first such studies to have been conducted in South Africa. Previous studies have been conducted in other countries

with different ethnic and economic backgrounds, thus extrapolation to the South African population is not possible. Improved diabetes-induced cardiomyopathy outcome relies on early diagnosis and timeous treatment. However, apart from TDI echocardiograph analysis, which is only done on referred diabetic cases, no biomarker exist that can detect asymptomatic cardiomyopathy timeously to implement corrective treatment. As such, researchers at the unit have identified and tested two possible diagnostic markers in serum of diabetic rats. The identified markers were comparable to the gold standard echocardiography and performed better than the current end stage heart failure biomarker, proBNP. These markers hold promise as possible diagnostic markers and will assist researchers in confirming the sensitivity of these markers in serum of diabetic individuals with confirmed cardiomyopathy.

NOVEL PROCESS FOR A ROOIBOS EXTRACT TO OPTIMISE THE HEALING EFFECT

The Unit has collaborated with the Agricultural Research Council and has entered into a license agreement with Afriplex, a leading South African nutraceutical company under terms by which Afriplex is licensed to produce an aspalathin rich green rooibos extract Afriplex GRTTM as an API (Active Pharmaceutical Ingredient). Afriplex GRTTM is intended to be used to help improve metabolic function related to diabetes, cholesterol and obesity. Aspalathin, isolated from rooibos, has demonstrated significant in vitro and in vivo anti-diabetic and cholesterol lowering activity. The SAMRC and the ARC are joint holders of a patented method to synthesize aspalathin. Further development of the process has upscaled the synthesis of pure aspalathin and thus the SAMRC is uniquely positioned to conduct further efficacy testing of aspalathin and develop therapeutic analogues.

CAPACITY DEVELOPMENT AND IMPACTFUL COLLABORATIONS

BRIP is actively engaged in capacity development of staff, postgraduate students and postdoctoral research fellows. In this reporting period 28 PhD and 12 MSc students were registered and are being trained by BRIP staff.

BRIP has presented training workshops in laboratory techniques and lectures to postgraduate students from various universities including Zululand, Limpopo and Stellenbosch. Furthermore, BRIP has promoted mathematics and science in numerous community outreaches/career expos at schools around Cape Town, including disadvantaged schools. Work emanating from research at BRIP was presented at several national and international conferences in 2018.

Staff from BRIP were involved in conducting a Special Infrastructure Laboratory Audit in the Faculty of Science and Agriculture at the University of Zululand, and regularly review funding applications and journal articles for national and international organizations. BRIP presents an annual Research Symposium where students are given the opportunity to showcase their research and network with other national researchers. As part of the SAMRC's strategic transformation programme, BRIP hosted and participated in a research meeting with principal investigators and students from resource-strained universities to promote "Impactful Collaborations and Partnerships".

As part of a capacity development programme, students from BRIP were offered the opportunity to attend national and international workshops and internship programmes. BRIP students were selected to attend the Bio International Conference in Boston in 2018, as well as the Grand Challenges Conference in Germany, which coincided with the 10th World Health Summit. The main purpose of these meetings was to expose young scientists to an international collaborative workshop to discuss effective transdisciplinary partnerships that speaks to the mandate of SAMRC, which is to combat the health burden of Africa through innovation and product development.

Students have also attended grant writing workshops and internships in various parts of the world in order to hone their skills in biobanking, epigenetics and 3D culturing.

Two young up-and-coming SAMRC Scientists have been given the opportunity to develop new research skills at leading European research institutions namely: Polytechnic University of Marche in Italy and the Christian Albrecht University in Germany.

Research conducted at BRIP is both transdisciplinary and multi-departmental, involving national and international collaborations under various themes. National collaborators include the Agricultural Research Council (ARC) and the Universities of Zululand, Limpopo, Pretoria, Western Cape and Cape Town. International collaborators include the Polytechnic University of Marche in Ancona, Italy, Department of Experimental and Clinical Pharmacology at the Christian Albrecht University, Germany, Tokyo University of Agriculture and Technology (TUAT), Tokyo, Japan and National Health Research Institutes (Taiwan), Chunan Town, Taiwan. We have established strong links between the institutions involved to ensure continued collaborations for future studies.

Contact Details:
Johan Louw
johan.louw@mrc.ac.za

SAMRC/TUT HERBAL DRUGS RESEARCH UNIT

Unit Director: Alvaro Viljoen

BACKGROUND

Southern Africa is one of the richest centres of plant diversity in the world. It is against this backdrop of botanical diversity that traditional medicine is widely practiced in our country. It is estimated that more than 27 million people in South Africa use indigenous medicines as a component of health care. Additionally, there is a growing use of herbal medicinal products (HMP) of Asian and European origin. This translates into a high trade value of phytomedicines for the country and tremendous opportunities for the development of herbal products.

Herbal medicine has not been officially recognised in most countries, despite the continued use of medicinal plants over many centuries and an upsurge in the popularity and use of these natural resources throughout the last decade. Consequently, education, training and research in this area have not been rendered due attention and support. The quantity and quality of the safety and efficacy data on phytomedicines are far from sufficient to meet the criteria needed to support their use worldwide. This lack of research data can be attributed partly to the fact that health care policies have neglected to adequately address phytomedicines. However, the absence of appropriate or accepted research methodology for evaluating traditional and herbal medicines remains the biggest stumbling block to the commercial development of phytomedicines.

OVERVIEW

The Herbal Drugs Research Unit is exploring Indigenous Knowledge Systems where ancient traditions are being scientifically explored to provide a solid foundation for evidence-based African traditional medicines. The main aim of the Unit is to conduct technologically advanced scientific research, and to make basic knowledge readily available to stakeholders, in order to promote the quality, safety and efficacy (QSE) of herbal medicines.

The SAMRC/TUT Herbal Drugs Research Unit uses modern technology to add substantial value to assist in developing some of South Africa's botanical assets into commercial products. In this way, the Unit may be instrumental in unlocking and advancing the possible socio-economic value of our indigenous resources to the benefit of all South Africans.

QUALITY AND SAFETY IN THE HERBAL DRUGS ENVIRONMENT

The herbal medicines industry delivers products fortified with extracts of natural origin that are known to have beneficial active ingredients. Despite the common belief that phytocompounds are safe, they pose the same inherent risks as synthetic xenobiotics. Not surprisingly, associations between the consumption of herbal products and instances of toxicity have been made. Although the adverse effects of phytotherapeutic medicines are recorded less frequently compared to synthetic drugs, such effects have been reported. A serious and valid concern to regulators, health professionals and users is that most herbal medicines are sold as food supplements, therefore circumventing regulations regarding their quality and safety.

As of November 2013, all herbal medicinal products, packaged as a pharmaceutical dosage form (tablets, capsules etc.) or marketed as natural health products (NHP), will now be subject to regulation by The South African Health Products Regulatory Agency (SAHPRA), previously the South African Medicines Control Council (MCC). African Traditional Medicines will for now not be regulated, but it is envisaged that those that are available in pharmaceutical dosage forms will soon also face regulation. The success of any herbal medicine hinges on three crucial aspects, namely quality, safety and efficacy (QSE). It is only when these three components are confirmed that consumer trust and confidence are ensured.

SCIENTIFIC GAP FILLED IN 2018/19

Despite a tremendous biodiversity and access to rich indigenous knowledge systems relating to medicinal plant use, South Africa has not performed well in globalising its botanical resources. Developing a South African Herbal Pharmacopeia is a fundamentally important prerequisite needed to transform our indigenous resources into tangible consumer products. Furthermore, a herbal pharmacopeia would be highly beneficial to the regulator, consumer and nascent industries. The unfortunate underrepresentation of pharmacognosy (a discipline dedicated to the botany, chemistry and bioactivity of medicinal plants) in the curricula of pharmacy schools in South Africa, has left a void of expertise, which has hampered the development of a comprehensive herbal pharmacopoeia.

A further challenge remains the inherent complexity of medicinal plants exacerbated by extensive chemotypic variation. Chemical fingerprinting is a crucial component of any herbal pharmacopeia and requires a dedicated approach to develop analytical methods for the profiling of complex herbal extracts.

Funding from the South African Medical Research Council has catalysed initiatives at the Tshwane University of Technology to develop analytical methods that aid in the identification and quality control of important South African Herbal Medicines. Following a formidable workflow, which includes extensive sampling, preparative chromatography to isolate biomarkers, development of analytical methods to profile volatiles and non-volatiles using HPTLC, vibrational spectroscopy, GC-MS and LC-MS. The powerful tandem application of analytical chemistry and chemometric modelling has been achieved. Developing a herbal pharmacopeia requires a multidisciplinary collaborative effort in South Africa to ensure the safety, efficacy and quality of African Traditional Medicines and commercial herbal formulations developed from our botanical resources.

CAPACITY DEVELOPMENT

The higher education policy has called for a drastic increase in the overall production of the number of PhDs in South Africa. As TUT is a developing research institution, there is an urgent need to create suitable opportunities for capacity development. The SAMRC Unit continues to act as an incubator to develop research capacity and to equip and empower both staff and students with knowledge and expertise to contribute to academic and socio-economic development. The SAMRC Unit aims to accelerate the progression of young researchers and to provide them with opportunities to participate in research and so develop their own knowledge and skills to further build their research careers.

The primary objective remains the training of postgraduate students and developing human capital. The Unit managed to attract and train a large cohort of postgraduate students. Currently the Unit is a research incubator accommodating 26 postgraduate students whose projects are directly related to the aims and objectives of the Unit. Almost all students have managed to publish work emanating from their postgraduate studies and the research has been widely presented at national and international meetings. The Unit is mindful to redress and equity with >90% of students in the Unit being black Africans and >70% are women.

PARTNERSHIPS AND COLLABORATIONS

Prof Josias Hamman North-West University (Potchefstroom Campus)
Pharmaceutics specialist. Collaborating on projects investigating biopharmaceutics, pharmacokinetics and toxicity aspects of herbal products using cell culture systems.

Prof Sandy Van Vuuren University of the Witwatersrand
Microbiologist. Collaborating on projects that validate the traditional use of natural products for treatment of microbial infections. Hosting and training of students on in vitro antimicrobial, cell based and toxicity assays.

Prof Ikhlas Khan University of Mississippi
Specialist in new analytical techniques in the quality control of natural products. Techniques such as Nuclear Magnetic Resonance (NMR) spectroscopy in plant metabolomics.

Dr Clinton Veale University of KwaZulu-Natal
Organic chemist. Structural elucidation and identification of isolated compounds from medicinal plants using Nuclear Magnetic Resonance Spectroscopy.

Prof Beverly Summers University of Limpopo
Cosmetics specialist. Co-supervisory and analytical support in projects (clinical trials) investigating the cosmetic benefit of herbal products.

Prof Piotr Podlasz University of Warmia and Mazury in Olsztyn
Student exchange. Specialist in pathophysiology with expertise in anti-inflammatory assays using the Zebrafish model. Hosted and trained students on various Zebra fish-based assays used to investigate anti-inflammatory activity of medicinal plants.

Prof Krystyna Skalicka - Woźniak Medical University of Lublin
Student exchange. Co-supervisory role on projects investigating anxiolytic activity of medicinal plants using the Zebrafish model. Hosting and training of students in the various types of in vivo anxiolytic assays.

Prof Maryna Van De Venter, Nelson Mandela University
Student exchange. Hosting and training of students in high throughout screening of medicinal plants for potential hepatotoxicity and genotoxicity using in vitro cell culture methods.

Prof Peter De Witte University of Leuven
Student exchange. Expert in the use of Zebrafish in vivo assays to investigate toxicity of phytomedicines. Hosted and trained students on methods to investigate liver toxicity using the Zebrafish model

Prof Hermann Stuppner University of Innsbruck
Student exchange. Training of students on NMR metabolomics and other quality aspects of phytomedicines. In addition, bioassays to investigate anti-ageing and anti-inflammation were conducted.

Contact Details:
Alvaro Viljoen
Email: ViljoenAM@tut.ac.za

PROGRAMME 6: BIOMEDICAL RESEARCH

PURPOSE OF THE PROGRAMME

To conduct basic research, applied research and transactional research to determine predisposition to disease. This understanding is important for planning effective intervention and disease control.

UNITS THAT CONSTITUTE THIS PROGRAMME

- SAMRC/SANBI/UWC Bioinformatics Capacity Development Research Unit
- SAMRC/UCT Immunology of Infectious Diseases Research Unit
- SAMRC/UP Stem Cell Research and Therapy Unit
- SAMRC/ WITS Antiviral Gene Therapy Research Unit

PROGRAMME STRATEGIC OBJECTIVES

- To generate scientific knowledge in the field of biomedical science, which will provide insights into various diseases of national priority. This in turn will lead to novel diagnostic, preventive and therapeutic strategies
- To undertake original research of high quality, which will provide novel insights into acute and chronic inflammatory diseases of national priority, thus leading to novel diagnostic, preventive and therapeutic strategies
- To train and mentor high-quality postgraduate students who are able to compete in the science, health and/or education sectors locally and abroad
- To strengthen biomedical research through a policy of enabling researchers from other academic institutions to have access to sophisticated laboratory equipment and supervision. In addition, to provide assistance to national research funding agencies with respect to evaluating applications for research funding
- To translate research data into policy and practice regarding prevention, diagnosis, treatment and management of diseases
- To develop and test biomedical innovations that will address various conditions
- To develop health-care management systems and plan a 'gene therapy' intervention programme for retinal degenerative diseases

SAMRC/SANBI/UWC BIOINFORMATICS CAPACITY DEVELOPMENT RESEARCH UNIT

Unit Director: Alan Christoffels

OVERVIEW

The Bioinformatics Research Unit is part of the South African National Bioinformatics Institute based at the University of the Western Cape. Our mandate is to develop computational biology skills in the country and we do so alongside research and development projects in collaboration with researchers nationally and globally. During the reporting period the SAMRC Unit has published at least 18 peer-reviewed manuscripts and currently maintains an open-source repository for two internationally relevant software namely COMBAT-TB (www.combattb.org) and Baobab LIMS (www.baobablims.org).

Our research and development activities have impacted clinical research with new knowledge, technology and innovation as follows:

- **Disease associated genetic variants:** We have demonstrated the use of computational tools to analyse next generational sequencing data to identify disease-associated SNPs.
- **Technology Platform for biospecimen collections**: Our African footprint has increased during 2018/2019 with the adoption of our Baobab laboratory information management system in west and east Africa (Ivory Coast and Uganda).
- **Computer aided drug design**: Our computational analytical framework for identifying new molecules active against Tuberculosis and Malaria has gained momentum with publications demonstrating the value of data analytics tools for biomedical research.
- **Community engagement**: The role of community awareness during development of disruptive technologies cannot be reinforced enough. We have concluded our study on the use of a recently developed health intervention on "Biobanking and Me". We show the increase in understanding from the public when using audio and illustrations to communicate the value of storing DNA and carrying out research. This level of science communication has been strengthened by a broader level of engagement using "The Conversation" as a global platform to inform the public of the work that we do.

BIG DATA IN BIOMEDICAL RESEARCH

South Africa's ability to respond to the large data deluge facing the biomedical space requires research at the level of new methodology for data analytics, data storage and data integration. It is this intersection of the lifecycle of biomedical data where the SAMRC Bioinformatics Unit has the greatest impact. For example, we are researching ways of storing meta-data, research into machine learning approaches for pathogen interactions and also ways of analysing genetic sequence data to understand diseases. These data-centric strategies have a national and a global impact.

SCIENTIFIC GAP FILLED IN 2018/19

The SAMRC Bioinformatics Unit has published 18 Peer-reviewed papers and maintained two software repositories (http://combattb.sanbi.ac.za; http://baobablims.org) that are globally accessible. Two examples are highlighted below that demonstrate the scientific gap that has been filled with respect to practice (Exome sequencing for clinical research), and impact on biomedical biospecimen collections.

EXOME SEQUENCING FOR CLINICAL RESEARCH

The rapid update of high throughput sequencing in clinical research globally requires analytical methods be prioritised functionally relevant genetic variants. One of our projects focuses specifically on analysing large datasets of next generation sequencing reads with a view to identify disease-

associated SNPs. Our method published in 2017 has now been applied to a few collaborative projects with the University of Cape Town and Stellenbosch and the resulting publications demonstrate the impact of our computational approach. For example, recently we used exome sequencing to identify a novel dysferlin mutation in a family with paucisymptomatic heterozygous carriers (https://doi.org/10.1186/s12881-018-0613-x).

INFORMATICS RESEARCH AND DEVELOPMENT FOR BIOMEDICAL BIOSPECIMEN COLLECTIONS

Accurate storage of biospecimen collections ensure reproducibility of data derived from these carefully maintained collections. Underpinning these collections is a requirement for an informatics platform to track these samples. The baobab LIMS project at the SAMRC Bioinformatics Unit (http://www.baobablims.org) published its first software for managing biospecimen collections in a core facility in 2017. During 2018, this work has expanded its African footprint with adoption of this technology by research groups at Makerere University, Uganda; Abidjan Biobank in Cote d'Ivoire and the Pregnancy Care Integrating Translational Science, Everywhere (Precise Network) (http://precisenetwork.org) in Kenya, Mozambique, the Gambia, UK and University of British Columbia, Canada. Specific impact of this innovation on research practice can be seen from:

ABIDJAN BIOBANK, COTE D'IVOIRE

Baobab LIMS was translated to French. This foundational work formed the basis of an application to the West African Health Organisation to support the R&D of Baobab LIMS for infectious disease collections in Francophone countries.

PRECISE NETWORK

This UK MRC Funded project aims to study placental disorders over a period of five years with biospecimen collections being carried out in Kenya, Mozambique and The Gambia. Baobab LIMS was customized in 2018 for the purpose of being a distributed LIMS that can be used in this multi-national consortium project.

RESEARCH TRANSLATION

GALAXY AFRICA CONFERENCE 2018

Data analytics for biology research drives the SAMRC Bioinformatics Unit in its mandate to strengthen computational biology capacity in South Africa and across the African continent. To this end, the Bioinformatics Unit has launched the first Galaxy Africa Conference (http://galaxyafrica.sanbi.ac.za/) from 3-5 April 2018 with a focus on bioinformaticians, biologists, and computer scientists from around the African continent. This conference was attended by 44 participants from seven countries (South Africa, Uganda, Tunisia, Ghana, Sudan and Kenya) (and 12 institutions) and featured 13 speakers over its three days.

ILIFU RESEARCH CLOUD

The Ilifu Project (http://www.ilifu.ac.za/) is a big data research project driven by a consortium of six South African partner universities and research institutes in the Western and Northern Cape. Astronomy and bioinformatics form key research foci of the project. The SAMRC Bioinformatics Unit staff member Eugene de Beste, played a key role as engineer on the research cloud component of this project, assisting to build the OpenStack cloud (with more than 3,000 CPU cores) and Ceph storage cluster (with more than 2 PB of storage). We also presented this work at the first Ilifu User Workshop, held at UWC in November 2018 and attended by delegates from four universities in the consortium.

BAOBAB LIMS

Following on from the successful training in 2017, a team from Makerere University was hosted at the SAMRC Bioinformatics Unit in February 2018 for a four-day training session on Baobab LIMS. This team subsequently held two internal training events for professionals at their host institution, highlighting the 'train the trainer' principle.

In March 2018, we hosted Ismael Kone from the Institute Pasteur in the Ivory Coast, where he was trained on the Baobab LIMS code. In April 2018, we hosted a 12 -strong team from the Precise Network, providing customised training for one of their collaborative projects. Further training events took place at the 4th African Conference on Emerging Infectious Diseases and Biosecurity in Freetown, Sierra Leone and the workshop for Biobanking and Biosecurity in Lagos, Nigeria.

CAPACITY DEVELOPMENT

The Bioinformatics Unit aims to train biomedical researchers in bioinformatics in order to expand the community of data analytics researchers that feeds into the SAMRC research agenda. Below is a list of workshops/courses that the SAMRC Bioinfomatics Unit participate in and/or manage:

BIOINFORMATICS MODULE (BTN 315)

Each year the UWC undergraduate Bioinformatics Module is taught to approximately 85 third-year students by SAMRC Bioinformatics Unit Staff.

POSTGRADUATE REGISTRATION

2018 saw the highest number of 15 Masters students of the total of 33 student registrations at SANBI-UWC and these students contribute to the research of the Unit. Additionally, there were six Postdoctoral fellows and 12 Doctoral registrations. While the male to female ratio was split 58% - 42%, it was interesting to note the increase in the number of females registered for PhDs.

The country split was 66% South African, 12% Nigerian, 6% India and 3% each from Algeria, Burkina Faso, Congo, Sudan and USA.

GRADUATIONS FOR 2018 AT THE SAMRC BIOINFORMATICS UNIT

NAME	DEGREE	SUPERVISOR	THESIS TITLE
Gratia Willemse	MSc	Professor Alan Christoffels	The effects of SNPs on the acetylation rate and functionality of human N-acetyltransferase-1 (NAT1)
Toluwaleke Ademuyiwa	MSc	Professor Alan Christoffels	Development of opensource LIMS for human biobanking
Emil Tanov	PhD	Dr Gordon Harkins	Identification and ranking of pervasive secondary structures in positive sense single-stranded ribonucleic acid viral genomes

BIOINFORMATICS TRAINING COURSE

This annual course runs for approximately five weeks from February at SAMRC Bioinformatics Unit. For 2018, there were 24 participants from UWC, University of Cape Town (UCT) and University of Stellenbosch (US) in attendance.

Workshops organised/presented by Unit members

PRESENTER	VENUE	DATE	COURSE NAME + PURPOSE OF COURSE
Dominique Anderson	SANBI-UWC	February 2018	Baobab LIMS training. Training for the Makerere University Biobanking team on the use of Baobab LIMS. Three members from Makerere University in Uganda attended the 4-day course
Quinton Coert, Hocine Bendou	SANBI-UWC	March 2018	Baobab LIMS code modification. Training for Ismael Kone (Institute Pasteur, Ivory Coast) on modification of the LIMS code base
Dominique Anderson	SANBI-UWC	April 2018	Baobab LIMS training. Customised training for the Precise Network Team on the use of Baobab LIMS for their collaborative project. Members who attended included biobank managers, IT managers, and project principal investigators
Eugene de Beste	Nosy Be, Madagascar	May 2018	JEDI Workshop in Big Data Science: Using CWL and Toil to Wrap an Ad-hoc Astronomy Data Processing Pipeline
Dominique Anderson	Freetown, Sierra Leone	September 2018	Baobab LIMS practical. 4th African Conference on Emerging Infectious Diseases and Biosecurity. Practical demonstration and training on Baobab LIMS for Bio-repositories held for interested members attending the conference
Peter van Heusden	Nairobi, Kenya	September/ October 2018	Galaxy workflows at ILRI-BecaHub "Bioinformatics Community of Practice" course
Peter van Heusden	Cape Town, South Africa	December 2018	HPC in a Day: Introduction to High Performance Computing workshop at Centre for High Performance Computing (CHPC) National Conference
Dominique Anderson	Lagos, Nigeria	December 2018	Workshop for Lagos Biobanking and Biosecurity. Training for biobanking staff on the use of Baobab LIMS for sample management

PARTNERSHIPS AND COLLABORATIONS

PARTNERSHIP	TOPIC	NATURE OF COLLABORATION
Prof Witbooi – Math department, UWC	Machine learning methodology	We developed a new approach to improve accuracy of machine learning tools with limited data
Profs Warren and Sampson, University of Stellenbosch, SAMRC Unit	Identification of novel drug targets for multidrug resistant tuberculosis	We computationally identified new molecules that target *M.tuberculosis (Mtb)*. These compounds were tested in-vitro for activity against Mtb
Prof Malan, School of Pharmacy, UWC	Efflux pump inhibitors in Mtb.	We described molecules that inhibit an efflux pump in Mtb
Dr Samuel Egieyeh, School of Pharmacy, UWC	Predicting compounds in herbal extracts that have anti-plasmodial activity	Using machine learning techniques we are searching for signatures in medicinal compounds with similarity to registered anti-malarial compounds
Prof Jeannine Heckmann, UCT	Using NGS data to identify clinically relevant genetic variants.	SAMRC Bioinformatics Unit analysed NGS data in a dysferlinopathy family and identified a disease associated mutation in the dysferlin gene

Contact details:
Alan Christoffels
alan@sanbi.ac.za

IMMUNOLOGY OF INFECTIOUS DISEASES RESEARCH UNIT

Unit Director: Frank Brombacher

OVERVIEW

Translation from relevant fundamental gene deficient mouse models to clinical research in humans. We unravel the complexity between immunity and infectious diseases with focus on Listeriosis, Tuberculosis, Leishmaniasis, Helminth infections and allergic diseases. Goals are to develop new preventive and therapeutic strategies and drugs to improve the health of South Africans.

Infectious diseases and asthma continue to be leading causes of childhood and adult morbidity and mortality with South Africa having disproportionate, predominantly disadvantaged communities suffering the most. We address these enormous health problems, by understanding disease pathogenesis through fundamental research and translation to cure patients.

Infectious and non-infectious diseases, like Allergy are major public health problems in South Africa. Infectious diseases like listeriosis, TB, leishmaniasis, helminth infections are accountable for significant mortality and morbidity in the world. For example, South Africa is one of the six countries that account for 60% of the global TB burden, partly due to opportunistic M. tuberculosis co-infection with human immunodeficiency virus (HIV). South Africa has recently the biggest Listeriosis outbreak in the world. Approximately 5.2 million South Africans are infected with Schistosoma haematobium and according to WHO approximately 3,2 million children require treatment in South Africa. For leishmaniasis, there are about 350 million people worldwide who are at risk of contracting leishmaniasis with growing number anticipated in South Africa. Additionally, allergic asthma, a chronic inflammatory pulmonary disease, is the fifth highest case fatality rate in the world and the third most common cause of hospital admission in South African children. Co-morbidity of infectious disease and allergic asthma in South Africa will significantly increase the socio-economic impact of each of these individual diseases.

Thus, we will further engage in research of these diseases for translation to humans by increasing the capacity development for long-term sustainability, knowledge and most important to push our research activities into clinics and influence policies to improve public health and innovation and technology development. This includes the training and transformation of pre- and post-graduate students, as well as transfer technology at the national and international levels.

RESEARCH IMPACT

- Our science on statins research in macrophages opened the door for host-directed therapy in tuberculosis patients. We currently initiated a clinical trial to reduce drug therapy by adding statins in infected people.
- Our science on gene deficient mouse models allows a better understanding of our genes in health and disease in humans.
- Our science in infectious diseases develop new preventive and therapeutic strategies for human health using systems approaches for innovation. Currently, we in collaboration with a South African company (Edelweiss) to produce a statin crème to reduce lesions in cutaneous leishmaniasis.

SCIENTIFIC GAP FILLED IN 2018/19

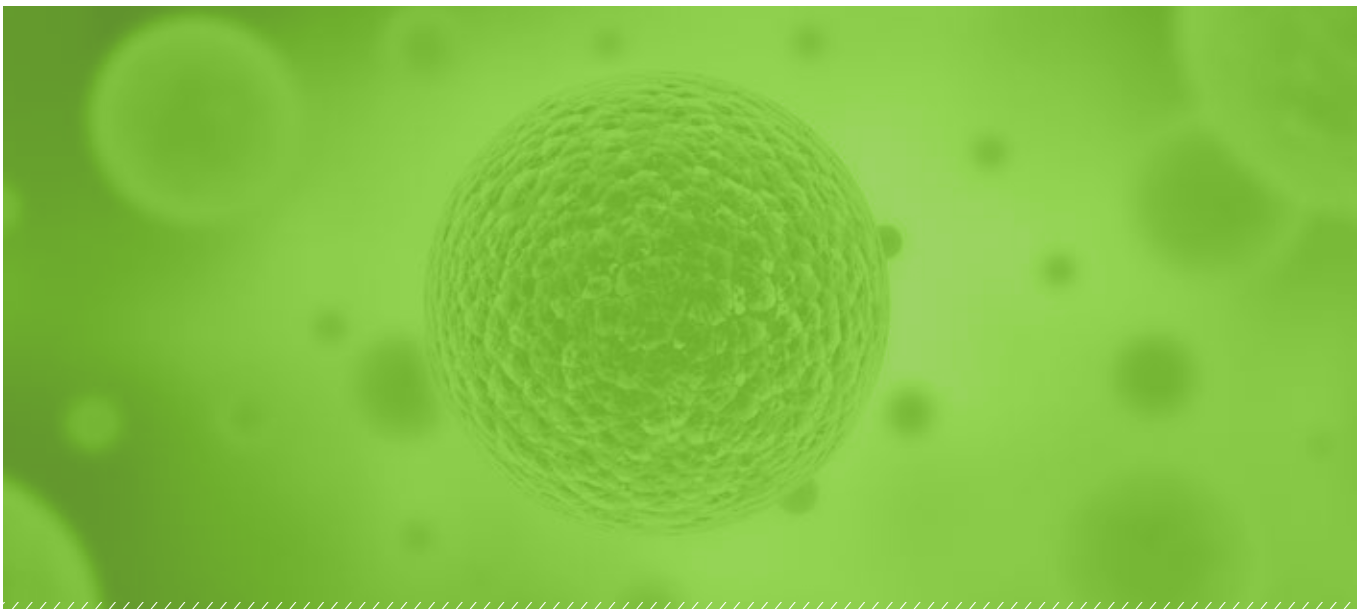
The mouse is the foremost mammalian model for studying human disease and human health. Genetically engineered mouse models for human diseases are valuable experimental system for human diseases as mice are very similar, with many of the disease-related genes nearly identical.

The Unit produces unique genetically engineered mouse models for preclinical tools in infectious and non-infectious diseases in South Africa and the world. Our mouse models, produced in South Africa are used in four continents with more than 150 collaborators around the world.

CAPACITY DEVELOPMENT AND PARTNERSHIPS

The Unit is 80% black and female with successful career awards and lecturer positions. Together with national and international partnerships, the Unit produced 18 peer-reviewed publications with more than 120 impact factors. Collaborations included technology like transcriptomics, and bioinformatics, gene knockdown in cells by gapmers, as well as gene knockout and knockdown in mice. Here, we uncovered immunological mechanisms in models of human infectious diseases, like leishmaniasis, schistosomiasis, as well as non-infectious diseases like fibrosis and vaccination. We were able to uncover fundamental immunological processes, important in humans.

Contact Details:
Frank Brombacher
Email: brombacher.frank@gmail.com



SAMRC/UP STEM CELL RESEARCH AND THERAPY UNIT

Unit Director: Michael Pepper

OVERVIEW

The Stem Cell Research Unit studies diseases that are major contributors to morbidity and mortality, both in South Africa and abroad, these are HIV, obesity, cancer and "birth asphyxia". The Unit's work contributes to understanding their pathogenesis and aims to result in the development of therapies that can be successfully applied to combat these diseases.

SCIENTIFIC GAP FILLED IN 2018/19

The Unit is coming to the end of its first five-year cycle and has already established itself as the leading group for cell-based therapy in the country. The Unit has several projects underway and they can be grouped in the following categories:

- HIV and haematopoiesis including HIV gene therapy
- Mesenchymal stromal/stem cell (MSC) differentiation: adipogenesis, osteogenesis and myogenesis
- Effect of MSCs on tumorigenesis
- Neonatal encephalopathy with suspected hypoxic ischemic encephalopathy (NESHIE)
- Development of hematopoietic stem cell (HSC) and MSC therapeutic products
- Ethical, legal and social implications of cell-based therapy and genomics in SA.

RESEARCH TRANSLATION

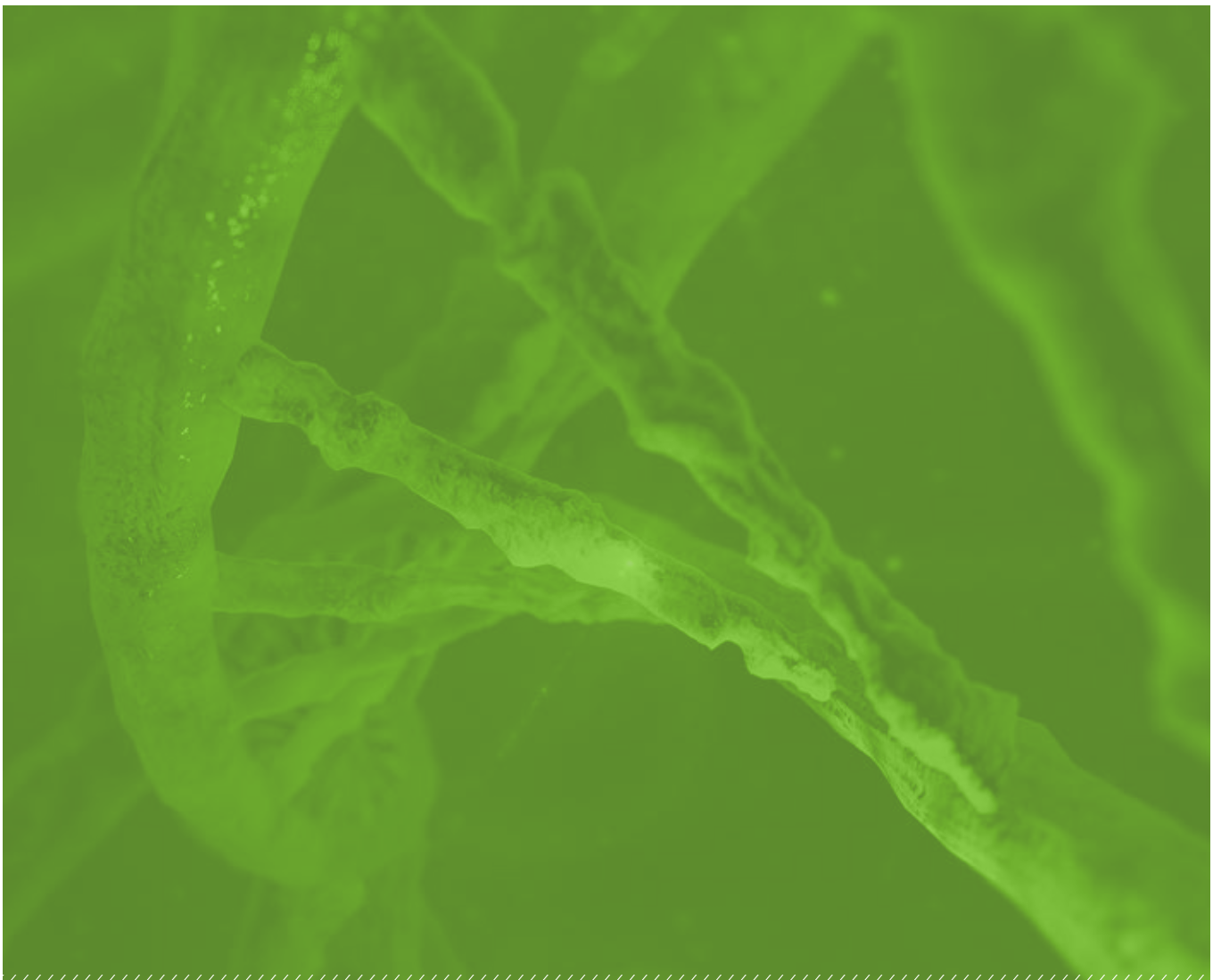
In the reporting period, the Unit Director Professor Michael Pepper chaired a group that worked on a consensus study for the Academy of Science of South Africa (ASSAf) the final report of which was launched in December 2018. The ASSAf report has generated a lot of interest, and was presented at the Director General's meeting at the Department of Science and Technology. Additionally, the Unit together with the Institute for Cellular and Molecular Medicine at the University of Pretoria (also directed by Prof Pepper) ran a successful Infectious Diseases Day on 13 July 2018. Investigator meetings were held for the HIV gene therapy and "birth asphyxia" groups.

CAPACITY DEVELOPMENT

During 2018, a large number of MSc and PhD students were active in the Unit, with two MScs and two PhDs graduating in April 2019. The current tally (supervision and co-supervision) includes 15 PhD and 13 MSc students.

The Unit has also focused on collaborative efforts, in the reporting period the Unit collaborated with Prof Karl-Heinz Krause (University of Geneva) and Prof Roberto Speck (Zurich) for the HIV gene therapy project. The Unit also has a productive and long-standing collaboration with Prof Brigitte Pittet-Cuenod (Geneva) on MScs and wound healing.

Contact Details:
Michael Pepper
michael.pepper@up.ac.za



SAMRC/WITS ANTIVIRAL GENE THERAPY RESEARCH UNIT

Unit Director: Patrick Arbuthnot

OVERVIEW

The SAMRC/WITS Antiviral Gene Therapy Research Unit (AGTRU) aims to develop use of therapeutic nucleic acids (gene therapy) to counter serious viral infections of public health importance in sub-Saharan Africa. Gene therapy is based on rational drug design, which in turn is informed by knowledge about DNA sequences. With impressive advances in sequencing technology, there is a wealth of information that may be applied to gene therapy.

The Unit focuses mainly on developing gene therapy to treat infection with hepatitis B virus (HBV). Chronic infection with HBV is hyperendemic to sub-Saharan Africa and continues to be a significant but underappreciated cause of public health problems. Despite availability of an HBV vaccine, approximately 700,000 people die each year as a result of complicating cirrhosis and liver cancer. Currently licensed anti-HBV drugs are poorly effective and there is a need for improved treatment to prevent the serious complications. Research completed to date at the unit shows that gene therapy has the potential to eliminate the virus and cure infected individuals. Advancing the unit's technology to use in patients has been undertaken in partnership with the pharmaceutical industry.

SCIENTIFIC GAP FILLED IN 2018/19

AGTRU is one of the only laboratories in the country with the range of skills that is required to advance gene therapy

from very basic science to a stage of completion of preclinical evaluation. To advance innovative new technologies and make contributions to global research, it is vitally important that South African medical scientists are very involved in this promising new field.

Training of young scientists who represent the demography of South Africa is also a fundamental goal of the Unit. The Unit is currently vigorously growing expertise to ensure that internationally competitive and relevant research is carried out in our unit. Members of historically disadvantaged backgrounds are now established as career scientists in the unit and are making an impact on research in gene therapy. Many postgraduate students and postdocs of the AGTRU have been, and are being, trained in gene therapy.

In addition to developing capacity and addressing important health problems, the Unit aims to grow new knowledge that will enable commercialisation of technology. Attention is being paid to ensuring that valuable intellectual property is generated and that these innovations are protected by patent filings.

In the 2018/19 reporting period, the focus has been on advancing gene editing and gene silencing to disable HBV replication, with the aim of making the technology therapeutically applicable. A secondary aim has been to develop vectored immunoprophylaxis using broadly neutralising antibodies from South African patients (CAPRISA cohort) to prevent transmission of HIV-1.

Postgraduate students have been major contributors to the work and the projects have proven valuable for development of South African human capacity on the field. As far as gene silencing is concerned, the AGTRU has continued to develop the lead multimeric gene silencers that act efficiently to suppress replication of HBV. A focus has been on ensuring efficient, safe delivery and achieving efficacy over an extended period. We have generated recombinant viruses derived from the ancestral adeno-associated virus (AAV) that was originally described by Dr Luk van den Berghe of Harvard University (MA, USA). The advantage of these vectors is that they efficiently target the liver and deliver the engineered sequences that encode gene silencers very safely. Moreover, as they are ancestral vectors, there is no immunoreactivity to the vectors, which confers improved efficiency and safety.
To develop gene editing for treatment of HBV infection, the unit has engineered sequences that transcribe messenger RNA (mRNA), which in turn encodes HBV-specific gene editors. The gene editors comprise engineered transcription activator-like effector nucleases (TALENs), which are capable of mutating HBV DNA efficiently. TALEN-encoding mRNA has been used in this project to facilitate delivery of the gene editors in the context of non-viral vectors comprising lipoplex formulations. As synthetic complexes they are suitable for large scale preparation and translation to clinical use.

PARTNERSHIPS AND COLLABORATIONS

Vectored immunoprophylaxis is a novel interesting approach to prevention of HIV-1 transmission. The essential underlying principle is that introducing sequences that express HIV-1-targeting broadly neutralising antibodies over an extended period should prevent infection by the virus. This work has been carried out in partnership with the team of Professor Lynn Morris, and has been part of a project supported by the SAMRC SHIP funding initiative. The team contributed to the work through the propagation of recombinant AAVs that produce HIV-1-neutralizing antibodies (including CAP256) derived from the CAPRISA cohort. DNA encoding the single chain antibodies was incorporated into the AAVs and administered to mice. Measurement of antibody titres showed that effective antiviral antibodies were generated after intramuscular administration and concentrations of the V2-targeting antibodies persisted for the year's period of the duration of the analysis.

Collectively this data represent sophisticated application of modern techniques of molecular biology as applied to therapeutic gene transfer. The outcome of the work is leading to generation of new knowledge that will form the basis of future technologies and treatment innovations.

ADVANCING THE TREATMENT OF VIRAL INFECTIONS

The fundamental aim of the SAMRC-supported Antiviral Gene Therapy Research Unit is to harness modern gene therapy technology to advance treatment of viral infections of particular importance to South Africa. As with development of most new therapies, translating gene therapy for viral infections involves a stepwise series of investigations. The process requires preliminary analysis in simple models then progresses to more complex disease simulations before embarking on trials in humans. Candidate drugs that show good efficacy in the simple models are often not effective in humans. Analysis is typically initiated on cells in culture. From there, lead compounds are taken forward for testing in various disease models in vivo and then in clinical trial. Current research has been employing this sequence of investigations for the development of gene therapy for HBV and HIV-1 infection.

The Unit has established a colony of HBV transgenic mice in the Central Animal Services facility of the University of the Witwatersrand. These animals closely simulate the human condition of human HBV persistence and are a valuable resource for assessing efficacy of anti-HBV compounds. Lead anti-HBV gene therapy candidates have been identified using this model and are being taken forward. The Unit is initiating establishment of a macaque model of HBV replication. Assessment in these non-human primates will be a valuable precursor clinical evaluation.

CAPACITY DEVELOPMENT

Two senior members of the research unit, Associate Professor Abdullah Ely (CM) and Dr Mohube Betty Maepa (AF), have received training and guidance of several years' duration in the SAMRC/WITS AGTRU. These academics from designated groups have now established themselves as independent researchers. They are developing their own programmes in the field of gene therapy, successfully publishing their work and supervising postgraduate students. The student body of the SAMRC/WITS Antiviral Gene Therapy Research Unit broadly reflects the demography of South Africa and has a preponderance of women. During 2018, three students from the Unit graduated with MSc degrees and one other student received a PhD. All three MSc graduates are now PhD candidates in the Unit.

The Unit has several international research partnerships that promote our expertise. In addition to traditional research collaborations, the Unit has appointed Professor Simon Waddington, as an honorary member of the Antiviral Gene Therapy Research Unit. Professor Waddington is Director of the Gene Transfer Technology Group at University College London, which is a leading gene therapy research laboratory in Europe. Simon has valuable expertise in topics of viral vectorology, and particularly the methods for assessing kinetics of transgene expression. Access to this technological resource has been useful and in turn our unit has been of assistance with liver delivery of therapeutic sequences. The unit's groups are involved with joint supervision of PhD students, which is useful to impart a range of skills to young researchers.

In addition to academic partnerships, the Unit has been involved with a US-based pharmaceutical industry partner, Johnson & Johnson, to advance gene therapy for HBV infection. This collaboration has been particularly important to fully appreciate what the requirements are for advancing gene therapy to clinical application. The Unit is also engaged with traditional academic collaborations.

Contact Details:
Patrick Arbuthnot
Email: Patrick.Arbuthnot@wits.ac.za

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: Mark Nicol
mark.nicol@uct.ac.za

ADVANCING CARE AND TREATMENT (ACT) FOR TB/HIV

Contact: Gavin Churchyard
GChurchyard@auruminstitute.org

SOWETO MATLOSANA SAMRC COLLABORATING CENTRE FOR HIV/AIDS AND TB

Contact: Neil Martinson
Martinson@phru.co.za

CENTRE FOR TUBERCULOSIS BIOMARKER-TARGETED INTERVENTION

Contact: Mark Hatherill
mark.hatherill@uct.ac.za

CLINICAL AND COMMUNITY HIV-TUBERCULOSIS RESEARCH COLLABORATING CENTRE

Contact: Graeme Meintjes
graeme.meintjes@uct.ac.za

WITS CLINICAL HIV/TB RESEARCH UNIT

Contact: Ian Sanne
isanne@witshealth.co.za

WITS RHI COLLABORATING CENTRE FOR HIV/AIDS

Contact: Helen Rees
hrees@wrhi.ac.za

TB FREE THROUGH RESEARCH AND INNOVATION

Contact: Keertan Dheda
keertan.dheda@uct.ac.za

CENTRE FOR BASIC AND TRANSLATIONAL HUMAN TB RESEARCH

Contact: Adrie Steyn
adrie.steyn@k-rith.org

TYGERBERG SAMRC COLLABORATING CENTRE FOR HIV LABORATORY RESEARCH

Contact: 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

COMMUNICATIONS AND STAKEHOLDER ENGAGEMENTS

COMMUNICATIONS AND STAKEHOLDER ENGAGEMENTS

During the 2018/19 reporting period the SAMRC had a number of key communication and stakeholder engagements. Communication and stakeholder engagement touchpoints during the reporting period are detailed below:

ENGAGEMENT	OBJECTIVE
March for Science 14 April 2018 Durban	• The SAMRC joined leading academics, scientists, researchers, students, civil society and the public in the 2018 Durban March for Science. • South Africa and scientists from the SAMRC have made significant contributions in all spheres of science that has contributed to discoveries and improving lives in Africa and globally. The March was an opportunity for scientists, staff and people from all walks of life to highlight the impact that science has on societies.
Bio Convention 4 -7 June 2018 Boston, U.S.A	• The SAMRC joined the SA pavilion at Bio 2018. The pavilion represented the SAMRC along with key stakeholders: AfricaBio, the Department of Science and Technology, Department of Trade and Industry, Technology Innovation Agency, and a group of entrepreneurs. • Bio is the largest bio technology event providing access to global biotech and pharma leaders, about 18 000 delegates attended Bio 2018.
5th SA TB Conference 12- 15 June 2018 Durban	• SAMRC exhibited at the 5th SA TB Conference, held under the theme: Step Up, Let's Embrace All to End TB! • Through the exhibition and a series of video clips with TB experts across the country, the SAMRC engaged with audiences.
International AIDS Conference 23 - 27 July 2018 Amsterdam	• The SAMRC collaborated with the South African National AIDS Council, the Department of Science and Technology, Human Sciences Research Council and CAPRISA to showcase HIV and TB funded projects through one exhibition. • The SAMRC was also part of the 2018 HIV & TB campaign launched at AIDS 2018 and distributed globally through key events and conferences, for several months. This was multimedia campaign with the UK Global Cause.

ENGAGEMENT	OBJECTIVE
Bio Africa 27 - 29 August 2018 Durban	• The 2018 BIO Africa Convention provided a platform for global stakeholders to engage in dialogue about innovative strategies aimed at elevating biotechnology on the continent. • The SAMRC was part of a joint exhibition with the Department of Science and Technology and GrainSA to showcase South Africa's BioEconomy SA (Strategy).
Nutrition Congress 5-7 September 2018 Johannesburg	• SAMRC Corporate and SAFOODS exhibited at the 2018 Nutrition Congress hosted in Johannesburg. • The local organising committee, Nutrition Society of South Africa (NSSA) and the Association for Dietetics in South Africa (ADSA) created a platform for nutrition professionals in South Africa to acknowledge achievements made as well as showcase nutrition-related activities, from science to implementation.
Evidence 2018 25 -28 September CSIR, Pretoria	• The SAMRC showcased their evidence based projects at the 2018 Evidence Conference held at the CSIR International Convention Centre in Pretoria.
12th Annual Early Career Scientist Convention 17-19 October 2018, Cape Town	• Taking science to the masses and building effective communication workshop presented by the Corporate Division with Cochrane South Africa. • The Convention was led by the Research Capacity Development Division of the SAMRC.
FameLab 7 – 8 February 2019 Cape Town	• The DST-NRF Centre of Excellence for Biomedical Research in Tuberculosis and the SAMRC Centre for Tuberculosis Research, with the support of the SAMRC Corporate & Marketing Communications Division, presented the FameLab platform for young scientists at the SAMRC. • FameLab is of great benefit to scientists and to the organisations in which they work. Scientists took part in a full day skills training workshop after which they gave three-minute presentations about their scientific concepts for a chance to participate in the national FameLab heats in Johannesburg.

MEDIA RELATIONS MANAGEMENT

The press releases issued to national, regional and community media institutions in the reporting period April 2018 to March 2019 are included below:

FEBRUARY 2019

- SAMRC invests over R20 million in research capacity development

DECEMBER 2018

- New population research centre to be launched at the University of Limpopo
- World AIDS Day: Reflecting on our commitment to fighting HIV and AIDS

NOVEMBER 2018

- SAMRC injects R45 million per annum to a joint programme with the US-NIH for biomedical research
- Understanding Violence against Women and Girls with Disabilities

OCTOBER 2018

- A silent killer: Why South Africa's health could crumble under pressure from non-communicable diseases
- Researchers in primary healthcare revisit the Alma Ata Declaration
- SAMRC's scientific excellence recognized by the NRF

SEPTEMBER 2018

- Professor Gita Ramjee receives prestigious scientific award
- Outcomes of a systematic review result in the implementation of condom availability programmes in schools in the United States of America
- National Cochrane Library licence renewed
- South Africa's top health researchers honoured for contributions to public health

AUGUST 2018

- Public-private partnership initiative shows its commitment to enhancing the development of the next generation of scientists
- Study shows children with multidrug-resistant tuberculosis can be treated
- DST-NRF-SAMRC SARChI Research Chair in Biostatistics announced
- SAMRC invests in a new Extramural Research Unit to tackle Antimicrobial Resistance

JULY 2018

- The SAMRC mourns the loss of leading Cardiologist Professor Bongani Mayosi
- SAMRC scientists share progress on science transformation projects
- National Research Foundation recognises SAMRC Mid-Career scientist

JUNE 2018

- BRICS TB Research Network to accelerate research and innovation through collaboration across the BRICS countries

MAY 2018

- Reminder: Call for Nominations: SAMRC scientific Merit Awards 2018

APRIL 2018

- Investing in drug development strategies to curb antimicrobial resistance
- National Tuberculosis Prevalence Survey moves into the Eastern Cape
- Students and Academics to lead the global March for Science in Durban

MARCH 2018

- FIND and SAMRC team up to tackle childhood TB diagnosis
- Call for Nominations Now Open: SAMRC Scientific Merit Awards
- 60% of adverse drug reactions are caused by herbal medicines
- Novel process for a rooibos extract to optimise the healing effect

The independently measured media performance of the SAMRC is reflected below:

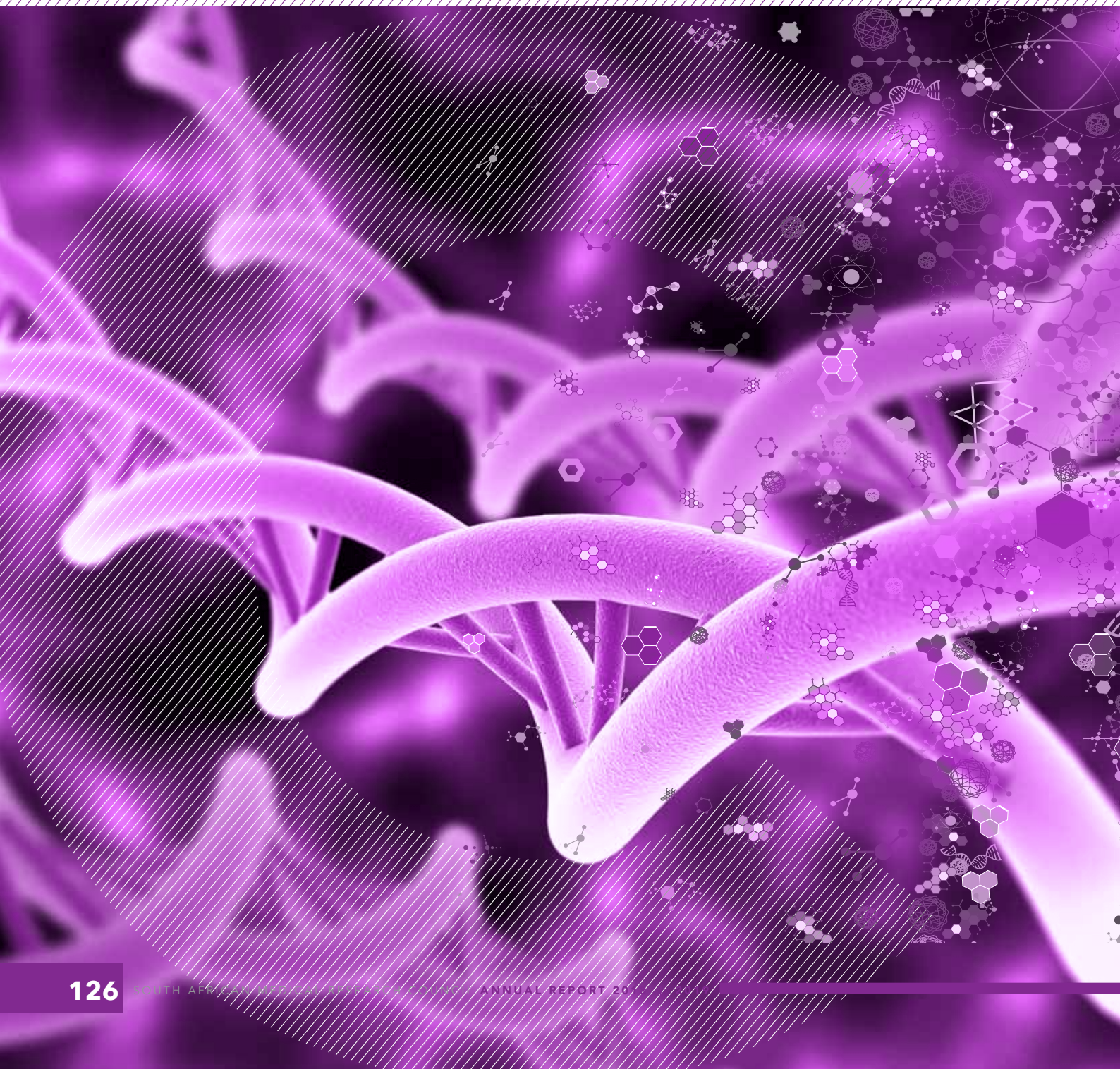
TITLE	AVE VALUE MEASURED
AVE generated for print media	R26 819 605
AVE generated for broadcast media	R29 144 681
Total AVE generated by the SAMRC (1 April 2018 – 31 March 2019)	R55 964 286

AVE refers to the Advertising Value Equivalent that an article has generated

COVERAGE TYPE	NUMBER OF ARTICLES
Number of articles considered as positive coverage	954
Number of articles considered as neutral coverage	443
Number of articles considered as negative coverage	1
TOTAL number of articles generated	1398

Note:
Negative articles are described by the issue reported on and are not a reflection that the SAMRC's reputation was brought into disrepute or was perceived negatively in the articles.

GOVERNANCE



INTRODUCTION

The SAMRC Act provides for the governance of the organisation. As a Section 3A entity, it is accountable to Parliament for its performance and budget. As the SAMRC executive authority is the Department of Health, the Minister of Health is responsible for appointing the Board. The Board, in turn, is responsible for the corporate governance of the SAMRC. This includes fiduciary responsibility and compliance with legislative requirements, including the Public Finance Management Act (PFMA). In addition, the SAMRC Board appoints the SAMRC's President, who carries full responsibility for implementing the Board's mandate. The SAMRC President chairs the SAMRC's Executive Management Committee, which is responsible for the day-to-day management of the organisation.

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.

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 the SAMRC's work must translate to some tangible / realisable proposition addressing one of these areas.

STATUTORY & OTHER MANDATES

The Legal & Compliance Services Division of the SAMRC has identified 49 Acts of Parliament (with 23 of those characterised as primary (i.e. non-compliance therewith or parts thereof would be catastrophic to the business / mandate of the SAMRC). Further to that, 7 Good Practice Standards (local and international) have been identified to be applicable to the SAMRC. Last, 10 Regulatory Authorities have been identified to have authority over the business or conduct of the SAMRC.

THE 51 ACTS INCLUDE THE FOLLOWING:

- SAMRC Act 58 of 1991, as amended
- The National Health Act 61 of 2003
- Intellectual Property, Rights from Publicly Financed Research and Development Act, 2008
- Employment Equity Act 55 of 1998
- Basic Conditions of Employment Act 75 of 1997
- 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 Trade Marks 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.

ENGAGEMENT WITH THE PORTFOLIO COMMITTEE ON HEALTH

The SAMRC is accountable to Parliament through the Parliamentary Portfolio Committee of Health. The SAMRC regularly responds to invitations from the Committee. During the 2018/19 reporting period the following presentations took place.

DATE	DISCUSSION
18 April 2018	2018/19 Annual Performance Plan (APP) and budget for the 2018/19 financial year
16 October 2018	2017/18 Annual Report

OUR BOARD

The role of our Board is set out in the South African Medical Research Council Act of 1991 and states that "the affairs of the SAMRC shall be managed and controlled by a Board, which shall, subject to the provisions of this Act, determine the policy and objectives of the SAMRC and exercise control generally over the performance of its functions, the exercise of its powers and the execution of its duties".

The Board Charter details the role and responsibilities of the Board, as follows -

1. The Board is ultimately accountable and responsible for the management and control of the affairs of the SAMRC subject to the provisions of the SAMRC Act. The Board determines the policies and objectives of the SAMRC and exercises control generally over the performance of its functions, the exercise of its powers and the execution of its duties.
2. To the extent that it is not contrary to the provisions enabling legislation or the powers of the Executive Authority, the Board or its Committees have the responsibility to manage the conduct of individual members of the Board / Board Committee as the case may be, including referral to the Executive Authority for appropriate intervention.
3. The Board constitutes the focal point and custodian of corporate governance in the SAMRC by managing its relationship with management and stakeholders along sound corporate governance principles. Accordingly, the SAMRC must be headed and controlled by an effective and efficient Board, comprising of Executive and Non-Executive members in order to ensure independence and objectivity in decision-making.
4. The Board must appreciate that strategy, risk, performance and sustainability are inseparable and to give effect to this by:
    a) Contributing to and approving the SAMRC's strategy
    b) Satisfying itself that the strategy and business plans do not give rise to risks that have not been thoroughly assessed by management
    c) Identifying key performance and risk areas
    d) Ensuring that the strategy will result in sustainable outcomes
    e) Considering sustainability as a business opportunity that guides strategy formulation
5. The Board has absolute responsibility for the performance of the entity and is accountable for such Performance. As a result, the Board should give strategic direction to the SAMRC.
6. The Board must appoint and evaluate the performance of the President, Vice Presidents, the Chief Financial Officer and other members of the EMC, and ensure that an effective succession plan is in place and adhered to for all key executive posts.
7. The Board must retain full and effective control over the SAMRC and monitor management in implementing Board decisions, plans and strategies.
8. The Board must ensure that the SAMRC is and is seen to be a responsible corporate citizen by having regard to not only the financial aspects of the business of the SAMRC but also the impact that business operations have on the environment and the society within which it operates.
9. The Board must ensure that the SAMRC ethics are managed effectively.
10. The Board must ensure that the SAMRC establishes and maintains:
    a) effective, efficient, and transparent systems of financial management, risk management and internal control
    b) a system of internal audit under the control and direction of an audit committee complying with, and operating in accordance with, the regulations and instructions which are set out in Sections 76 and 77 of the PFMA
    c) an appropriate procurement and provisioning system that is fair, equitable, transparent, competitive and cost effective;
    d) a system for properly evaluating all major capital projects prior to the final decision on a project
11. The Board is responsible for the governance of risk.
12. The Board is responsible for information technology (IT) governance.
13. The Board must ensure that the SAMRC complies with applicable laws and considers adherence to non-binding rules and standards.
14. The Board must approve and ensure that the SAMRC submits all reports, returns, notices and other information required by Parliament, the Executive Authority and Treasury.
15. The Board must appreciate that stakeholder's perceptions affect the SAMRC's reputation.
16. The Board must approve the SAMRC's five-year Strategic Plan before submission to the Executive Authority.
17. The Board must approve the SAMRC's Annual Report, Compliance Report(s), Strategic Plan and Annual Performance Plan before submission to the Executive Authority.
18. The Board must approve the SAMRC's Annual Financial Statements before submission to the Auditor General and subsequently to the executive authority.
19. The Board must approve the SAMRC's budget for the financial year in the prescribed format before submission

PROF GLENDA GRAY
PRESIDENT & CEO

PROF M SATHEKGE
BOARD CHAIRPERSON

PROF QUARRAISHA ABDOOL KARIM
BOARD VICE CHAIRPERSON

DR ZILUNGILE KWITSHANA

MS NAFEESA KAWDA

PROF BRANDON SHAW

PROF ELIZABETH BUKUSI

DR PATRICIA HANEKOM

PROF JOHNNY MAHLANGU

PROF LINDA SKAAL

PROF LINDIWE ZUNGU

DR RACHEL CHIKWAMBA

PROF MARK COTTON

PROF SITHEMBISO VELAPHI

PROF THOLENE SODI

PROF WILLIAM RAE

to Treasury and the executive authority.

20. The Board must take effective and appropriate steps to prevent irregular and fruitless and wasteful expenditure, losses resulting from criminal conduct, and expenditure not complying with the operational policies of the SAMRC.
21. The Board must ensure that the SAMRC conducts an independent institutional review every five years.
22. The Board must act in the best interests of the SAMRC by ensuring that individual members of the Board:
    a) adhere to legal standards of conduct
    b) are permitted to take independent advice in connection with their duties following an agreed procedure
    c) participate in the deliberations and are enabled to vote for the approval or rejection of a motion / proposal / or recommendation placed before them
    d) disclose real or perceived conflicts to the Board and deal with them accordingly. As such, the Board must compile and retain a register of interests for all Board members and update this register once every year.
23. The Board should do everything necessary to fulfil its role set out above.

The Act furthermore mandates the Board to designate an Executive Management Committee, consisting of the President and other members who are employees of the SAMRC, and who, subject to the directives and control of the Board, are responsible for managing the affairs of the organisation in accordance with the objects and policy of the SAMRC.

BOARD CHARTER

Provide commentary on the Board's charter and comment on the progress made on complying with the Charter.

The purpose of this Board Charter is to set out the Board's role and responsibilities, as well as the requirements for its composition and meeting procedures.

The Charter is reviewed annually to ensure that the Board remains compliant with legislation and trends in corporate governance. The review of the Charter took place at the Board meeting held on 30 July 2018 and no amendments to the Charter were deemed necessary.

The Board Charter requires an annual assessment to be conducted of the Board, its Sub-Committees and individual members, including the Chairperson. The evaluation is in the form of a self-assessment completed by every member of the Board and was conducted in December 2018. The assessment yielded a positive outcome in all areas.

COMPOSITION OF BOARD

NAME	DESIGNATION	DATE APPOINTED	DATE RESIGNED	QUALIFICATIONS	AREA OF EXPERTISE	BOARD DIRECTORSHIPS	OTHER COMMITTEES OR TASK TEAMS	NO. OF MEETINGS ATTENDED
Prof. M Sathekge	Chairperson	01 Nov 2010	n/a	MB ChB, MMed (Nucl Med), PhD. Professor, Chief Specialist and Head of Department of Nuclear Medicine	Design and implementation of novel point-of-care targeted diagnostics and therapies using molecular nuclear medicine to address cancer and the dual curse (HIV &TB)	• President of the Colleges of Medicine of South Africa (National Specialist Examining body) • President of International Society of Radio labelled Blood Elements (ISORBE) • Governing Board of the World Association of Radiopharmaceutical Therapy	Board ExCo R&D	6 0 3
Prof Q Abdool Karim	Deputy Chairperson	1 Nov 2016	n/a	PhD (Medicine); Diploma in Public Service Management (cum laude); MS (Parasitology); Higher Education Diploma (Post-graduate); BSc (Hons) (Biochemistry); BSc (Microbiology, Biochemistry) NRF A rated scientist; Fellow: Royal Society of South Africa; Academy of Science of South Africa; African Academy of Science (Vice-President: Southern Africa); The World Academy of Science; Organisation of Women in Science and Development; US National Academy of Medicine (Foreign Associate)	HIV/AIDS, Sexual reproductive health, surveillance, Adolescent Health, Implementation Science	• PEPFAR Scientific Advisory Board • MAC AIDS Foundation Board	Board ExCo R&D	5 0 4
Dr R Chikwamba	Member	1 Nov 2016	n/a	MBA; PhD; Member of the Academy of Science of South Africa (ASSAF Member, South African Council for Natural Scientific Professions; Dr Chikwamba sits on various boards focusing on agriculture, conservation and health, notably the Global Governing Board of ICRISAT, the Board of Directors of the Wits Health Consortium (Pty) Ltd, the South African Medical Research Council and is the chair of the Advisory Board of the Applied Center for Climate and Earth System Sciences (ACCESS).	Life sciences and health; Leadership, strategy development and execution; Research and development strategy, management; Strategic partnerships and business development; Strategic communication and stakeholder engagement; Governance.	• Member of Advisory Committee of the Academy of Science of South Africa (ASSAF) • Member of Applied Center of Climate and Earth System Science (ACCESS) • Global Governing Board of ICRISAT • Global Oversight Council: Vital Signs • Board Member, WITS Health Consortium (PTY) Ltd. • African Union (AU) High–Level committee on Science, Technology and Innovation Strategy for Africa 2024 (STISA 2024)	Board REMCO	5 4

NAME	DESIGNATION	DATE APPOINTED	DATE RESIGNED	QUALIFICATIONS	AREA OF EXPERTISE	BOARD DIRECTORSHIPS	OTHER COMMITTEES OR TASK TEAMS	NO. OF MEETINGS ATTENDED
Dr P Hanekom	Member	1 Nov 2010	n/a	BSc; BVMCH (Veterinarian); Postgraduate Diploma in Economic Principles MSc in Financial Economics	Financial and economic analysis and research Strategic planning Project management Governance and accountability	• Pikitup SOC • Mapungubwe Institute of Strategic Reflection • Muropeng a''Afrika (PTY LTD) • Cradle of Humankind Trust	Board ExCo ARIC Chair	6 0 6
Prof M Cotton	Member	1 Nov 2016	n/a	MBChB (UCT), M.Med (Wits), PhD (Stell), FCPaed (SA), DTM&H (Wits), DCH (SA) Registered as specialist in Paediatric Infectious Diseases with HPCSA	Paediatric infectious diseases	• n/a	Board R&D	5 2
Ms N Kadwa	Member	1 Nov 2016	n/a	B. Proc Practicing attorney in South Africa; Member of KwaZulu-Natal Law Society; Appeared in the High and Constitutional Court of South Africa.	Administrative and Constitutional; Environmental and Property Law; Commercial and Corporate Law; Property Law Delivery of a vast number of opinions on varied aspects including property issues, e.g. lease, eviction, public liability and insurance, human resources, financial and tax obligations especially in relation to property disposition structuring, advices on brief with respect to policies and procedures. Chairing of disciplinary hearings, mediation on matters, Training and Workshops; Drafting, Reviewing, Vetting of Contracts Purchase and Sales as well as other dispositions such as cessions and donations Grant Agreements, Purchase and Sales of Movables (with Various specifications) Leases, assignments, cessions and other encumbrances CDA's & NDA's Corporate Financing Agreements including for a Corporate Financial lender Consultancy Agreements Memorandum of Understanding Material Transfer Agreements Intellectual Property Agreements Drafting as paper on Corporate governance in terms of NEMA, Drafting several appeal decision recommendations for Minister of EDTEA and his predecessors.	• Appeals Panel Member of EDTEA (Economic Development, Tourism and Environmental Affairs); • Trustee of Several Private Trusts	Board ARIC	6 6

NAME	DESIGNATION	DATE APPOINTED	DATE RESIGNED	QUALIFICATIONS	AREA OF EXPERTISE	BOARD DIRECTORSHIPS	OTHER COMMITTEES OR TASK TEAMS	NO. OF MEETINGS ATTENDED
Prof. E Bukusi	Member	1 Nov 2013	n/a	Certificate in International Health Postgraduate diploma in International Research Ethics Bachelor of Medicine and Bachelor of surgery Masters of Medicine in Obstetrics and Gynaecology Master of Public Health (Epidemiology) Masters in Bioethics (MBE) PhD in Epidemiology	Research focused on sexually transmitted infections, reproductive health, and HIV prevention, care and treatment Enhancing capacity to conduct socio-behavioural and biomedical research and provide HIV care through training and infrastructure development Research ethics and the development of systems and structures for regulation of research	• Member Board of Trustees, HIV Research Trust • UNAIDS Scientific Expert Panel • International Partnership for Microbicides • DSMB Advisory Panel • Reduction of Early Mortality Advisory Committee • AVAC • Multipurpose Prevention Technologies (MPT) • DSMB World Health Organization • Corticosteriods in pregnancy use study • Board of local NGO – IMPACT Research and Development organisation • Advisory board on the ATHENA network PrEP Preference study	Board R&D	6 4
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	• Member of the Examination Board at Texila • American University (TAU) in India	Board REMCO	6 4
Dr Z Kwitshana	Member	1 Nov 2013	n/a	Doctor of Philosophy (Immunology) Master of Medical Science Diploma Project Management National Higher Diploma Med Tech (Pathophys/ Immunology) Specialist Diploma Med.Tech. (Chemical Pathology) National Diploma Medical Technology (Clinical Pathology)	Immunological and nutritional impact of co-infection with HIV and neglected tropical diseases (Helminthiasis). Revitalising capacity in medical parasitology for national control of neglected tropical diseases	• Charles James Hospital Board • SA Immunology Society • International Journal of Maternal and Child Health and AIDS Editorial Board • National Schistosomiasis Review Working Group (Group Leader) • Mass Treatment Campaign Committee	Board Exco Remco	6 0 4

NAME	DESIGNATION	DATE APPOINTED	DATE RESIGNED	QUALIFICATIONS	AREA OF EXPERTISE	BOARD DIRECTORSHIPS	OTHER COMMITTEES OR TASK TEAMS	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.	• Poliomyelitis Research Foundation Board. • WITS Health Consortium Board	Board ARIC	5 4
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 ARIC	4 4
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	• Editorial board: ACSM's Health and Fitness Journal • Executive Director: Africa & Vice-President: Publications and Communication - International Physical Activity Projects (IPAP)	Board ARIC	6 6
Prof L Skaal	Member	1 Nov 2016	n/a	Doctor of Public Health (DrPH); Master of Public Health (MPH); BSc Physiotherapy; Assessment and Moderation Certificate	Social & Behavioural Studies: Addictive behaviours and Obesity Prevention	• SAIDS Board • PHASA Exec	Board R&D	6 4
Prof T Sodi	Member	1 Nov 2016	n/a	Honours Degree in Psychology; Masters Degree in Clinical Psychology; PhD (Psychology). Prof Sodi is registered with the Health Professions Council of South Africa as a 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.	• n/a	Board Exco Remco	6 0 4
Prof S Velaphi	Member	1 Nov 2016	n/a	MBChB, MMed, FC Paed, Fellowship in Perinatal Neonatal Medicine	Neonatology	• Clothing Company for Church Clothes/Uniform	Board R&D	4 3

COMMITTEES

COMMITTEE	NO OF MEETINGS HELD	NO OF MEMBERS	NAME OF MEMBERS
Board	6	15	Prof. M Sathekge
			Prof Q Abdool Karim
			Dr R Chikwamba
			Dr P Hanekom
			Prof M Cotton
			Ms N Kadwa
			Prof. E Bukusi
			Prof L Zungu
			Dr Z Kwitshana
			Prof J Mahlangu
			Prof W Rae
			Prof B Shaw
			Prof L Skaal
			Prof T Sodi
			Prof S Velaphi
ARIC	6	5	Dr P Hanekom
			Ms N Kadwa
			Prof J Mahlangu
			Prof W Rae
			Prof B Shaw
RemCo	4	5	Dr R Chikwamba
			Prof. E Bukusi
			Prof L Zungu
			Dr Z Kwitshana
			Prof T Sodi
R&D	4	6	Prof. M Sathekge
			Prof Q Abdool Karim
			Prof M Cotton
			Prof. E Bukusi
			Prof L Skaal
			Prof S Velaphi

ENTERPRISE RISK MANAGEMENT

The Board is responsible for monitoring and reviewing the effectiveness of the risk management and internal controls systems and reporting on its review in the Annual Report. The Board has delegated to the Audit, Risk & IT Committee (ARIC) the oversight role over the risk management process, systems of internal control, as well as fraud risk as it relates to financial reporting and information technology risks as it relates to operational and financial reporting. The Board is ultimately accountable to ensure that an effective holistic approach to risk management is in place to understand, evaluate and mitigate risk at the SAMRC.

The objective of risk management in the SAMRC is to identify and assess important and emerging risks. To this end the SAMRC has a dedicated Enterprise Risk Management (ERM) Unit that reports directly to the ARIC, and has established an ERM policy which is based on COSO (Committee of Sponsoring Organisations of the Treadway Commission) Enterprise Risk Management – Integrated Framework. The ERM 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 Group. The primary role of the ERM Unit is to design, implement and monitor the process of enterprise risk management and its integration into the day-to-day activities of the SAMRC.

The SAMRC's philosophy to ERM entails the proactive management and mitigation of risks and the exploitation of any related opportunities under the guidance of the SAMRC Board, President and Executive Management. The ERM strategy, policy and framework is subject to annual review, and any amendments are submitted to the ARIC for consideration and Board approval.

ERM Unit will continue to embed risk management principles and the methodology, and continue 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. An ERM software application to support the risk management process is currently being implemented within the ERM Unit. 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.

KEY RISKS & MITIGATION ACTIVITIES

A key objective of risk management is to ensure that all potentially significant risks facing SAMRC are identified, proactively assessed, and managed in such a way that the impact of these risks is maintained in accordance with the SAMRC's appetite and tolerance for risk.

During the financial year under review, the SAMRC Executive Management and Board identified, and took necessary mitigating actions on the key business risks identified. The table below shows the alignment between strategic focus areas and principle business risks that may impact the SAMRC's ability to achieve its objectives:

STRATEGIC FOCUS AREA	PRINCIPAL RISK	SUMMARY DESCRIPTION OF RISK	KEY RESPONSE MEASURES
Administer health research effectively and efficiently in South Africa	Relationship with organised Labour	Deference in interpretation between SAMRC and Union on the collective agreement and Union mandate	• Standing monthly meetings with Union • Strengthened industrial relations within SAMRC • Union recognition agreement
	Inefficiencies in Corporate Processes	The risks of delayed support / slow response times by support functions to assist research units in executing the SAMRC mandate	• Management oversight • Online helpdesk services and technology • Contracts for major procurement spends • Policies, processes, SOPs
	Insufficient facility management, including movable and immovable assets	Infrastructure deterioration and aging buildings and research assets	• Asset management and verification • Capital project refurbishment • Revamping and leasing out of office space in Ridge Road building
	Potential non-compliance to legal and regulatory requirements as well as policies and procedures	The risk involves failure to compliance with laws and regulations, including adverse changes, and failure of the control and oversight mechanisms	• Policies, guidelines and SOPs • Legal & Compliance Services • Occupational Health and Safety support
Lead the generation of new knowledge and facilitate its translation into policies and practices to improve health	Poor research governance	The risk of poor oversight over research output, data protection and scientific oversight over both human and animal research	• Establish Research Integrity Office • Human and animal ethics committees • Policies, guidelines and SOPs
	Maintaining research integrity	The risk involves weak project scoping, poorly conducted research, application of inconsistent research methodology and inadequate mentorship	• External and internal quality review processes • Scientific advisory committees • Research Integrity Office • Oversight over the conduct of human and animal research
	Ineffective management of Extra-mural research Units (EMUs)	Poor / fragmented management and oversight of extramural units and external/collaborative projects and research output	• Approved EMU management strategy • Scientific Advisory Committees
	Transformation challenges	Progression of staff transformation across the organisation at senior research level impacted by various factors, including limited pool of public health scientists, behavioural scientist and medical clinical research scientists	• EE Strategy and Plan • Appointment of Intra-mural Unit Deputy Directors • Diversity intervention initiatives / programs • Succession planning
	Inability to sustainably grow funding	Failure to appropriately utilise available funding to generate future funding opportunities Uncertainty about the extent to which the SAMRC can develop funding opportunities in the private sector	• Dedicated on-going investigation for further international funding opportunities

STRATEGIC FOCUS AREA	PRINCIPAL RISK	SUMMARY DESCRIPTION OF RISK	KEY RESPONSE MEASURES
Support innovation and technology development to improve health	Ineffective support for innovation, collaborative partnerships, platforms and technology development	Inability to provide adequate and consistent project monitoring to ensure effective project delivery	• Grant policy and procedures • IP Policy and strategy • Commercialisation plan • Spending model with long term return defined • On-going
Limited research capacity	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	• 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

INTERNAL CONTROL & ASSURANCE

The SAMRC has implemented and maintained a number of internal control systems and governance structures to provide assurance on the status of governance and internal control which is designed to ensure that risks are mitigated and that the SAMRC's objectives are attained. These include clearly defined and documented processes, policies approved by the Board, and monitoring mechanisms which ensures that appropriate actions are taken to correct deficiencies when identified. While the Board is ultimately responsible for the internal controls at the SAMRC, this function is delegated to the President to ensure that business risks are properly managed. The Board relies on the Audit Risk & IT Committee to monitor and report on the status of internal controls at the SAMRC.

The SAMRC makes use of an outsourced internal audit function, it derives its independence from its Charter, which is reviewed and approved annually by the Board. Internal audit reports independently to the ARIC and has unrestricted access to the Chairperson of the ARIC and SAMRC President. The work of internal audit focuses primarily on areas that present the greatest risk to the SAMRC. This is achieved by following a risk-based assurance approach, focus on the key risk exposure as approved by the Board. The internal audit function is responsible for providing Executive Management and the Board with independent, objective assurance on the adequacy and effectiveness of the risk management, internal financial controls, the effectiveness of internal control over operational and compliance activities and governance processes across the SAMRC.

During the last financial year the SAMRC developed a combined assurance model and framework to provide a coordinated approach to all assurance activities, and a pilot detailed Combined Assurance Plan (CAP) was developed. Limited progress has been made to further implement the CAP during the current financial year. This process will be further implemented during the 2019/20 financial year. The ARIC is responsible for monitoring the appropriateness of the organisation's combined assurance model and ensuring that significant risks facing SAMRC are adequately managed.

The Auditor-General is responsibility 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.

FRAUD & CORRUPTION RISK MANAGEMENT

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 the SAMRC's Fraud Prevention Plan is an on-line whistle-blower hotline where staff can report fraudulent activities/incidents anonymously. The web-page, 'Report fraudulent activities at the SAMRC', is available to all staff via the SAMRC Intranet home page. Staff who have knowledge of an occurrence of fraud or corruption, or who have good reason to suspect that a fraudulent or corrupt act has occurred, have a duty to promptly report any reasonable suspicions. During the year under review no calls were received through the whistle-blower hotline which related to alleged governance breaches or ethical anomalies at SAMRC. All reported cases are directed to the appropriate governance structures and are treated with the utmost confidentiality to protect the rights of both the whistle blower and the alleged party.

ETHICAL CONDUCT

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 stakeholder on the SAMRC external website. The Code helps to define the parameters of the spirit of the SAMRC business and research conduct, ethics and personal ethos of staff. It is a requirement that all internal stakeholders display integrity, honesty, mutual respect and openness when conducting business.

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 and its stakeholders. In terms of the research conducted on humans, it must adhere to the broad ethical principles of beneficence and non-maleficence, distributive justice (equality) and respect for persons (dignity and autonomy). In case of the research involving animals, it must protect the welfare and interest of animals and adhere to the principles of reduction, refinement and replacement. Research in the SAMRC must be conducted in line with the SAMRC Research Ethics Policy, all legislative and regulatory frameworks.

The South African Medical Research Council recognises that the pursuit of excellent research and the fulfilment of responsibilities to participants in research, require adherence to the highest standards of integrity and ethics. As such the SAMRC provide trainings for the staff members in Good Clinical Practice (GCP), Applied Ethics and providing awareness sessions on the SAMRC responsible conduct of research guidelines.

It is the responsibility of each employee to ensure that he/she complies with the provisions of the Code. In an event where an employee breaches the provisions of the policy, this will be addressed in terms of the Disciplinary and Grievance Policy. The SAMRC also has a Declaration of Gifts Procedure which clearly defines and communicates the parameters for accepting gifts and outlines prohibited gifts and the approval process for accepting gifts.

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.

Where these relate to dealings with any state entity full declaration must be provided. SAMRC staff are entrusted with public funds and as such, they need to maintain the highest standards of professional ethics.

In addition, a code of conduct for supply chain management (SCM) practitioners and other role players is in place, whereby conflicts of interest are declared on an annual basis in addition to the SAMRC-wide annual on-line declaration process.

SAMRC'S MATERIALITY & SIGNIFICANCE FRAMEWORK: 2018/2019

The Materiality and Significance Framework for the MRC, 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 and Minister of Finance (National Treasury) for approval (simultaneous submission).
b) participation in a significant partnership, trust, unincorporated joint venture or similar arrangement;	Qualifying transactions exceeds R12.5Mil (based on 2% of total average SAMRC assets, as at 31 March 2017). 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 R12.5Mil (based on 2% of total average SAMRC assets, as at 31 March 2017). 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 R12.5Mil transaction value (based on 2% of total average SAMRC assets, as at 31 March 2017).	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 R12.5Mil (based on 2% of total SAMRC assets, as at 31 March 2017)	

SECTION 55: ANNUAL REPORT AND FINANCIAL STATEMENTS

3) The annual report and financial statements referred to in subsection (1) (d) ("financial statements") must -

a) 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;

b) 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	• Report quarterly to the Minister of Health. • Report annually in the Annual Financial Statements
(ii) any criminal or disciplinary steps taken as a consequence of such losses or irregular expenditure or fruitless and wasteful expenditure;		
(iii) any losses recovered or written off;		
(iv) any financial assistance received from the state and commitments made by the state on its behalf; and		
(v) any other matters that may be prescribed.	All instances, as prescribed	

SECTION 56: ASSIGNMENT OF POWERS AND DUTIES BY ACCOUNTING AUTHORITIES

PFMA SECTION	QUANTITATIVE [AMOUNT]	QUALITATIVE [NATURE]
1) The accounting authority for a public entity may— (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 R12.5 Million;
2) Obtained prior written approval from National Treasury for variation amounts in excess of:
   a. 20% or R20 Million (including applicable taxes) for construction related orders; and
   b. 15% or R15 Million (including applicable taxes) for goods / service related orders

The materiality level mentioned above was calculated using the guidance practice note of the National Treasury. Using these parameters the MRC materiality level calculation outcomes were as follows:

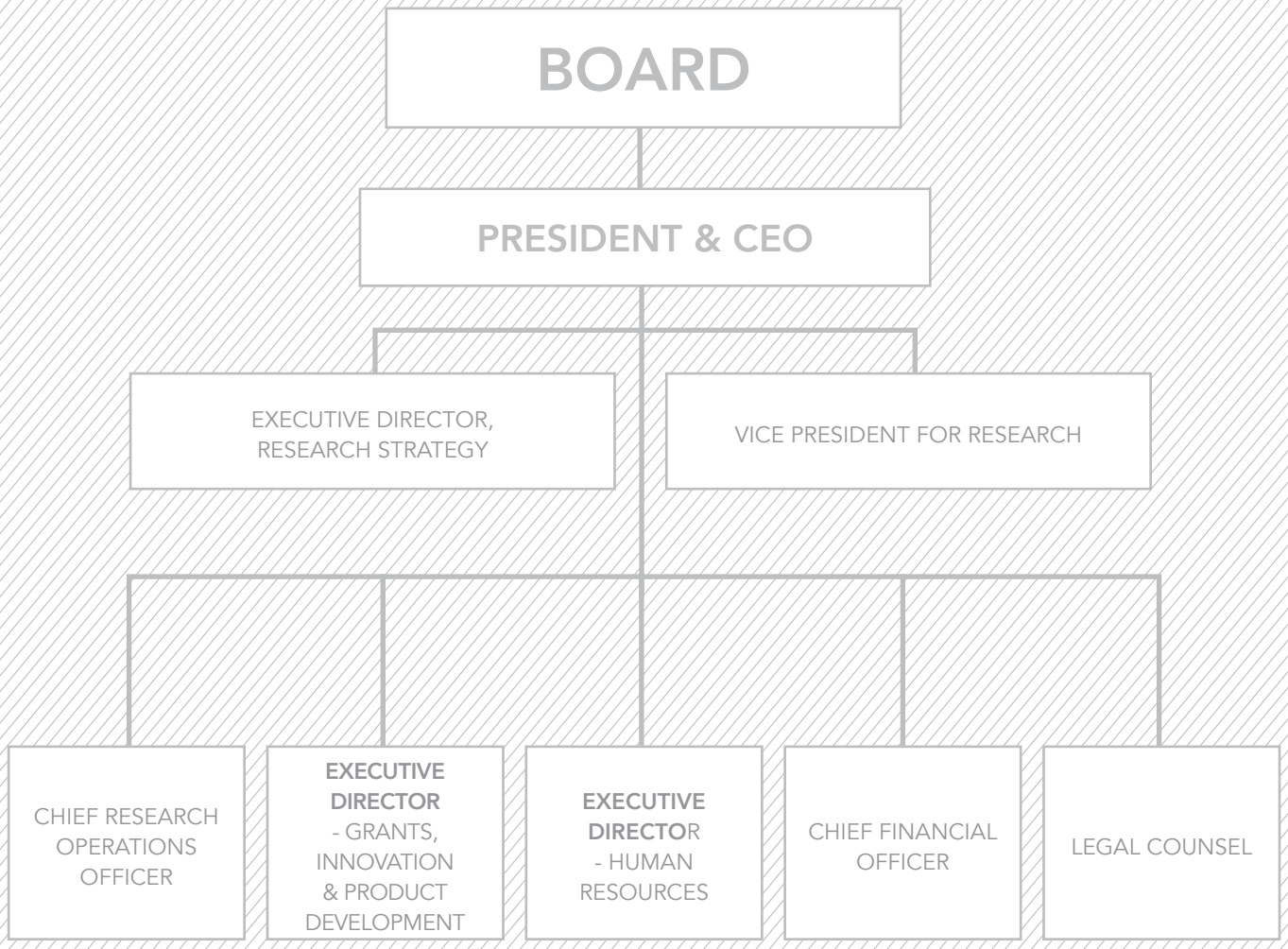
ELEMENT	% RAND TO BE APPLIED AGAINST R VALUE	ELEMENT VALUE AT 31 MARCH 2017	CALCULATED MATERIALITY & SIGNIFICANCE VALUE
Total Assets (1%-2%)	2%	R752 067 522	R15 041 350

The SAMRC materiality and significance value will be R12.5 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.


Spot
146
140
120
100
80
60
Five years
Months

HUMAN RESOURCE INFORMATION

SAMRC ORGANOGRAM



HIGH LEVEL ORGANISATIONAL STRUCTURE

OVERVIEW

The goal of the Human Resources function remains to enable scientists and those who support research in the organisation to have the necessary passion, aptitude, skills and experience to help the SAMRC deliver its mandate of funding and conducting research that improves the lives of all South Africans. In this HR Report, information on employment is provided which demonstrate how the HR function is translating the SAMRC's strategic priorities into action in order to create better and healthier lives of all South Africans. It provides evidence of what was achieved in 2018/19 in the areas of transformation, recruitment, organisational development (employment relations, career development and performance management) and human capacity development (through numerous study assistance and training programmes). The report addresses the implementation of the remuneration policy through career progression of staff that is fair, transparent and addresses issues of internal equity.

HR operates in close partnership with the executive management, unit directors and all business divisions and infrastructure functions and endeavors to assist the SAMRC and its employees to achieve the annual performance indicators.

HR PRIORITIES FOR THE YEAR UNDER REVIEW

The SAMRC's top priority during this period remained transformation. It was also important to continue with process related to career advancement and progression for staff. The effective management of staff continued to be a focus area through the training of Managers in Employee Relations and the completion of formal Management training and development programmes.

With a concerted effort, HR prioritised improving its recruitment practice and turnaround times so that the appropriate skills are attracted and appointed to the organisation. Performance management remained an ongoing priority with a process of moderation of performance results introduced to ensure the alignment of individual performance scores with the organisational performance.

As the relationship with organised labour is critical, ongoing engagement with organised labour has improved the trust relationship, and there are high levels of co-operation between Management and the Union.

EMPLOYEE PERFORMANCE MANAGEMENT FRAMEWORK

The SAMRC has ensured that all employees have a performance contract in place. At least one mid-year formal performance discussion was held with all employees and all year-end reviews were conducted between managers and their reportees. Performance management results were used to inform the bonus award process. A moderation process was introduced to ensure statistical alignment and to ensure consistency in the application of performance management across the organisation. HR has also continued to train managers on the management of poor performance in order to facilitate a culture of corrective behaviour as far as possible using alternate dispute resolution in managing any potential conflicts in the workplace.

The organisation has developed career progression criteria for Scientists, Statisticians and Project Leaders, which provided clear career development opportunity for employees. The same process is envisaged for the other job categories during 2019/20.

EMPLOYEE WELLNESS PROGRAMME

The employee assistance programme provides for individual counselling, trauma debriefing, HIV and chronic disease management, life management and work-related issues, management assistance, Ill health, incapacity and absenteeism management. The utilisation of the Employee Wellness Programme improved due to ongoing marketing of and exposure to the programme. The Wellness Days held in Cape Town, Pretoria and Durban were very well attended. More employees contacted the call centre, and teams requested trauma debriefing sessions when needed.

ACHIEVEMENTS FOR THE YEAR UNDER REVIEW

Managers were offered further training on employee relations in order to improve the management of employees. This has already had a positive impact on the relationship with employees. Recruitment training for Managers and Supervisors also continue.

The utilisation of the Employee Wellness Programme escalated due to ongoing marketing and exposure to the programme. Wellness days were held in Cape Town, Pretoria and Durban.

The Career Progression and Advancement processes continued and a further 36 staff were successful in their application for advancement to a next job level. This opportunity has an ongoing impact on staff motivation.

The relationship with the Union is sound and co-operative. The Union is involved in many of the HR processes. Union members sat on committees evaluating career progression and advancement, and union observers participated in all recruitment processes. Regular meetings with labour were held to discuss matters of importance and mutual interest.

Salary negotiations resulted in a settlement for annual salary increases well within the approved budget. HR executed the payment of 2017/18 performance bonuses whilst still remaining within the approved quantum. The SAMRC refreshed its salary ranges and all ensured that staff are paid at the minimum of their salary range in compliance with the Remuneration Policy.

TRANSFORMATION

Organisational transformation targets were further improved. There is still a need to appoint more Africans to the Senior Management cadre. A transformation plan for scientists was developed. The need for developing a pipeline and appointing more Specialist Scientists as well as Chief Specialists Scientists was identified and is continuously being actioned.

A limited critical mass in medical and health research has been identified. Therefore, the transformation of the pool of scientists, particularly at the Specialist Scientist level and above, are the key targets of this Transformation Plan. To address succession and transformation, Deputy Director posts were created and internal staff appointed into those posts giving preference to Employment Equity candidates.

Internal capacity development initiatives continue to grow intramural scientific critical mass through the funding of Masters and PhD students and the provision of Post-doctoral development opportunities.

As part of the Transformation programme, the SAMRC also focused on Disabilities by doing a disability declaration campaign and having a disability workshop for all staff. This will enable the SAMRC to accommodate disabled staff within the workplace.

RECRUITMENT

In 2018, the recruitment turnaround time was improved to well below the target of 32 days. The table below depicts the number and level of new recruits appointed to the SAMRC to ensure that we are fit for purpose.

Recruitment (appointment of new employees), 1 April 2018 to 31 March 2019

OCCUPATIONAL BAND	MALE				FEMALE				TOTAL
	African	Coloured	Indian	White	African	Coloured	Indian	White	
Top management	1	0	0	0	0	0	0	0	1
Senior management	0	0	0	0	0	0	0	0	0
Professionally qualified and experienced specialists and mid-management	7	2	0	0	6	1	2	3	21
Skilled technical and academically qualified workers, junior management, supervisors, foreman and superintendents	13	3	2	0	28	6	7	3	62
Semi-skilled and discretionary decision making	6	5	1	0	23	5	1	1	42
Unskilled and defined decision making	1	0	0	0	0	0	0	0	1
Total	28	10	3	0	57	12	10	7	127

CHALLENGES FACED

There is a need to develop career development criteria for support staff in order to provide them with clearer career paths and a mechanism for advancement within the organisation.

An on-going challenge is responding to staff's need for security of employment whilst balancing the organisation's need to carefully manage its headcount. This means a move toward contract appointments for longer than 12 months.

Transformation (including Diversity) is an on-going challenge for the SAMRC particularly at the Specialist Scientist level and above.

There is a need to incentivise excellent performance. The current bonus budget available for this purpose seems to be insufficient to do so.

The 2019 salary negotiations has been interrupted due to the restrictions imposed by National Treasury on salary increases for staff earning above R1 million per annum.

FUTURE HR PLANS AND GOALS

The organisation will continue refining its Performance Management System paying particular attention to embedding a culture of on-going performance discussions and focusing on the development of employees to enable them to improve their performance. In addition, a clear strategy to manage poor performance must become a focus area.

HR will continue to focus on Transformation within the SAMRC. The goal will be to appoint more women to senior leadership positions. More disabled people will also be appointed as part of the transformation plan for the SAMRC. Together with the Transformation Forum, a Transformation Plan for Corporate Support will be developed.

Diversity will continue to be an important focus area of the Transformation plan. Diversity workshops will continue during the coming financial year. Managers will be trained in managing diversity in the workplace. A series of workshops for employees will be held helping them develop knowledge about Diversity in the workplace and understanding the value of Diversity in order to create an inclusive organisational culture.

Training has been scheduled to train a core group of employees to chair a formal disciplinary hearing, in order to ensure that the outcome of such a process is fair in terms of process and reason. There is a need to migrate to a new Human Resource Information System (HRIS). This presents an opportunity to ensure that the SAMRC adopts a new HRIS which will enable greater effectiveness and efficiencies in reporting and data management.

HUMAN RESOURCE OVERSIGHT STATISTICS

EXPENDITURE

Table 1 below summarises the final audited expenditure on personnel costs by salary bands.

Table 1: Personnel costs by salary bands, 1 April 2018 - 31 March 2019

SALARY BANDS	PERSONNEL EXPENDITURE (R)	% OF TOTAL PERSONNEL COST	AVERAGE PERSONNEL COST PER EMPLOYEE (R)
Lower skilled (levels 1-2)	3,255,033.00	1.01	147,956
Skilled (level 3-5)	22 515 325.00	6.96	171 873
Highly skilled production (levels 6-8)	97 144 670.00	30.02	358,771
Highly skilled supervision (levels 9-12)	123,188,138.08	38.07	755,755
Senior management (levels 13-16)	77,445,889.00	23.94	1,461,243
Total	323,549,055.08	100	506,336

The following tables provide a summary of expenditure incurred as a result of salaries, overtime, home owners' allowances and medical assistance. In each case, the table provides an indication of the percentage of the personnel budget that was used for these items.

Table 2: Salaries, overtime, home-owners' allowance and medical assistance by salary bands, 2018/19

SALARY BANDS	SALARIES		OVERTIME		HOME-OWNERS ALLOWANCE		MEDICAL ASSISTANCE	
	Amount (R)	Salaries as a % of personnel cost	Amount (R)	Overtime as a % of personnel cost	Amount (R'000)	HOA as a % of personnel cost	Amount (R'000)	Medical assistance as a % of personnel cost
Lower skilled (Levels 1-2)	3,255,033.00	1.01	15,700.50	0.00	0	0	44,000.00	0.01
Skilled (Levels 3-5)	22,515,325.00	6.96	257,529.39	0.08	0	0	97,000.00	0.03
Highly skilled production (Levels 6-8)	97,144,670.00	30.02	564,589.84	0.17	0	0	0	0
Highly skilled supervision (Levels 9-12)	123,188,138.08	38.07	21,850.43	0.01	0	0	0	0
Senior management (Levels 13-16)	77,445,889.00	23.94	0	0	0	0	0	0
Total	323,549,055.08	100.00	859,670.16	0.27	0	0	141,000.00	0.04

Note: The SAMRC provides a total cost to company package. Home-owners' allowance and medical aid assistance in general are excluded. However, as part of a settlement agreement with organised labour, the SAMRC pays a medical allowance of R500 per month to employees earning less than R165 000 during the reporting period. The employee should be the principal member of a medical scheme to qualify.

EMPLOYMENT AND VACANCIES

The following table summarises the number of posts on the establishment, the number of employees, the vacancy rate, and whether there are any supernumerary staff.

Table 3: Employment and vacancies by salary bands, 31 March 2019 (includes permanent and contract staff)

SALARY BAND	NUMBER OF POSTS	NUMBER OF POSTS FILLED	BASELINE FUNDED (PERMANENT, INDEFINITE AND TERM BASELINE)	CONTRACT FUNDED	FLAGSHIP	VACANCY RATE (%) (NO OF VACANCIES/ NO OF POSTSX100)	NUMBER OF SUPERNUMERARY POSTS FILLED (ADDITIONAL TO THE ESTABLISHMENT)
Lower skilled (Levels 1-2)	25	22	20	2	0	12.0	0
Skilled (Levels 3-5)	131	131	44	87	0	0	0
Highly skilled production (Levels 6-8)	284	270	148	121	1	4.9	0
Highly skilled supervision (Levels 9-12)	176	163	110	51	2	7.3	0
Senior management (Levels 13-16)	59	53	51	2	0	10.7	0
TOTAL	675	639	373	263	3	5.3	0

JOB EVALUATION

Table 4 below summarises the number of jobs that were evaluated during the year under review. The table also provides statistics on the number of posts that were upgraded or downgraded.

Table 4: Job evaluation, 1 April 2018 to 31 March 2019

SALARY BAND	NUMBER OF POSTS	NUMBER OF JOBS EVALUATED	% OF POSTS EVALUATED BY SALARY BANDS	POSTS UPGRADED		POSTS DOWNGRADED	
				Number	% of posts upgraded	Number	% of posts downgraded
Lower skilled (Levels 1-2)	22	0	0	0	0	0	0
Skilled (Levels 3-5)	131	7	5.3%	3	8.3%	0	0
Highly skilled production (Levels 6-8)	270	27	10.0%	14	39%	0	0
Highly skilled supervision (Levels 9-12)	163	28	17.2%	16	44.4%	0	0
Senior management (Levels 13-16)	53	7	13.2%	3	8.3%	0	0
Total	639	69	10.8%	36	100%	0	0

Note: Posts evaluated were for both promotions (career progression and advancement) and recruitment (new posts). Therefore, not all posts qualify to be considered for up- or downgrading.

Table 5 below provides a summary of the number of employees whose salary positions were upgraded due to their posts being upgraded. The number of employees might differ from the number of posts upgraded since not all employees are automatically absorbed into the new posts and some of the posts upgraded could also be vacant.

Table 5: Profile of employees whose salary positions were upgraded due to their posts being upgraded, 1 April 2018 to 31 March 2019

BENEFICIARIES	AFRICAN	INDIAN	COLOURED	WHITE	TOTAL
Female	6	5	9	2	22
Male	2	4	6	2	14
Total	8	9	15	4	36
Employees with a disability					0

The following table summarises the number of cases where remuneration levels exceeded the grade determined by job evaluation. Reasons for the deviation are provided in each case.

Table 6: Employees whose salary level exceed the grade determined by job evaluation, 1 April 2018 to 31 March 2019

Total number of employees whose salaries exceeded the grades determined by job evaluation in 2018/19	0

EMPLOYMENT CHANGES

Turnover rates provide an indication of trends in the employment profile of the organisation. Table 7 below provides a summary of turnover rates by salary band.

Table 7: Annual turnover rates by salary band, 1 April 2018 to 31 March 2019

				TURNOVER RATE (%)
SALARY BAND	NUMBER OF EMPLOYEES PER BAND	APPOINTMENTS AND TRANSFERS INTO THE ORGANISATION	TERMINATIONS AND TRANSFERS OUT OF THE ORGANISATION	TERMINATIONS / TOTAL X 100 = TURNOVER RATE
Lower skilled (Levels 1-2)	22	1	2	9
Skilled (Levels 3-5)	131	42	62	47
Highly skilled production (Levels 6-8)	270	62	39	14
Highly skilled supervision (Levels 9-12)	163	21	19	12
Senior management (Levels 13-16)	53	1	6	11
TOTAL	639	127	128	20

Table 8: Reasons why staff are leaving the organisation

TERMINATION TYPE	NUMBER	% OF TOTAL LEAVING
Death	0	0
Resignation	53	41.4
Expiry of contract	62	48
Dismissal – operational changes	0	0
Dismissal – misconduct and Absconded	4	3.1
Dismissal: Inefficiency	0	0
Discharged due to ill-health	0	0
Retirement	7	5.5
Transfers to other public service departments	0	0
Terminations	1	1
Other: Retrenchment	1	1
Total	128	100
Total number of employees who left as a % of the total employment		20
Formula used: terminations / total staff x 100 = % leaving the organisation.		

Table 9: Promotions by salary band 1 April 2018 to 31 March 2019

SALARY BAND	NO OF EMPLOYEES	PROMOTIONS TO ANOTHER SALARY LEVEL	SALARY BANDS PROMOTIONS AS A % OF EMPLOYEES BY SALARY LEVEL	PROGRESSIONS TO ANOTHER NOTCH WITHIN A SALARY LEVEL	NOTCH PROGRESSIONS AS A % OF EMPLOYEES BY SALARY BAND
Lower skilled (Levels 1-2)	22	0	0	N/A	N/A
Skilled (Levels 3-5)	131	3	2.3%		
Highly skilled production (Levels 6-8)	270	14	5.2%		
Highly skilled supervision (Levels 9-12)	163	16	9.8%		
Senior management (Levels 13-16)	53	3	5.7%		
Total	639	36	5.6%		

Note:

1. The SAMRC has moved away from promotions, to be replaced by career progression and advancement
2. The SAMRC does not have a system of notch progressions. Salary adjustments in the event of promotions (career progression or advancement) is calculated as per the criteria in the Remuneration Policy.

EMPLOYMENT EQUITY

The tables in this section are based on the formats prescribed by the Employment Equity Act, 55 of 1998.

Table 10: Total number of employees (including employees with disabilities) in each of the following occupational categories, 31 March 2019

OCCUPATIONAL CATEGORY	MALE				FEMALE				TOTAL
	African	Coloured	Indian	White	African	Coloured	Indian	White	
Legislators, senior officials and managers	7	4	4	13	1	4	4	16	53
Professionals	17	11	4	1	44	27	27	32	163
Technicians and associate professionals	33	26	13	4	105	51	31	7	270
Clerks	35	9	1	1	62	14	6	3	131
Service and sales workers	0	0	0	0	0	0	0	0	0
Skilled agriculture and fishery workers	0	0	0	0	0	0	0	0	0
Craft and related trades workers	0	0	0	0	0	0	0	0	0
Plant and machine operators and assemblers	0	0	0	0	0	0	0	0	0
Elementary occupations	10	3	0	0	5	4	0	0	22
Total	102	53	22	19	217	100	68	58	639
Employees with disabilities (included in above totals)	0	0	0	1	1	1	0	1	4

Table 11: Total number of employees (including employees with disabilities) in each of the following occupational bands, 31 March 2019

OCCUPATIONAL BAND	MALE				FEMALE				TOTAL
	African	Coloured	Indian	White	African	Coloured	Indian	White	
Top management	3	1	0	2	0	0	0	2	8
Senior management	4	3	4	11	1	4	4	14	45
Professionally qualified and experienced specialists and mid-management	17	11	4	1	44	27	27	32	163
Skilled technical and academically qualified workers, junior management, supervisors, foreman and superintendents	33	26	13	4	105	51	31	7	270
Semi-skilled and discretionary decision making	35	9	1	1	62	14	6	3	131
Unskilled and defined decision making	10	3	0	0	5	4	0	0	22
Total	102	53	22	19	217	100	68	58	639
Employees with disabilities (included in above totals)	0	0	0	1	1	1	0	1	4

Table 12: Recruitment (appointment of new employees), 1 April 2018 to 31 March 2019

OCCUPATIONAL BAND	MALE				FEMALE				TOTAL
	African	Coloured	Indian	White	African	Coloured	Indian	White	
Top management	1	0	0	0	0	0	0	0	1
Senior management	0	0	0	0	0	0	0	0	0
Professionally qualified and experienced specialists and mid-management	7	2	0	0	6	1	2	3	21
Skilled technical and academically qualified workers, junior management, supervisors, foreman and superintendents	13	3	2	0	28	6	7	3	62
Semi-skilled and discretionary decision making	6	5	1	0	23	5	1	1	42
Unskilled and defined decision making	1	0	0	0	0	0	0	0	1
Total	28	10	3	0	57	12	10	7	127
Employees with disabilities	0	0	0	0	0	0	0	0	0

Table 13: Promotions by race and gender, 1 April 2018 to 31 March 2019

OCCUPATIONAL BAND	MALE				FEMALE				TOTAL
	African	Coloured	Indian	White	African	Coloured	Indian	White	
Lower skilled (Levels 1-2)	0	0	0	0	0	0	0	0	0
Skilled (Levels 3-5)	1	0	0	0	0	1	1	0	3
Highly skilled production (Levels 6-8)	0	1	3	1	3	5	1	0	14
Highly skilled supervision (Levels 9-12)	1	5	1	0	3	3	2	1	16
Senior management (Levels 13-16)	0	0	0	1	0	0	1	1	3
Total	2	6	4	2	6	9	5	2	36
Employees with disabilities	0	0	0	0	0	0	0	0	0

Table 14 below details all staff exiting the organisation for any of the reasons identified in table 8 above.

Table 14: Exits by race and gender, 1 April 2018 to 31 March 2019

OCCUPATIONAL BAND	MALE				FEMALE				TOTAL
	African	Coloured	Indian	White	African	Coloured	Indian	White	
Top management	1	0	0	0	0	0	0	0	1
Senior management	0	0	1	1	1	1	0	1	5
Professionally qualified and experienced specialists and mid-management	4	0	0	1	6	3	4	1	19
Skilled technical and academically qualified workers, junior management, supervisors, foreman and superintendents	12	0	1	0	21	3	0	2	39
Semi-skilled and discretionary decision making	13	3	1	0	35	9	0	1	62
Unskilled and defined decision making	2	0	0	0	0	0	0	0	2
Total	32	3	3	2	63	16	4	5	128
Employees with disabilities	0	0	0	0	0	0	0	0	0

Table 15: Disciplinary action considered by a formal disciplinary hearing, 1 April 2018 to 31 March 2019

	MALE				FEMALE				TOTAL
	African	Coloured	Indian	White	African	Coloured	Indian	White	
Disciplinary action	0	1	1	0	0	0	0	1	3

Table 16: Skills development, 1 April 2018 to 31 March 2019

The table below refers to all staff who are enrolled in a formal tertiary qualification programme and/or attending occupational training.

OCCUPATIONAL CATEGORY	MALE				FEMALE				TOTAL
	African	Coloured	Indian	White	African	Coloured	Indian	White	
Legislators, senior officials and managers	2	0	0	5	1	1	3	7	19
Professionals	6	3	2	1	13	10	18	10	63
Technicians and associate professionals	11	4	8	1	69	15	28	5	141
Clerks	23	2	0	0	45	4	4	1	79
Service and sales workers	0	0	0	0	0	0	0	0	0
Skilled agriculture and fishery workers	0	0	0	0	0	0	0	0	0
Craft and related trades workers	0	0	0	0	0	0	0	0	0
Plant and machine operators and assemblers	0	0	0	0	0	0	0	0	0
Elementary occupations	1	1	0	0	1	3	0	0	6
Total	43	10	10	7	129	33	53	23	308
Employees with disabilities (included above)	0	0	0	1	1	1	0	1	4

PERFORMANCE REWARDS

To encourage performance, the organisation has granted the following performance rewards during the year under review. Table 17 presents performance rewards by race, gender, and disability while Table 18 presents the performance rewards awarded by salary bands.

Table 17: Performance rewards by race, gender, and disability, 1 April 2018 to 31 March 2019

	BENEFICIARY PROFILE			COST	
	NUMBER OF BENEFICIARIES	TOTAL NUMBER OF EMPLOYEES IN GROUP	% OF TOTAL NUMBER OF BENEFICIARIES WITHIN GROUP	COST (R)	AVERAGE COST PER EMPLOYEE (R)
African					
Male	41	102	40.2	R 451,354.00	11,008.63
Female	94	217	43.3	R 801,863.00	8,530.46
Indian					
Male	16	22	72.7	R 191,291.00	11,955.69
Female	47	68	69.1	R 644,599.00	13,714.87
Coloured					
Male	33	53	62.3	R 359,852.00	10,904.61
Female	78	100	78	R 866,615.00	11,110.45
White					
Male	18	19	94.7	R 391,518.00	21,751.00
Female	43	58	74.1	R 765,764.00	17,808.47
Employees with a disability (included in above table)	2	4	50%	R43,011.00	21,505.50
Total	370	639	57.9	4,472,856.00	12 088.80

African employees received significantly less of the bonus pool as a group while White males are significantly overrepresented in those receiving a bonus.

Table 18: Performance rewards by salary bands for personnel below Senior Management Service, 1 April 2018 to 31 March 2019

SALARY BAND	BENEFICIARY PROFILE			COST		
	NUMBER OF BENEFICIARIES	NUMBER OF EMPLOYEES	% OF TOTAL WITHIN SALARY BANDS	TOTAL COST OF PERFORMANCE REWARDS (R)	AVERAGE COST PER EMPLOYEE (R)	TOTAL COST AS A % OF THE TOTAL PERSONNEL EXPENDITURE
Lower skilled (Levels 1-2)	16	22	72.7	53 173.00	3 323.31	1.2
Skilled (Levels 3-5)	47	131	35.9	175 312.00	3 730.04	3.9
Highly skilled production (Levels 6-8)	155	270	57.4	1 214 212.00	7 833.63	27.2
Highly skilled supervision (Levels 9-12)	110	163	67.5	1 798 102.00	16 346.38	40.2
Total	328	586	56	3 240 799.00	9 880.48	72.5

Table 19: Performance related rewards (cash bonus), by salary band, for Senior Management

SALARY BAND	BENEFICIARY PROFILE			TOTAL COST (R)	AVERAGE COST PER EMPLOYEE (R)	TOTAL COST AS A % OF THE TOTAL PERSONNEL EXPENDITURE
	Number of beneficiaries	Number of employees	% of total within band			
Senior Management (Levels 13-16)	42	53	79	1,232,057.00	29 334.69	27.5
Total	42	53	79	1,232,057.00	29 334.69	27.5

Note: Average cost per employee based on beneficiaries

FOREIGN 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 workers in each salary band and by each major occupation.

Table 20: Foreign workers, 1 April 201 to 31 March 2019, by salary band

SALARY BANDS	1 APRIL 2018		31 MARCH 2019		CHANGE	
	Number	% of total no of employees (640)	Number	% of total no of employees (639)	Number	% change
Lower skilled (Levels 1-2)	0	0	0	0	0	0
Skilled (Levels 3-5)	1	0.16	2	0.31	1	0.15
Highly skilled production (Levels 6-8)	4	0.63	2	0.31	-2	-0.32
Highly skilled supervision (Levels 9-12)	19	2.97	22	3.44	3	0.47
Senior management (Levels 13-16)	6	0.94	5	0.78	-1	-0.21
Total	30	4.69	31	4.9	1	0.16

Table 21: Foreign workers, 1 April 2018 to 31 March 2019, by major occupation or job title

MAJOR OCCUPATION/ JOB TITLE	1 APRIL 2018		31 MARCH 2019		CHANGE	
	Number	% of total no of employees (640)	Number	% of total no of employees (639)	Number	% change
Unit Director	2	0.31	3	0.47	1	0.16
Acting Unit Director	1	0.16	0	0	-1	-0.16
Statistician	0	0	0	0	0	0
BOD Intern	0	0	0	0	0	0
Research Trainee	0	0	0	0	0	0
Scientist	1	0.16	1	0.16	0	0
Chief Research Technologist	1	0.16	1	0.16	0	0.00
Senior Scientist	6	0.94	8	1.25	2	0.31
Senior Statistician	0	0	0	0	0	0
Specialist Scientist	8	1.25	9	1.41	1	0.16
Specialist Statistician	1	0.16	0	0	-1	-0.16
Senior IT Advisor	0	0	0	0	0	0
Senior Specialist Scientist	2	0.31	1	0.16	-1	-0.16
Senior Specialist Statistician	0	0	0	0	0	0
Chief Specialist Scientist	1	0.16	1	0.16	0	0.00
Chief Specialist Statistician	0	0	0	0	0	0
Project Leader	0	0	0	0	0	0
Project Coordinator	0	0	0	0	0	0
Division Manager	0	0	1	0.16	1	0.16
Research Manager	1	0.16	1	0.16	0	0.00
Research Support Manager	1	0.16	1	0.16	0	0.00
Research Technologist	3	0.47	1	0.16	-2	0.31
Project Manager	1	0.16	1	0.16	0	0.00
Pharmacist	1	0.16	1	0.16	0	0.00
Driver	0	0	1	0.16	1	0.16
Total	30	4.69%	31	4.9%	1	0.16

LEAVE UTILISATION, 1 JANUARY 2018 TO 31 DECEMBER 2018

The Public Service Commission identified the need for careful monitoring of sick leave within the public service. Table 22 below provides an indication of the use of sick leave while Table 23 depicts disability leave granted. In both cases, the estimated cost of the leave is also provided.

Table 22: Sick leave, 1 January 2018 to 31 December 2018

SALARY BAND	TOTAL SICK LEAVE DAYS TAKEN	NO OF SICK LEAVE DAYS TAKEN REQUIRING A MEDICAL CERTIFICATE	% DAYS WITH MEDICAL CERTIFICATION	NUMBER OF EMPLOYEES USING SICK LEAVE	TOTAL NO OF EMPLOYEES PER BAND	% OF TOTAL EMPLOYEES PER BAND USING SICK LEAVE	AVERAGE DAYS PER EMPLOYEE	ESTIMATED COST (R)
Lower skilled (Levels 1-2)	136	56	41.2	18	22	4.0	7.6	80 434
Skilled (Levels 3-5)	468	160	34.2	80	136	17.9	5.9	324 845
Highly skilled production (Levels 6-8)	1183	450	38	207	272	46.3	5.7	1 723 602
Highly skilled supervision (Levels 9-12)	624	317	50.8	118	165	26.4	5.3	1 849 785
Senior management (Levels 13-16)	80	32	40	24	53	5.4	3.3	427 084
Total	2491	1015	40.1	447	648	100	5.6	4 405 750

Table 23: Disability leave (temporary and permanent), 1 January 2018 to 31 December 2018

SALARY BAND	TOTAL DAYS TAKEN	% DAYS WITH MEDICAL CERTIFICATION	NUMBER OF EMPLOYEES USING DISABILITY LEAVE	NO OF EMPLOYEES PER BAND	% OF TOTAL EMPLOYEES FOR THIS BAND USING DISABILITY LEAVE	AVERAGE DISABILITY LEAVE DAYS PER EMPLOYEE	ESTIMATED COST (R)
Lower skilled (Levels 1-2)	31	100%	1	22	4.6	31	19 201
Skilled (Levels 3-5)	0	0	0	136	0	0	0
Highly skilled production (Levels 6-8)	34	100%	1	272	0.4	34	52 417
Highly skilled supervision (Levels 9-12)	3	100%	1	165	0.6	3	13 957
Senior management (Levels 13-16)	24	100%	1	53	1.9	24	177 515
Total	92	100%	4	648	0.6%	23	263 090

Table 24 below summarises the utilisation of annual leave.

Table 24 Annual Leave, 1 January 2018 to 31 December 2018

SALARY BANDS	NO OF EMPLOYEES	TOTAL DAYS TAKEN	AVERAGE ANNUAL LEAVE DAYS TAKEN PER EMPLOYEE
Lower skilled (Levels 1-2)	22	534	24.3
Skilled (Levels 3-5)	146	1 544	11.4
Highly skilled production (Levels 6-8)	272	4 527	16.6
Highly skilled supervision (Levels 9-12)	165	3 126	18.9
Senior management (Levels 13-16)	53	1 220	23
Total	648*	10 951	16.9

the leave cycle is not the same as the financial year and hence no of employees differs from other tables.

Table 25: Capped leave, 1 January 2018 to 31 December 2018. The SAMRC does not have a capped leave category. All employees are required to use their leave by June of the following year. Any leave in excess of 20 days is then forfeited.

SALARY BANDS	NO OF EMPLOYEES WHO FORFEITED LEAVE	TOTAL DAYS OF LEAVE FORFEITED	AVERAGE NUMBER OF DAYS FORFEITTED PER EMPLOYEE
Lower skilled (Levels 1-2)	9	88	10
Skilled (Levels 3-5)	10	92	9
Highly skilled production (Levels 6-8)	46	442	10
Highly skilled supervision (Levels 9-12)	40	448	11
Senior management (Levels 13-16)	30	430	14
Total	135	1 500	11

Note: the SAMRC policy has provided for leave forfeiture by end June of the next year.

The following table summarises payments made to employees as a result of leave that was not taken. At the SAMRC, leave is only paid out at termination of employment to a maximum of 20 days.

Table 26: Leave payouts, 1 April 2018 to 31 March 2019

REASON	TOTAL AMOUNT (R'000)	NUMBER OF EMPLOYEES	AVERAGE PAYMENT PER EMPLOYEE
Terminations (all exits)	2 064 655	92	22 442
Total	2 064 655	92	22 442

HIV AND AIDS & HEALTH PROMOTION PROGRAMMES

Table 27: Steps taken to reduce the risk of occupational exposure

UNITS/CATEGORIES OF EMPLOYEES IDENTIFIED TO BE AT HIGH RISK OF CONTRACTING HIV & RELATED DISEASES	KEY STEPS
HIV Prevention Research Unit (HPRU), Office of TB Research, Biomedical Research and Innovation Platform (BRIP)	Staff screening Good Clinical Practice (GCP) training, medical surveillance, needle stick injuries protocol.

Table 28: Details of Health Promotion and HIV and AIDS Programmes

QUESTION	YES	NO	DETAILS, IF YES
1. Has the department designated a member of the SMS to implement the provisions contained in Part VI E of Chapter 1 of the Public Service Regulations, 2001? If so, provide her/his name and position.	Y		The Executive Director of HR takes responsibility as part of the Wellness programme
2. Does the department have a dedicated unit or has it designated specific staff members to promote the health and well-being of your employees? If so, indicate the number of employees who are involved in this task and the annual budget that is available for this purpose.	Y		3 members from SAMRC, in collaboration with the appointed service provider. R500 000 budget
3. Has the department introduced an Employee Assistance or Health Promotion Programme for your employees? If so, indicate the key elements/services of this Programme.	Y		• 24/7/365 Call Centre • Employee assistance programme • Trauma debriefing • HIV and Chronic disease management • Life management and work-related issues • Wellness days • Staff orientation and awareness programmes • Management assistance and orientation • Ill health, incapacity and absenteeism management
4. Has the department established (a) committee(s) as contemplated in Part VI E.5 (e) of Chapter 1 of the Public Service Regulations, 2001? If so, please provide the names of the members of the committee and the stakeholder(s) that they represent.	Y		There is a Committee consisting of members of the SAMRC, the appointed service provider, the corporate supported medical scheme and the Safety Manager.
5. Has the department reviewed its employment policies and practices to ensure that these do not unfairly discriminate against employees on the basis of their HIV status? If so, list the employment policies/practices so reviewed.	Y		Performance Management Policy Recruitment Policy Transformation Strategy Remuneration Policy
6. Has the department introduced measures to protect HIV-positive employees or those perceived to be HIV-positive from discrimination? If so, list the key elements of these measures.	Y		No special references are formally made. It is part of the SAMRC general code of conduct to honour the Constitution, EE and LRA Acts and other legislation. The SAMRC subscribes to the principles of no unfair discrimination.
7. Does the department encourage its employees to undergo Voluntary Counselling and Testing? If so, list the results that you have you achieved.	Y		Yes, as part of our Wellness day initiatives. The individual information remains confidential, but feedback is that more than 60% of staff know their status. There are also employees formally registered on the HIV programme under the umbrella of the wellness program.
8. Has the department developed measures/indicators to monitor & evaluate the impact of its health promotion programme? If so, list these measures/indicators.	Y		One of the SLAs are to measure and monitor the impact of the wellness programme via regular statistics, as well to promote the programme through information sessions and training.

LABOUR RELATIONS

The following collective agreements were entered into with trade unions within the organisation.

Table 29: Collective agreements, 1 April 2018 to 31 March 2019

SUBJECT MATTER	DATE
Salary adjustments	March 2018-Effective 1 April 2018

The following table summarises the outcome of both formal and informal disciplinary processes conducted within the organisation for the year under review.

Table 30: Misconduct and disciplinary hearings finalised, 1 April 2018 to 31 March 2019

OUTCOME OF DISCIPLINARY HEARINGS	NUMBER	% OF TOTAL
Correctional counselling	0	0%
Verbal warning	0	0%
Written warning	0	0%
Final written warning	4	57.1%
Suspended without pay	0	0%
Fine	0	0%
Demotion	0	0%
Dismissal	3	42.9%
Not guilty	0	0%
Case withdrawn	0	0%
Total	7	100%

Table 31: Types of misconduct addressed at disciplinary hearings

TYPE OF MISCONDUCT	NUMBER OF STAFF	% OF TOTAL
Improper conduct	2	28.5
Theft	1	14.3
Improper use of company vehicle	1	14.3
Insubordination	1	14.3
Breach of research protocol	1	14.3
Incapacity - poor performance	1	14.3
Total	7	100

Table 32: Grievances lodged, 1 April 2018 to 31 March 2019

	NUMBER	% OF TOTAL
Number of grievances resolved	1	100%
Number of grievances not resolved	0	0
Total number of grievances lodged	1	100%

Table 33: Disputes lodged with Councils, 1 April 2018 to 31 March 2019

	NUMBER	% OF TOTAL
Number of disputes upheld	3	100%
Number of disputes dismissed	0	0
Total number of disputes lodged	3	100%

Note: Councils defined as CCMA

Table 34: Strike actions, 1 April 2018 to 31 March 2019

Total number of person working days lost	None
Total cost (R) of working days lost	None
Amount (R) recovered as a result of no work no pay	None

Table 35: Precautionary suspensions, 1 April 2018 to 31 March 2019

Number of people suspended	3
Number of people whose suspension exceeded 30 days	1
Average number of days suspended	38.3
Cost (R) of suspensions	R401 486

SKILLS DEVELOPMENT

This section highlights the efforts of the organisation with regard to skills development.

Table 36: Training needs identified, 1 April 2018 to 31 March 2019

			TRAINING NEEDS IDENTIFIED AT START OF REPORTING PERIOD			
OCCUPATIONAL CATEGORY	GENDER	NUMBER OF EMPLOYEES AS AT 1 APRIL 2018	Learnerships	Skills programmes & other short courses	Other forms of training	Total
Legislators, senior officials and managers	Female	25	0	2	11	13
	Male	29	0	1	4	5
Professionals	Female	130	0	7	219	226
	Male	33	0	1	57	58
Technicians and associate professionals	Female	194	0	3	561	564
	Male	76	0	20	82	102
Clerks	Female	85	0	1	32	33
	Male	46	0	1	182	183
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	9	0	0	0	0
	Male	13	0	0	0	0
Total		640	0	36	1148	1184

Table 37: Training provided, 1 April 2018 to 31 March 2019

OCCUPATIONAL CATEGORY	GENDER	NUMBER OF EMPLOYEES AS AT 1 APRIL 2018	TRAINING PROVIDED WITHIN THE REPORTING PERIOD			
			Learnerships	Skills programmes & other short courses	Other forms of training	Total
Legislators, senior officials and managers	Female	25	0	10	11	21
	Male	29	0	5	23	28
Professionals	Female	130	0	40	97	137
	Male	33	0	7	13	20
Technicians and associate professionals	Female	194	0	151	233	384
	Male	76	0	49	89	138
Clerks	Female	85	0	15	97	112
	Male	46	0	8	59	67
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	9	0	3	4	7
	Male	13	0	0	0	0
Total		639	0	288	626	914

INJURY ON DUTY

The following tables provide basic information on injury on duty

Table 38: Injury on duty, 1 April 2018 to 31 March 2019

NATURE OF INJURY ON DUTY	NUMBER	% OF TOTAL
Required basic medical attention only	4	44
Temporary total disablement	5	56
Permanent disablement	0	0
Fatal	0	0
Total	9	100

FINANCIAL INFORMATION

INDEX

REPORT OF THE CHIEF EXECUTIVE OFFICER & PRESIDENT

(All figures R'000, prior year in parenthesis)

STATEMENT OF FINANCIAL PERFORMANCE

Revenue for the year showed an increase of 5.2% to R1 053 401 (R1 000 857). This consists of an increase in government grants of 0.7% to R543 330 (R539 439) as well as a substantial increase in contract income of 10.5% to R510 071 (R461 418).

This has resulted in an operating deficit of R37 565 for the year compared to an operating deficit of R88 247 in 2017/18. A decrease in investment income of 18.2% to R34 547 (R42 270) due to a decrease in the average balance of investments during the year under review resulted in a net deficit for the year of R3 186 compared to a net deficit of R46 480 in 2017/18.

The final deficit for the year of R3 186 was under the budgeted deficit of R81 425. Collaborative research costs were R17 707 under budget due to delays in the finalisation of research outputs. Personnel costs were R31 973 under budget due to a reduction in the liability for the pension fund and medical aid as well as budgeted vacant positions not filled. Depreciation was R7 409 under budget due to an increase in the estimated useful lives of certain categories of IT and laboratory equipment. Tight control of costs resulted in repairs and maintenance and consulting fees of R6 308 and R3 393 under budget respectively. Interest income was R2 882 under budget due to a decrease in the average balance of investments.

STATEMENT OF FINANCIAL POSITION

The organisation remains financially strong with accumulated reserves of R286 569 (R289 755).

Total assets have increased by 5.6% to R770 853 (R730 297) due mainly to an increase in receivables of R46 182 and property plant and equipment of R24 886 resulting mainly from capital expenditure.

Deferred income has increased by R31 329 to R310 682 due to an increase in grants income received not yet recognised. Current liabilities have increased by R23 396 to R141 671 due to an increase in accruals and trade payables raised for collaborative research costs.

CASH FLOW

The organisation generated a positive operating cashflow of R17 607 compared to a negative operating cash flow of R11 894 in the prior period.

Net cash flows from investing activities were negative due mainly to capital expenditure of R38 503 (R38 885).

The net impact of the above is a decrease of R27 844 in cash and cash equivalents compared to a decrease of R52 789 in cash and cash equivalents in the prior year.

SPENDING TRENDS

Operating expenses reflected a small increase of 1.2% to R1 110 909 (R1 097 373) lower than the increase in income mainly driven by a similar growth of 0.5% in collaborative research costs to R 515 618 (R513 099) maintaining the current levels of high impact grant awards.

Laboratory costs, computer expenses as well as travel, subsistence and conference attendance costs have shown increases in excess of inflation. This is mainly due to the costs recognized on additional contract income for the year.

Employee related costs have increased by 3.8% to R370 045 (R356 570). Basic salary costs have increased by 9.9% to R214 054 (R194 736) due to annual increases and the recruitment of additional staff. Temporary staff costs have increased by 37.2% to R23 085 (R16 825) due to the increase in temporary staff employed on contracts. Employee related costs include a bonus provision of R4 919. Initiatives to manage the employer liability with regard to the Defined Benefit Pension fund and Post-Retirement Medical Aid have yielded results with a reduction in these liabilities of R13 389 for the year.

REQUESTS FOR ROLL OVER OF FUNDS

Accumulated reserves at 31 March 2019 amount to R286 569 (R289 755). The necessary approvals have been requested for the rollover of funds received from Government but not yet spent.

SUPPLY CHAIN MANAGEMENT

There were no unsolicited bid proposals received during the year. The existing Materiality Framework was approved by the Minister.

AUDIT REPORT MATTERS

There were no matters to report.

EVENTS AFTER THE REPORTING DATE

There were no significant events occurring after balance sheet date

ECONOMIC VIABILITY

Funding allocations of R659 819 for 2019/20 have been approved by government through the MTEF process. This together with accumulated reserves of R286 569 and the increases anticipated in grant income 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 175 to 233, which comprise the statement of financial position as at 31 March 2019, 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 the 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 2019, and its financial performance and cash flows for the year then ended in accordance with the South African Standards of Generally Recognised Accounting Practice (SA Standards of GRAP) and the requirements of the Public Finance Management Act of South Africa, 1999 (Act No. 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 this auditor's report.

4. I am independent of the public entity in accordance with sections 290 and 291 of the International Ethics Standards Board for Accountants' Code of ethics for professional accountants and parts 1 and 3 of the International Ethics Standards Board for Accountants' International code of ethics for professional accountants (including International Independence Standards) (IESBA codes) as well as the 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 codes.

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.

RESTATEMENT OF CORRESPONDING FIGURES

7. As disclosed in note 41 to the financial statements, the corresponding figures for 31 March 2018 have been restated as a result of errors discovered during the 2018-19 financial year in the financial statements of the public entity at, and for the year ended, 31 March 2018.

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 234 does not form part of the financial statements and is presented as additional information. I have not audited this schedule and, accordingly, I do not express an opinion thereon.

RESPONSIBILITIES OF THE ACCOUNTING AUTHORITY FOR THE FINANCIAL STATEMENTS

10. The board of directors, which constitutes the accounting authority, is responsible for the preparation and fair presentation of the financial statements in accordance with the SA 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 South African Medical Research Council's ability to continue as a going concern, disclosing, as applicable, matters relating to going concern and using the going concern basis of accounting unless the appropriate governance structure either intends to liquidate the public entity or to cease operations, or has no realistic alternative but to do so.

AUDITOR-GENERAL'S RESPONSIBILITIES FOR THE AUDIT OF THE FINANCIAL STATEMENTS

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.

REPORT OF THE AUDITOR-GENERAL TO PARLIAMENT ON THE SOUTH AFRICAN MEDICAL RESEARCH COUNCIL CONTINUED

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 of South Africa, 2004 (Act No. 25 of 2004) (PAA) and the general notice issued in terms thereof, I have a responsibility to report material findings on the reported performance information against predetermined objectives for selected strategic goals presented in the annual performance report. I performed procedures to identify findings but not to gather evidence to express assurance.

15. My procedures address the reported performance information, which must be based on the approved performance planning documents of the public entity. I have not evaluated the completeness and appropriateness of the performance indicators included in the planning documents. My procedures also did not extend to any disclosures or assertions relating to 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 strategic goals presented in the annual performance report of the public entity for the year ended 31 March 2019:

STRATEGIC GOAL	PAGES IN THE ANNUAL PERFORMANCE REPORT
Strategic goal 2: lead the generation of new knowledge and facilitate its translation into policies and practices to improve health	24 to 25
Strategic goal 3: support innovation and technology development to improve health	26 to 27
Strategic goal 4: build capacity for the long-term sustainability of the country's health research	26 to 27

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 raise any material findings on the usefulness and reliability of the reported performance information for these strategic goals:
    - Strategic goal 2 :lead the generation of new knowledge and facilitate its translation into policies and practices to improve health
    - Strategic goal 3: support innovation and technology development to improve health
    - Strategic goal 4: build capacity for the long-term sustainability of the country's health research

OTHER MATTERS

19. I draw attention to the matters below.

REPORT OF THE AUDITOR-GENERAL TO PARLIAMENT ON THE SOUTH AFRICAN MEDICAL RESEARCH COUNCIL CONTINUED

ACHIEVEMENT OF PLANNED TARGETS

20. Refer to the annual performance report on pages 24 to 27 for information on the achievement of planned targets for the year and explanations provided for the under- or overachievement of a significant number of targets.

ADJUSTMENT OF MATERIAL MISSTATEMENTS

21. I identified material misstatements in the annual performance report submitted for auditing. These material misstatements were on the reported performance information of strategic goals 3 and 4. As management subsequently corrected the misstatements, I did not raise any material findings on the usefulness and reliability of the reported performance information.

REPORT ON THE AUDIT OF COMPLIANCE WITH LEGISLATION

INTRODUCTION AND SCOPE

22. In accordance with the PAA and the general notice issued in terms thereof, I have a responsibility to report material findings on the compliance of the public entity with specific matters in key legislation. I performed procedures to identify findings but not to gather evidence to express assurance.

23. I did not raise material findings on compliance with the specific matters in key legislation set out in the general notice issued in terms of the PAA.

OTHER INFORMATION

24. The accounting authority is responsible for the other information. The other information comprises the information included in the annual report. The other information does not include the financial statements, the auditor's report and those selected strategic goals presented in the annual performance report that have been specifically reported in this auditor's report.

25. 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 thereon.

26. 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 strategic goals presented in the annual performance report, or my knowledge obtained in the audit, or otherwise appears to be materially misstated.

27. If, based on the work I have performed, I conclude that there is a material misstatement in this other information, I am required to report that fact.

28. I have nothing to report in this regard.

INTERNAL CONTROL DEFICIENCIES

29. 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. I did not identify any significant deficiencies in internal control.

Auditor-General

Cape Town
31 July 2019

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 selected strategic goals and on the public entity's compliance with respect to the selected subject matters.

FINANCIAL STATEMENTS

2. In addition to my responsibility for the audit of the financial statements as described in this auditor's report, I also:
    - identify and assess the risks of material misstatement of the financial statements whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for my opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control
    - obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the public entity's internal control
    - evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the board of directors, which constitutes the accounting authority
    - conclude on the appropriateness of the use of the going concern basis of accounting by the board of directors, which constitutes the accounting authority, in the preparation of the financial statements. I also conclude, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the South African Medical Research Council's ability 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 the opinion on the financial statements. My conclusions are based on the information available to me at the date of this auditor's report. However, future events or conditions may cause a public entity to cease continuing as a going concern
    - evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation

COMMUNICATION WITH THOSE CHARGED WITH GOVERNANCE

3. I communicate with the accounting authority regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that I identify during my audit.

4. I also confirm to the accounting authority that I have complied with relevant ethical requirements regarding independence, and communicate all relationships and other matters that may reasonably be thought to have a bearing on my independence and, where applicable, related safeguards.

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 relateddata.

The annual financial statements have been prepared in accordance with Standards of Generally Recognised Accounting Practice (GRAP) including any interpretations, guidelines and directives issued by the Accounting Standards Board.

The annual financial statements are based upon appropriate accounting policies consistently applied and supported by reasonable and prudent judgements and estimates. On a quarterly basis the Board approved revised estimates in response to additional income received and progress with research projects.

The Accounting Authority acknowledges that it is ultimately responsible for the system of internal financial control established by the entity and places considerable importance on maintaining a strong control environment. To enable the Accounting Authority to meet these responsibilities, the Accounting Authority sets standards for internal control aimed at reducing the risk of error or deficit 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 or deficit.

The Accounting Authority has reviewed the entity's cash flow forecast for the year to 31 March 2020 and, in the light of this review and the current financial position, is satisfied that the entity has or has access to adequate resources to continue in operational existence for the foreseeable future.

Although the Accounting Authority is primarily responsible for the financial affairs of the entity, it is supported by the entity's external auditors.

The external auditors are responsible for independently auditing and expressing an opinion on the entity's annual financial statements. The annual financial statements have been examined by the entity's external auditors and their report is presented on page 169.

The annual financial statements set out on pages 175 to 233, which have been prepared on the going concern basis, were approved by the Accounting Authority on 30 July 2019 and were signed on its behalf by:

Professor M Sathekge
Chairperson of the Board

AUDIT COMMITTEE MEMBERS AND ATTENDANCE

We are pleased to present our report for the financial year ended March 31, 2019.

The audit committee consists of the members listed hereunder and should meet 4 times per annum as per its approved terms of reference. During the current year 7 meetings were held. The unaudited annual financial statements were reviewed and discussed at a meeting held on 27 May 2019.

NAME OF MEMBER	NUMBER OF MEETINGS ATTENDED
Doctor P Hanekom (Chairperson)	6
Advocate N Kadwa	6
Professor J Mahlangu	4
Professor W Rae	4
Professor B Shaw	6

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 SAMRC 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 the entity's compliance with legal and regulatory provisions.

The audit committee concurs with and accept the Auditor-General of South Africa's report on the annual financial statements, and are 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

The IT infrastructure; The Supply Chain Management System Escape and the JD Edwards financial system was upgraded during the year under review.

Chairperson of the Audit Committee
Date: 30 July 2019

STATEMENT OF FINANCIAL POSITION AS AT MARCH 31, 2019

	NOTE(S)	2019 R	2018 R
Assets			
Current Assets			
Financial assets at fair value	3	6,968,351	6,789,704
Receivables from exchange transactions	4	89,082,829	42,900,802
VAT receivable	5	5,610,834	15,094,330
Prepayments	6	8,125,353	7,114,586
Cash and cash equivalents	7	463,366,711	491,211,168
		573,154,078	**563,110,590**
Non-Current Assets			
Biological assets that form part of an agricultural activity	8	1,307,270	1,285,103
Property, plant and equipment	9	183,717,574	158,831,606
Intangible assets	10	12,674,035	7,069,970
Investments in controlled entities	11	2	2
		197,698,881	**167,186,681**
Total Assets		**770,852,959**	**730,297,271**
Liabilities			
Current Liabilities			
Payables from exchange transactions	12	141,671,156	118,275,377
Provisions	13	19,042,314	16,783,576
Deferred income	14	310,682,402	279,352,698
		471,395,872	**414,411,651**
Non-Current Liabilities			
Employee benefit obligation	15	8,795,000	22,184,000
Earmarked funds	16	4,093,058	3,946,152
		12,888,058	**26,130,152**
Total Liabilities		**484,283,930**	**440,541,803**
Net Assets		**286,569,029**	**289,755,468**
Accumulated surplus	17	286,569,029	289,755,468

STATEMENT OF FINANCIAL PERFORMANCE

	NOTE(S)	2019 R	2018 R
Revenue	18	1,053,401,277	1,000,857,070
Other income	19	19,942,395	8,269,185
Operating expenses		(1,110,908,565)	(1,097,373,155)
Operating (deficit)	**27**	**(37,564,893)**	**(88,246,900)**
Investment income	20	34,547,490	42,270,230
Fair value adjustments	25	143,986	246,091
Finance costs	22	(313,018)	(749,868)
(Deficit) for the period		**(3,186,435)**	**(46,480,447)**

STATEMENT OF CHANGES IN NET ASSETS

	ACCUMULATED SURPLUS AND TOTAL NET ASSETS R
Balance at April 1, 2017	**336,235,915**
Changes in net assets	
Deficit for the year	(46,480,447)
Total changes	(46,480,447)
Balance at April 1, 2018	**289,755,468**
Changes in net assets	
Deficit for the year	(3,186,435)
Total changes	(3,186,435)
Balance at March 31, 2019	**286,569,029**

CASH FLOW STATEMENT

	NOTE(S)	2019 R	2018 R
Cash flows from operating activities			
Receipts			
Interest income	20	34,417,767	42,152,540
Dividends received	20	129,723	117,690
Cash receipts from grants and other income		1,066,964,077	988,175,138
		1,101,511,567	1,030,445,368
Payments			
Suppliers		(1,083,591,650)	(1,041,589,345)
Finance costs		(313,018)	(749,868)
		(1,083,904,668)	(1,042,339,213)
Net cash flows from operating activities	28	**17,606,899**	**(11,893,845)**
Cash flows from investing activities			
Purchase of property, plant and equipment	9	(38,503,465)	(38,884,675)
Proceeds from sale of property, plant and equipment		18,932	80,383
Purchase of other intangible assets	10	(7,242,762)	(2,229,400)
Purchase of biological assets that form part of an agricultural activity	8	(85,801)	(162,069)
Proceeds from sale of biological assets that form part of an agricultural activity	8	214,834	24,067
Net cash flows from investing activities		**(45,598,262)**	**(41,171,694)**
Cash flows from financing activities			
Movement in earmarked funds	16	146,906	337,024
Net (decrease) increase in cash and cash equivalents		**(27,844,457)**	**(52,728,515)**
Cash and cash equivalents at the beginning of the year		491,211,168	543,939,683
Cash and cash equivalents at the end of the period	**7**	**463,366,711**	**491,211,168**

An amount of R310,682,402 (March 2018: R279,352,698) 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

	APPROVED BUDGET	ADJUSTMENTS	FINAL BUDGET	ACTUAL AMOUNTS ON COMPARABLE BASIS	DIFFERENCE BETWEEN FINAL BUDGET AND ACTUAL	REFERENCE
	R	R	R	R	R	R
Statement of Financial Performance						
Revenue						
Revenue from exchange transactions						
Income from contracts, grants and services rendered	341,285,967	146,906,309	**488,192,276**	437,493,176	**(50,699,100)**	40
Rental income	6,260,000	1,240,000	**7,500,000**	7,185,956	**(314,044)**	
Bad debts recovered	-	-	**-**	1,457	**1,457**	
Other income	6,340,000	(2,740,000)	**3,600,000**	3,756,009	**156,009**	
Interest received-investment	39,500,000	(2,200,000)	**37,300,000**	34,417,767	**(2,882,233)**	40
Dividends received	-	-	**-**	129,723	**129,723**	
Total revenue from exchange transactions	**393,385,967**	**143,206,309**	**536,592,276**	**482,984,088**	**(53,608,188)**	
Revenue from non-exchange transactions						
Government grants & subsidies	543,329,564	-	**543,329,564**	543,329,565	**1**	
Income from contractsand grants (non-exchange)	-	-	**-**	72,578,536	**72,578,536**	40
Total revenue from non-exchange transactions	**543,329,564**	**-**	**543,329,564**	**615,908,101**	**72,578,537**	
Total revenue	**936,715,531**	**143,206,309**	**1,079,921,840**	**1,098,892,189**	**18,970,349**	

	APPROVED BUDGET	ADJUSTMENTS	FINAL BUDGET	ACTUAL AMOUNTS ON COMPARABLE BASIS	DIFFERENCE BETWEEN FINAL BUDGET AND ACTUAL	REFERENCE
	R	R	R	R	R	R
Expenditure						
Personnel	(362,861,647)	(39,155,549)	**(402,017,196)**	(370,044,580)	**31,972,616**	40
Infra-structural, communication & statutory costs	(29,002,056)	2,056	**(29,000,000)**	(34,818,650)	**(5,818,650)**	40
Depreciation and amortisation	(20,000,000)	(2,000,000)	**(22,000,000)**	(14,591,495)	**7,408,505**	40
Finance costs	-	-	**-**	(313,018)	**(313,018)**	
Lease rentals	(8,196,000)	1,570,000	**(6,626,000)**	(5,902,210)	**723,790**	
Debt Impairment/(reversal)	(1,000,000)	1,000,000	**-**	3,769	**3,769**	
Repairs and maintenance	(19,974,100)	1,500,000	**(18,474,100)**	(12,166,586)	**6,307,514**	40
Travel, subsistence and vehicle fleet costs	(40,474,834)	(5,525,166)	**(46,000,000)**	(46,922,623)	**(922,623)**	
Collaborative research	(414,063,359)	(119,262,066)	**(533,325,425)**	(515,617,938)	**17,707,487**	40
External research support, consulting and internal audit	(20,293,365)	9,239,650	**(11,053,715)**	(7,660,711)	**3,393,004**	40
Printing, stationery and publication costs	(10,134,256)	1,566,616	**(8,567,640)**	(7,964,007)	**603,633**	
Information technology	(21,504,159)	-	**(21,504,159)**	(22,369,499)	**(865,340)**	
Laboratory operating expenses	(56,218,957)	7,718,957	**(48,500,000)**	(52,192,071)	**(3,692,071)**	40
Audit fees	(2,430,000)	-	**(2,430,000)**	(2,296,300)	**133,700**	
Other expenses	(18,919,436)	(329,599)	**(19,249,035)**	(17,719,897)	**1,529,138**	40
Total expenditure	**(1,025,072,169)**	**(143,675,101)**	**(1,168,747,270)**	**(1,110,575,816)**	**58,171,454**	
Operating deficit	**(88,356,638)**	**(468,792)**	**(88,825,430)**	**(11,683,627)**	**77,141,803**	
Loss on disposal of assets	-	-	**-**	(645,767)	**(645,767)**	
Gain on foreign exchange	-	7,400,000	**7,400,000**	8,998,973	**1,598,973**	40
Fair value adjustments	-	-	**-**	143,986	**143,986**	
	-	**7,400,000**	**7,400,000**	**8,497,192**	**1,097,192**	
Deficit for the year	**(88,356,638)**	**6,931,208**	**(81,425,430)**	**(3,186,435)**	**78,238,995**	
Actual Amount on Comparable Basis as Presented in the Budget and Actual Comparative Statement	**(88,356,638)**	**6,931,208**	**(81,425,430)**	**(3,186,435)**	**78,238,995**	

The accounting policies on pages 180 to 200 and the notes on pages 201 to 233 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 isalso the functional currency. The amounts presented in the annual financial statements are rounded to the nearest Rand.

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 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 theportfolio.

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 long-term debt. Other techniques, such as estimated discounted cash flows, are used to determine fair value for the remaining financial instruments. The fair value of interest rate swaps is calculated as the present value of the estimated future cash flows. The fair value of forward foreign exchange contracts is determined using quoted forward exchange rates at the end of the reporting period.

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 13 - 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 aredenominated 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 15.

1.3 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.

ACCOUNTING POLICIES CONTINUED

1.4 Property, plant and equipment

Property, plant and equipment are tangible non-current assets (including infrastructure assets and biological assets used for research) 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.

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 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.

Property, plant and equipment is carried at cost less accumulated depreciation and any impairment losses.

Property, plant and equipment are depreciated on the straight line basis over their expected useful lives to their estimated residual value.

The useful lives of items of property, plant and equipment have been assessed as follows:

ITEM	DEPRECIATION METHOD	AVERAGE USEFUL LIFE
Land (including boreholes)	Not depreciated	Indefinite
Buildings	Straight line	40 - 50 years
Vehicles and containers	Straight line	5 - 10 years
Furniture and office equipment	Straight line	3 - 15 years
Computer equipment	Straight line	5 - 10 years
Borehole tanks and pumps	Straight line	10 - 15 years
Air conditioners	Straight line	10 - 15 years
Irrigation equipment	Straight line	10 - 15 years
Signage	Straight line	10 - 15 years
Usufruct buildings	Straight line	over life of asset
Prefabricated buildings	Straight line	20 - 30 years
Water pipes	Straight line	20 - 30 years
Water meters	Straight line	10 - 15 years
Other property, plant and equipment -Biological assets - Vervet monkeys	Straight line	30 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; laboratory equipment and other property, plant and equipment - vervet monkeys classes.

The residual value, the useful life and depreciation method of each asset is reviewed at the end of each reporting date. If the expectations differ from previous estimates, the change is accounted for as a change in accounting estimate. The useful lives of assets are based on management's estimation. The actual useful lives of assets and residual values are assessed annually, and may vary depending on a number of factors. In re-assessing asset useful lives, factors such as technology, innovation, product life cycles and maintenance programmes are taken into account. The estimation of residual values of assets determine whether they will be sold or used to the end of their useful lives and what their condition would be like at that time. Residual value assessments consider issues such as, the remaining life of the asset and the estimated amount which the entity would currently obtain.

Each part of an item of property, plant and equipment with a cost that is significant in relation to the total cost of the item is depreciated separately.

The depreciation charge for each period is recognised in surplus or deficit unless it is included in the carrying amount of another asset.

Items of property, plant and equipment are derecognised when the asset is disposed of or when there are no further economic benefits or service potential expected from the use of the asset.

The gain or loss arising from the derecognition of an item of property, plant and equipment is included in surplus or deficit when the item is derecognised. The gain or loss arising from the derecognition of an item of property, plant and equipment is determined as the difference between the net disposal proceeds, if any, and the carrying amount of the item.

Assets which the entity sells via auction when it is obsolete or can no longer be used by the entity, are not accounted for as current assets held for sale. Proceeds from sales of these assets are recognised as profit or loss on disposal of assets. All cash flows on these assets are included in cash flows from investing activities in the cash flow statement.

Reviewing the impairment of assets is performed on an annual basis. Assets impaired as a result of restructuring are not accounted for as non-current assets held for sale as these assets will be transferred to institutions of higher learning.

The entity separately discloses expenditure to repair and maintain property, plant and equipment in the notes to the financial statements (see note 9).

1.5 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.

ACCOUNTING POLICIES CONTINUED

1.5 Intangible assets (continued)

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).

1.6 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.

1.7 Financial instruments

A financial instrument is any contract that gives rise to a financial asset of one entity and a financial liability or a residual interest of another entity.

A concessionary loan is a loan granted to or received by an entity on terms that are not market related.

Credit risk is the risk that one party to a financial instrument will cause a financial loss for the other party by failing to discharge an obligation.

Currency risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in foreign exchange rates.

Derecognition is the removal of a previously recognised financial asset or financial liability from an entity's statement of financial position.

The effective interest method is a method of calculating the amortised cost of a financial asset or a financial liability (or group of financial assets or financial liabilities) and of allocating the interest income or interest expense over the relevant period. The effective interest rate is the rate that exactly discounts estimated future cash payments or receipts through the expected life of the financial instrument or, when appropriate, a shorter period to the net carrying amount of the financial asset or financial liability. When calculating the effective interest rate, an entity shall estimate cash flows considering all contractual terms of the financial instrument (for example, prepayment, call and similar options) but shall not consider future credit losses. The calculation includes all fees and amounts paid or received between parties to the contract that are an integral part of the effective interest rate, transaction costs, and all other premiums or discounts. There is a presumption that the cash flows and the expected life of a group of similar financial instruments can be estimated reliably. However, in those rare cases when it is not possible to reliably estimate the cash flows or the expected life of a financial instrument (or group of financial instruments), the entity shall use the contractual cash flows over the full contractual term of the financial instrument (or group of financial instruments).

Fair value is the amount for which an asset could be exchanged, or a liability settled, between knowledgeable willing parties in an arm's length transaction.

A financial asset is:
- cash;
- a contractual right to:
  - receive cash or another financial asset from another entity;or
  - exchange financial assets or financial liabilities with another entity under conditions that are potentially favourable to the entity.

A financial liability is any liability that is a contractual obligation to:
- deliver cash or another financial asset to another entity; or
- exchange financial assets or financial liabilities under conditions that are potentially unfavourable to the entity.

Interest rate risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market interest rates.

Liquidity risk is the risk encountered by an entity in the event of difficulty in meeting obligations associated with financial liabilities that are settled by delivering cash or another financial asset.

Loan commitment is a firm commitment to provide credit under pre-specified terms and conditions.

Market risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market prices. Market risk comprises three types of risk: currency risk, interest rate risk and other price risk.

Other price risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market prices (other than those arising from interest rate risk or currency risk), whether those changes are caused by factors specific to the individual financial instrument or its issuer, or factors affecting all similar financial instruments traded in the market.

A financial asset is past due when a counterparty has failed to make a payment when contractually due.

Transaction costs are incremental costs that are directly attributable to the acquisition, issue or disposal of a financial asset or financial liability. An incremental cost is one that would not have been incurred if the entity had not acquired, issued or disposed of the financial instrument.

Financial instruments at amortised cost are non-derivative financial assets or non-derivative financial liabilities that have fixed or determinable payments, excluding those instruments that:
- the entity designates at fair value at initial recognition; or
- are held for trading.

Financial instruments at cost are investments in residual interests that do not have a quoted market price in an active market, and whose fair value cannot be reliably measured.

Financial instruments at fair value comprise financial assets or financial liabilities that are:
- derivatives;
- combined instruments that are designated at fair value;
- instruments held for trading. A financial instrument is held for trading if:

ACCOUNTING POLICIES CONTINUED

1.7 Financial instruments (continued)

- 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 termprofit-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 measured at fair value
Unit trusts	Held for trading measured at fair value
Cash and cash equivalents	Financial asset measured at amortised cost
Loans and receivables	Financial asset measured at amortised cost
Employee costs in advance	Financial asset measured at amortised cost
Deposits	Financial asset measured at amortised cost

The entity has the following types of financial liabilities (classes and category) as reflected on the face of the statement of financial position or in the notes thereto:

CLASS	CATEGORY
Trade payables	Financial liabilities measured at amortised cost

Initial recognition

The entity recognises a financial asset or a financial liability in its statement of financial position when the entity becomes a party to the contractual provisions of the instrument.

The entity recognises financial assets using trade date accounting.

Initial measurement of financial assets and financial liabilities

The entity measures a financial asset and financial liability initially at its fair value plus, in the case of a financial asset or a financial liability not subsequently measured at fair value, transaction costs that are directly attributable to the acquisition or issue of the financial asset or financial liability.

Subsequent measurement of financial assets and financial liabilities

The entity measures all financial assets and financial liabilities after initial recognition using the following categories:

- Financial instruments at fair value.
- Financial instruments at amortised cost.

All financial assets measured at amortised cost, or cost, are subject to an impairment review. The factors taken into account when considering impairment are solvency and whether the account holder is a slow payer.

Impairment and uncollectibility of financial assets
The entity assesses at the end of each reporting period whether there is any objective evidence that a financial asset or group of financial assets is impaired.

Financial assets are measured at amortised cost:

If there is objective evidence that an impairment loss on financial assets measured at amortised cost has been incurred, the amount of the loss is measured as the difference between the asset's carrying amount and the present value of estimated future cash flows (excluding future credit losses that have not been incurred) discounted at the financial asset's original effective interest rate. The carrying amount of the asset is reduced through the use of an allowance account. The amount of the loss is recognised in surplus ordeficit.

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.

Losses and gains relating to a financial instrument or a component that is a financial liability is recognised as revenue or expense in surplus or deficit.

1.8 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.

1.9 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.

ACCOUNTING POLICIES CONTINUED

1.9 Impairment of cash-generating assets (continued)

Impairment of 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.

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.

1.10 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.

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 entity 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.

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 priorperiods.

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 usefullife.

ACCOUNTING POLICIES CONTINUED

1.11 Employee benefits

Employee benefits are all forms of consideration given by SAMRC in exchange for service rendered by employees. An annual valuation of the MRC Pension Fund and Post Retirement Medical Aid is performed.

A qualifying insurance policy is an insurance policy issued by an insurer that is not a related party (as defined in the Standard of GRAP on Related Party Disclosures) of the reporting entity, if the proceeds of the policy can be used only to pay or fund employee benefits under a defined benefit plan and are not available to the reporting entity's own creditors (even in liquidation) and cannot be paid to the reporting entity, unless either:

- the proceeds represent surplus assets that are not needed for the policy to meet all the related employee benefit obligations; or
- the proceeds are returned to the reporting entity to reimburse it for employee benefits already paid.

Termination benefits are employee benefits payable as a result of either:

- an entity's decision to terminate an employee's employment before the normal retirement date; or
- an employee's decision to accept voluntary redundancy in exchange for those benefits.

Short-term employee benefits

Short-term employee benefits are employee benefits (other than termination benefits) that are due to be settled within twelve months after the end of the period in which the employees render the related service.

When an employee has rendered service to the entity during a reporting period, the entity recognises the undiscounted amount of short-term employee benefits expected to be paid in exchange for that service:

- as a liability (accrued expense), after deducting any amount already paid. If the amount already paid exceeds the undiscounted amount of the benefits, the entity recognises that excess as an asset (prepaid expense) to the extent that the prepayment will lead to, for example, a reduction in future payments or a cash refund.

The expected cost of compensated absences is recognised as an expense as the employees render services that increase their entitlement or, in the case of non-accumulating absences, when the absence occurs. The entity measures the expected cost of accumulating compensated absences as the additional amount that the entity expects to pay as a result of the unused entitlement that has accumulated at the reporting date.

The entity recognises the expected cost of bonus, incentive and performance related payments when the entity has a present legal or constructive obligation to make such payments as a result of past events and a reliable estimate of the obligation can be made. A present obligation exists when the entity has no realistic alternative but to make the payments.

Post-employment benefits

Post-employment benefits are employee benefits (other than termination benefits) which are payable after the completion of employment.

SAMRC offers its employees post-employee benefits to the SAMRC Pension Fund.

Post-employment benefits: Defined contribution plans

Defined contribution plans are post-employment benefit plans under which an entity pays fixed contributions into a separate entity (a fund) and will have no legal or constructive obligation to pay further contributions if the fund does not hold sufficient assets to pay all employee benefits relating to employee service in the current and prior periods.

When an employee has rendered service to the entity during a reporting period, the entity recognises the contribution payable to a defined contribution plan in exchange for that service:

- as a liability (accrued expense), after deducting any contribution already paid. If the contribution already paid exceeds the contribution due for service before the reporting date, an entity recognise that excess as an asset (prepaid expense) to the extent that the prepayment will lead to, for example, a reduction in future payments or a cash refund; and

- as an expense, unless another Standard requires or permits the inclusion of the contribution in the cost of an asset.

Where contributions to a defined contribution plan do not fall due wholly within twelve months after the end of the reporting period in which the employees render the related service, they are discounted. The rate used to discount reflects the time value of money. The currency and term of the financial instrument selected to reflect the time value of money is consistent with the currency and estimated term of the obligation.

Post-employment benefits: Defined benefit plans

Defined benefit plans are post-employment benefit plans other than defined contribution plans.

Actuarial gains and losses comprise experience adjustments (the effects of differences between the previous actuarial assumptions and what has actually occurred) and the effects of changes in actuarial assumptions. In measuring its defined benefit liability the entity recognise actuarial gains and losses in surplus or deficit in the reporting period in which they occur.

Assets held by a long-term employee benefit fund are assets (other than non-transferable financial instruments issued by the reporting entity) that are held by an entity (a fund) that is legally separate from the reporting entity and exists solely to pay or fund employee benefits and are available to be used only to pay or fund employee benefits, are not available to the reporting entity's own creditors (even in liquidation), and cannot be returned to the reporting entity, unless either:

- the remaining assets of the fund are sufficient to meet all the related employee benefit obligations of the plan or the reporting entity; or
- the assets are returned to the reporting entity to reimburse it for employee benefits already paid.

Current service cost is the increase in the present value of the defined benefit obligation resulting from employee service in the current period.

Interest cost is the increase during a period in the present value of a defined benefit obligation which arises because the benefits are one period closer to settlement.

Past service cost is the change in the present value of the defined benefit obligation for employee service in prior periods, resulting in the current period from the introduction of, or changes to, post-employment benefits or other long-term employee benefits. Past service cost may be either positive (when benefits are introduced or changed so that the present value of the defined benefit obligation increases) or negative (when existing benefits are changed so that the present value of the defined benefit obligation decreases). In measuring its defined benefit liability the entity recognise past service cost as an expense in the reporting period in which the plan is amended.

Plan assets comprise assets held by a long-term employee benefit fund and qualifying insurance policies.

The present value of a defined benefit obligation is the present value, without deducting any plan assets, of expected future payments required to settle the obligation resulting from employee service in the current and prior periods.

The return on plan assets is interest, dividends or similar distributions and other revenue derived from the plan assets, together with realised and unrealised gains or losses on the plan assets, less any costs of administering the plan (other than those included in the actuarial assumptions used to measure the defined benefit obligation) and less any tax payable by the plan itself.

The entity account not only for its legal obligation under the formal terms of a defined benefit plan, but also for any constructive obligation that arises from the entity's informal practices. Informal practices give rise to a constructive obligation where the entity has no realistic alternative but to pay employee benefits. An example of a constructive obligation is where a change in the entity's informal practices would cause unacceptable damage to its relationship with employees.

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

1.11 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 determine 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.

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.

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.

ACCOUNTING POLICIES CONTINUED

1.11 Employee benefits (continued)

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 arecharged 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.

1.12 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.

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 31.

1.13 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 or social security benefit commitments are excluded.

1.14 Revenue from exchange transactions

Revenue is the gross inflow of economic benefits or service potential during the reporting period when those inflows result in an increase in net assets, other than increases relating to contributions from owners.

An exchange transaction is one in which the entity receives assets or services, or has liabilities extinguished, and directly gives approximately equal value (primarily in the form of goods, services or use of assets) to the other party in exchange.

Fair value is the amount for which an asset could be exchanged, or a liability settled, between knowledgeable, willing parties in an arm's length transaction.

Measurement

Revenue is measured at the fair value of the consideration received or receivable.

Sale of goods

Revenue from the sale of goods is recognised when all the following conditions have been satisfied:

- the entity has transferred to the purchaser the significant risks and rewards of ownership of the goods;
- the entity retains neither continuing managerial involvement to the degree usually associated with ownership nor effective control over the goods sold;
- the amount of revenue can be measured reliably;
- it is probable that the economic benefits or service potential associated with the transaction will flow to the entity; and
- the costs incurred or to be incurred in respect of the transaction can be measured reliably.

Revenue derived from the sale of animal blood; dietary assessment kits and nutritional text books and sale of biological assets are classified as sale of goods.

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:

ACCOUNTING POLICIES CONTINUED

1.14 Revenue from exchange transactions (continued)

- the amount of revenue can be measured reliably;
- it is probable that the economic benefits or service potential associated with the transaction will flow to the entity; the stage of completion of the transaction at the reporting date can be measured reliably; and
- the costs incurred for the transaction and the costs to complete the transaction can be measured reliably.

When services are performed by an indeterminate number of acts over a specified time frame, revenue is recognised on a straight line basis over the specified time frame unless there is evidence that some other method better represents the stage of completion. When a specific act is much more significant than any other acts, the recognition of revenue is postponed until the significant act is executed.

When the outcome of the transaction involving the rendering of services cannot be estimated reliably, revenue is recognised only to the extent of the expenses recognised that are recoverable.

Consulting and research service revenue is recognised by reference to the stage of completion of the transaction at the reporting date. Stage of completion is determined by the proportion that costs incurred to date bear to the total estimated costs of the transaction.

Interest, royalties and dividends

Revenue arising from the use by others of entity assets yielding interest, royalties and dividends or similar distributions is recognised when:

- It is probable that the economic benefits or service potential associated with the transaction will flow to the entity, and
- The amount of the revenue can be measured reliably.

Interest is recognised, in surplus or deficit, using the effective interest rate method.

Royalties are recognised as they are earned in accordance with the substance of the relevant agreements.

Dividends or their equivalent distributions are recognised, in surplus or deficit, when the entity's right to receive payment has been established.

Service fees included in the price of the product are recognised as revenue over the period during which the service is performed.

1.15 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 arise 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.

Services in-kind

The entity recognise services in-kind that are significant to its operations and/or service delivery objectives as assets andrecognise 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.

1.16 Revenue recognition for exchange and non-exchange transactions

Revenue represents the parliamentary grant from government as well as external income.

Parliamentary grant (Revenue from non-exchange transactions)

Government grants are recognised when it is probable that the future economic benefit will flow to the SAMRC and these benefits can be measured reliably. The grant is recognised to the extent that there are no further obligations arising from the receipt of the grant. Government grants are assistance by government in the form of transfer of resources in return for compliance with conditions related to operating activities. Grants that compensate the SAMRC for expenses incurred are recognised in surplus or deficit in the same periods in which the expense is recognised.

Revenue other than grants, donations, project revenue and council activities (Revenue from exchange transactions)

Revenue is recognised on the accrual basis. Revenue is recognised when significant risks and rewards of ownership have been transferred.

ACCOUNTING POLICIES CONTINUED

1.16 Revenue recognition for exchange and non-exchange transactions (continued)

Research revenue

Revenue is recognised only to the extent of research costs incurred and is probable that it will be recoverable. Advance income received in respect of which no work has been done, is treated as deferred income until such time the expenditure is incurred or the conditions of the grant/contract aremet.

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 to the extent that expenses are incurred and that conditions of the grant are met.

1.17 Borrowing costs

Borrowing costs are interest and other expenses incurred by an entity in connection with the borrowing of funds. Borrowing costs are recognised as an expense in the period in which they are incurred.

1.18 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 lossis 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.

1.19 Vat

The SAMRC accounts for VAT on the invoice basis.

1.20 Comparative figures

Where necessary, comparative figures have been reclassified to conform to changes in presentation in the current year.

1.21 Fruitless and wasteful expenditure

Fruitless and wasteful expenditure means expenditure which was made in vain and would have been avoided had reasonablecare been exercised.

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.

1.22 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 provincialgovernment.

National Treasury practice note no. 4 of 2008/2009 which was issued in terms of sections 76(1) to 76(4) of the PFMA requires the following (effective from 1 April 2008):

Irregular expenditure that was incurred and identified during the current financial year and which was condoned before year end and/or before finalisation of the financial statements is recorded appropriately in the irregular expenditure register. In such an instance, no further action is required with the exception of updating the note to the financial statements.

Irregular expenditure that was incurred and identified during the current financial year and for which condonement is being awaited at year end must be recorded in the irregular expenditure register. No further action is required with the exception of updating the note to the financial statements.

Where irregular expenditure was incurred in the previous financial year and is only condoned in the following financial year, the register and the disclosure note to the financial statements will be updated with the amount condoned.

Irregular expenditure written off by the Board is submitted to National Treasury for condonation.

Irregular expenditure that was incurred and identified during the current financial year and which was not condoned by the National Treasury or the relevant authority must be recorded appropriately in the irregular expenditure register. If liability for the irregular expenditure can be attributed to a person, a debt account must be created if such a person is liable in law. Immediate steps will be taken to recover the amount from the person concerned. If recovery is not possible, the accounting authority may write off the amount as debt impairment and disclose such in the relevant note to the financial statements. The irregular expenditure register will be updated accordingly.

1.23 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 4/1/2018 to 3/31/2019.

The annual financial statements and the budget are on the same basis of accounting therefore a comparison with the budgeted amounts for the reporting period have been included in the Statement of comparison of budget and actual amounts.

Comparative information is not required.

1.24 Related parties

The entity operates in an economic 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 are considered to be related parties.

ACCOUNTING POLICIES CONTINUED

1.24 Related parties (continued)

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 are 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.

1.25 Earmarked funds

The Earmarked funds are donations; bequests from deceased estates or cash received for a limited period to be used for visiting eminent scientists; cancer research or tuberculosis research. The monies received have been allocated to a separate account. The monies are ring-fenced from the cash balance of the SAMRC.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS

2. NEW STANDARDS AND INTERPRETATIONS

2.1 Standards and interpretations issued, but not yet effective

The entity has not applied the following standards and interpretations, which have been published and are mandatory for the entity's accounting periods beginning on or after April 1, 2019 or later periods:

STANDARD/ INTERPRETATION:	EFFECTIVE DATE:	EXPECTED IMPACT:
	Years beginning on or after	
GRAP 20: Related parties	April1,2019	Not expected to impact results but may result in additional disclosure than would have previously been provided in the financial statements
GRAP 32: Service Concession Arrangements: Grantor	April1,2019	Impact is currently being assessed
GRAP 109: Accounting by Principals and Agents	April1,2019	None
IGRAP 18 recognition and derecognition of land	April1,2019	None
IGRAP 19 Liabilities to pay levies	April1,2019	Not expected to impact results but may result in additional disclosure
GRAP 34 Separate Financial Statements	Undetermined	To be investigated
GRAP 35 Consolidated Financial Statements	Undetermined	To be investigated
GRAP 36 Investments in Associates and JointVentures	Undetermined	To be investigated
GRAP 37 Joint Arrangements	Undetermined	To be investigated
GRAP 38 Disclosure of Interests in Other Entities	Undetermined	To be investigated

NOTES TO THE ANNUAL FINANCIAL STATEMENTS CONTINUED

	2019 R	2018 R
3. FINANCIAL ASSETS AT FAIR VALUE		
Designated at fair value		
Class 1 Listed shares Sanlam demutualisation shares No. of shares 12715 (2018: 12715); Old Mutual demutualisation shares No. of shares 3682 (2018: 3682); Quilter shares No. of shares 1226 (2018: Nil) and Nedbank Ltd shares No. of shares 103 (2018: Nil)	1,078,434	1,233,453
Class 2 Unit trusts SIM General Equity Fund R 16595,74 units (2018: 16272,49 units) and SIM Balanced Fund R 28926,66 units (2018: 28074,07 units)	5,889,917	5,556,251
	6,968,351	**6,789,704**
Current assets		
Designated at fair value	6,968,351	6,789,704

Financial assets at fair value

Fair value hierarchy of financial assets at fair value

For financial assets recognised at fair value, disclosure is required of a fair value hierarchy which reflects the significance of the inputs used to make the measurements. The fair value hierarchy has the following levels:

Level 1 represents those assets which are measured using unadjusted quoted prices in active markets for identical assets. Quoted selling price per share at 31 March 2019 (31 March 2018) is used.

Level 2 applies inputs other than quoted prices that are observable for the assets either directly (i.e. as prices) or indirectly (i.e. derived from prices). The valuation certificate received from Sanlam indicating the unit balance and price per unit and market value

Level 3 applies inputs which are not based on observable market data.

Level 1		
Class 1 Listed shares	1,078,434	1,233,453
Class 2 Unit trusts	5,889,917	5,556,251
	6,968,351	**6,789,704**

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.

SAMRC was awarded Quilter Inc. shares on 25 June 2018 and Nedbank Ltd shares on 15 October 2018 by the Old Mutual unbundling.

3. FINANCIAL ASSETS AT FAIR VALUE (CONTINUED)

Reconciliation of financial assets at fair value through surplus or deficit measured in level 1

Reconciliation of financial assets at fair value through surplus or deficit measured in level 1 - March 2019

	OPENING BALANCE	GAINS OR LOSSES IN SURPLUS OR DEFICIT	PURCHASES	ISSUES	CLOSING BALANCE
Class 1 Listed shares	1,233,453	(210,725)	-	55,706	1,078,434
Class 2 Unit trusts	5,556,251	203,510	130,156	-	5,889,917
	6,789,704	**(7,215)**	**130,156**	**55,706**	**6,968,351**

Reconciliation of financial assets at fair value through surplus or deficit measured in level 1 - March 2018

	OPENING BALANCE	GAINS OR LOSSES IN SURPLUS OR DEFICIT	PURCHASES	CLOSING BALANCE
Class 1 Listed shares	980,619	252,834	-	1,233,453
Class 2 Unit trusts	5,449,904	(6,742)	113,089	5,556,251
	6,430,523	**246,092**	**113,089**	**6,789,704**

4. RECEIVABLES FROM EXCHANGE TRANSACTIONS

	2019 R	2018 R
Trade debtors	84,097,073	38,490,797
Employee costs in advance	101,020	158,387
Deposits	2,060,175	1,427,057
South African Revenue Services	2,824,561	2,824,561
	89,082,829	**42,900,802**

The increase in receivables from exchange transactions is attributed to funder/grantor debtors.

South African Revenue Services (SARS) amount refers to output vat that was disallowed in the September 2016 vat period that was re-assessed in November and December 2017. The output vat is claimable and SAMRC has lodged a dispute with SARS.

Credit quality of trade debtors

The credit quality of trade debtors that are neither past nor due nor impaired can be assessed by reference to external credit ratings (if available) or to historical information about counterparty default rates.

Trade and other receivables

Trade and other receivables which are less than one month past due are not considered to be impaired. At March 31, 2019: R2,322,323 (2018: R328,715) were past due but not impaired.

The ageing of amounts past due but not impaired is as follows:

1 month past due	2,318,538	94,888
2 months past due	2,238	202,703
3 months past due	1,547	31,124

NOTES TO THE ANNUAL FINANCIAL STATEMENTS CONTINUED

	2019 R	2018 R

4. RECEIVABLES FROM EXCHANGE TRANSACTIONS (CONTINUED)

Trade and other receivables impaired
The amount of the provision was R 34,198 as of March 31, 2019 (2018: R 40,991). All trade debtor balances are reviewed for impairment. Impairment considerations include solvency of debtor and recoverability of amount owed. Employee costsin 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	5,627	3,644
2 months but less than 3 months past due	5,627	-
More than 3 months past due	22,944	37,347
The carrying amount of trade debtors are denominated in the following currencies:		
Rand	73,631,564	14,325,522
US Dollar	4,838,654	3,498,624
Pound sterling	4,828,560	20,666,651
Euro	798,295	-
Reconciliation of provision for impairment of trade and other receivables		
Opening balance	40,991	322,168
Provision for impairment	34,198	40,991
Unused amounts reversed	(40,991)	(322,168)
	34,198	**40,991**

5. VAT RECEIVABLE

VAT	**5,610,834**	**15,094,330**

6. PREPAYMENTS

Prepayments - other relate to expenditure paid in advance for subscriptions, annual computer licenses; computer software updates and maintenance; computer warranties; insurance; airtickets and accommodation.

Subsistence and travel advances	670,091	1,280,735
Prepayments - other	7,455,262	5,833,851
	8,125,353	**7,114,586**

7. CASH AND CASH EQUIVALENTS

Cash and cash equivalents consist of:		
Cash on hand	9,504	105,740
Bank balances	463,357,207	491,105,428
	463,366,711	**491,211,168**

	2019 R	2018 R

7. CASH AND CASH EQUIVALENTS (CONTINUED)

Analysis of bank balances		
ABSA and Standard Bank	7,024,865	1,653,329
ABSA funder accounts	4,374,585	7,848,991
First National Bank	5,608,252	244,517
Cash at the Reserve Bank	414,818,220	448,929,838
First National Bank funder accounts	31,531,285	32,428,753
	463,357,207	**491,105,428**

The cash at the Reserve Bank includes funds for the Botha Trust; Bruhns Trust; Melville Douglas Trust; Q&S Abdool Karim Trust; FJ Kleynhans Trust; MF Ramashala Trust and Motor vehicle reserve fund.

The Motor vehicle reserve fund was established to provide self-insurance of motor vehicles with a low market value.

Motor vehicle reserve fund		
Balance at beginning of year	3,536,662	3,274,742
Allocation for the year	290,920	261,920
	3,827,582	**3,536,662**

8. BIOLOGICAL ASSETS THAT FORM PART OF AN AGRICULTURAL ACTIVITY

	2019 R		2018 R	
	COST/ VALUATION	CARRYING VALUE	COST/ VALUATION	CARRYING VALUE
Bearer mature biological assets	1,307,270	1,307,270	1,285,103	1,285,103

Reconciliation of biological assets that form part of an agricultural activity - March 2019 (R)

	OPENING BALANCE	ADDITIONS	DECREASES DUE TO SALES/ DISPOSALS	GAINS OR LOSSES ARISING FROM CHANGES IN FAIR VALUE	TOTAL
Bearer mature biological assets	1,285,103	85,801	(214,834)	151,200	1,307,270

Reconciliation of biological assets that form part of an agricultural activity - March 2018 (R)

	OPENING BALANCE	ADDITIONS	DECREASES DUE TO SALES/ DISPOSALS	TOTAL
Bearer mature biological assets	1,147,101	162,069	(24,067)	1,285,103

SAMRC holds certain monkeys and horses for breeding and external research purposes. All research 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	1,307,270	1,285,103

NOTES TO THE ANNUAL FINANCIAL STATEMENTS CONTINUED

9. PROPERTY, PLANT AND EQUIPMENT

	2019 R			2018 R		
	COST / VALUATION	ACCUMULATED DEPRECIATION AND ACCUMULATED IMPAIRMENT	CARRYING VALUE	COST / VALUATION	ACCUMULATED DEPRECIATION AND ACCUMULATED IMPAIRMENT	CARRYING VALUE
Land	1,872,502	-	1,872,502	1,872,502	-	1,872,502
Buildings	117,400,931	(37,583,462)	79,817,469	104,915,246	(34,632,124)	70,283,122
Vehicles and containers	22,197,005	(16,381,748)	5,815,257	21,650,974	(15,344,122)	6,306,852
Furniture and office equipment	42,621,886	(24,020,862)	18,601,024	41,184,184	(22,459,069)	18,725,115
Computer equipment	65,549,544	(32,968,986)	32,580,558	69,458,610	(48,787,777)	20,670,833
Laboratory equipment	67,096,731	(22,926,766)	44,169,965	59,931,151	(19,855,115)	40,076,036
Other property, plant and equipment - vervet monkeys	1,531,252	(670,453)	860,799	1,534,112	(636,966)	897,146
Total	**318,269,851**	**(134,552,277)**	**183,717,574**	**300,546,779**	**(141,715,173)**	**158,831,606**

Reconciliation of property, plant and equipment - March 2019 (R)

	OPENING BALANCE	ADDITIONS	DISPOSALS	TRANSFERS	DEPRECIATION	TOTAL
Land	1,872,502	-	-	-	-	1,872,502
Buildings	70,283,122	12,993,305	(104,044)	(298,413)	(3,056,501)	79,817,469
Vehicles and containers	6,306,852	738,216	(28,828)	-	(1,200,983)	5,815,257
Furniture and office equipment	18,725,115	3,436,782	(98,503)	314,821	(3,777,191)	18,601,024
Computer equipment	20,670,833	13,076,803	(99,315)	(16,408)	(1,051,355)	32,580,558
Laboratory equipment	40,076,036	8,218,156	(302,904)	-	(3,821,323)	44,169,965
Other property, plant and equipment - vervet monkeys	897,146	40,203	(25,134)	-	(51,416)	860,799
	158,831,606	**38,503,465**	**(658,728)**	**-**	**(12,958,769)**	**183,717,574**

Reconciliation of property, plant and equipment - March 2018 (R)

	OPENING BALANCE	ADDITIONS	DISPOSALS	DEPRECIATION	TOTAL
Land	1,738,558	133,944	-	-	1,872,502
Buildings	61,764,711	11,223,377	(68,209)	(2,636,757)	70,283,122
Vehicles and containers	5,454,456	2,217,044	(206,648)	(1,158,000)	6,306,852
Furniture and office equipment	17,263,288	5,066,838	(65,707)	(3,539,304)	18,725,115
Computer equipment	19,832,746	9,961,298	(126,536)	(8,996,675)	20,670,833
Laboratory equipment	33,452,859	10,216,387	(230,703)	(3,362,507)	40,076,036
Other property, plant and equipment - vervet monkeys	902,983	65,787	(20,600)	(51,024)	897,146
	140,409,601	**38,884,675**	**(718,403)**	**(19,744,267)**	**158,831,606**

9. PROPERTY, PLANT AND EQUIPMENT (CONTINUED)

Other information

Impaired assets March 2019 (R)	Oncology
Property, plant and equipment - Laboratory equipment	28,189
	28,189

Impaired assets March 2018 (R)	Oncology
Property, plant and equipment - Laboratory equipment	28,189
	28,189

The assets impaired for the discontinued research units is reflected above. The assets impaired constitutes 0.02% (March 2018: 0,02%) of the carrying cost of property, plant and equipment and Nil% for March 2019 (March 2018: Nil%) of the carrying value of intangible assets.

The SAMRC Board, at its meeting of 1 March 2013, approved the restructuring of the SAMRC to focus on the 10 highest causes of death in the burden of disease in South Africa. Following this decision the Board at its meeting of 19 February 2014 further approved that discussions be held with institutions for higher learning regarding the transfer of staff and assets of the following units: Promec, Indigenous Knowledge Systems, Oncology and Tuberculosis. To ensure that research in these areas was continued at these institutions it was further agreed that the assets be transferred for no consideration.

The approval for this transaction was received from the Minister of Health in terms of the SAMRC materiality framework on 3 April 2014.

During the year under review SAMRC reviewed and changed the useful lives of certain of its assets. The changes made were within the entity's average useful life policy. Certain items of computer equipment assets remaining useful lives changes from 5 to 10 and from 5 to 8 years, certain furniture and office equipment assets remaining lives changed from 10 to 15 years and certain laboratory equipment from 5 to 10 years. The effect of the change in accounting estimate has resulted in a decrease in depreciation amounting to R9,610,754 for the current period. The effect on future periods could not be reasonably be determined.

	2019 R	2018 R
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	9,972,487	165,000

Reconciliation of Work-in-Progress March 2019 (R)

	INCLUDED WITHIN BUILDINGS	TOTAL
Opening balance	165,000	165,000
Additions/capital expenditure	9,972,487	9,972,487
Other movements - costs capitalised	(165,000)	(165,000)
	9,972,487	**9,972,487**

NOTES TO THE ANNUAL FINANCIAL STATEMENTS CONTINUED

9. PROPERTY, PLANT AND EQUIPMENT (CONTINUED)

Reconciliation of Work-in-Progress March 2018 (R)

	INCLUDED WITHIN BUILDINGS	TOTAL
Additions/capital expenditure	165,000	165,000

Expenditure incurred to repair and maintain property, plant and equipment

	2019 R	2018 R
Expenditure incurred to repair and maintain property, plant and equipment included in Statement of Financial Performance		
Contracted services	10,974,590	12,918,282

10. INTANGIBLE ASSETS

	2019 R			2018 R		
	COST / VALUATION	ACCUMULATED AMORTISATION AND ACCUMULATED IMPAIRMENT	CARRYING VALUE	COST / VALUATION	ACCUMULATED AMORTISATION AND ACCUMULATED IMPAIRMENT	CARRYING VALUE
Computer software	25,585,144	(12,911,109)	12,674,035	18,625,451	(11,555,481)	7,069,970

Reconciliation of intangible assets - March 2019 (R)

	OPENING BALANCE	ADDITIONS	DISPOSALS	AMORTISATION	TOTAL
Computer software	7,069,970	7,242,762	(5,973)	(1,632,724)	12,674,035

Reconciliation of intangible assets - March 2018 (R)

	OPENING BALANCE	ADDITIONS	AMORTISATION	TOTAL
Computer software	6,436,756	2,229,400	(1,596,186)	7,069,970

There are no restrictions on the title of intangible assets.

11. INVESTMENTS IN CONTROLLED ENTITIES

NAME OF COMPANY	HELD BY	% HOLDING 2019	% HOLDING 2018	CARRYING AMOUNT 2019 R	CARRYING AMOUNT 2018 R
Medres (Pty) Ltd	SAMRC	100.00 %	100.00 %	1	1
Jirehsa Medical (Pty) Ltd	Medres (Pty) Ltd	25.00 %	25.00 %	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 material.

SAMRC has obtained National Treasury's approval to increase its shareholding in Jirehsa Medical (Pty) Ltd from 25% to 42%.

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.

12. PAYABLES FROM EXCHANGE TRANSACTIONS

	2019 R	2018 R
Trade payables	71,705,357	62,871,559
Leave accrual	24,407,689	23,411,905
Accruals	45,491,876	31,849,618
Interest due to funders	66,234	142,295
	141,671,156	118,275,377

The increase in payables from exchange transactions is attributed to amounts due in respect of grants awarded.

The carrying amount of trade payables are denominated in the following currencies:

Rand	50,835,871	58,197,975
US Dollar	1,273,065	122,321
Pound Sterling	19,181,248	4,551,263
Euro	407,719	-
Nigerian Naira	7,454	-

Leave accrual

Balance at the beginning of the year	23,411,905	20,293,356
Leave payouts	(1,164,656)	(1,389,306)
Movement recognised in surplus or deficit	2,160,440	4,507,855
	24,407,689	23,411,905

NOTES TO THE ANNUAL FINANCIAL STATEMENTS CONTINUED

13. PROVISIONS

Reconciliation of provisions - March 2019 (R)

	OPENING BALANCE	ADDITIONS	UTILISED DURING THE YEAR	TOTAL
Provision for bonus dispute	929,019	-	-	929,019
Provision for collaborative research	10,243,648	6,414,048	(9,993,648)	6,664,048
Provision for performance bonus	4,526,987	4,918,964	(4,526,987)	4,918,964
Other provisions	1,083,922	5,866,786	(420,425)	6,530,283
	16,783,576	**17,199,798**	**(14,941,060)**	**19,042,314**

Reconciliation of provisions - March 2018 (R)

	OPENING BALANCE	ADDITIONS	UTILISED DURING THE YEAR	TOTAL
Provision for bonus dispute	929,019	-	-	929,019
Provision for collaborative research	199,000	10,243,648	(199,000)	10,243,648
Provision for performance bonus	4,010,130	4,526,987	(4,010,130)	4,526,987
Other provisions	2,113,662	420,425	(1,450,165)	1,083,922
	7,251,811	**15,191,060**	**(5,659,295)**	**16,783,576**

Collaborative research costs

The provision relates to collaborative research costs for CDC funded projects that will be settled in the next twelve months.

Provision for bonus dispute

The bonus dispute provision relates to the estimated legal costs that needs to be paid to NEHAWU.

Other provisions

The other provisions relate to research units that closed during the rationalisation process; the Department of Labour assessment for the claim for occupational injury on duty assessment for 2019 (COIDA); retention payable on building works and repayment of grant funds to Eli Lilly and Company and Global Genomic Medicine Collaborative. (March 2018: relate to the Department of Labour assessment for the claim for occupational injury on duty assessment for 2018 (COIDA) estimate; grant funds received on completed projects and projects relating to research units that closed during the rationalisation process.

Provision for performance bonus

The performance bonus cycle was changed after discussions and agreement with the union. The Board approved the bonus cycle, which will be paid after the financial year. The 2017/2018 performance bonus was paid in August and November 2018. The amount reflected is the 2018/2019 provision for performance bonuses.

	2019 R	2018 R

14. DEFERRED INCOME

The increase in deferred income can be attributed to contract income received in advance: Department of Health; UK MRC; Department of International Development; Department of Science and Technology; Global Fund and and European and Developing Countries Clinical Trials Partnership (EDCTP).

Deferred income	310,682,402	279,352,698
Summary of deferred income		
Research grants received in advance	309,752,617	279,008,574
Other funds received in advance	929,785	344,124
	310,682,402	**279,352,698**

15. EMPLOYEE BENEFIT OBLIGATIONS

Post retirement medical aid obligation	8,472,000	10,412,000
Pension fund - Defined benefit obligation	323,000	11,772,000
	8,795,000	**22,184,000**

Post retirement benefits

Post retirement medical aid plan

SAMRC, took a compulsory insurance policy in order to fund post retirement medical obligations of its ex-employees. Given the nature of the policy, it is appropriate to treat this as a plan asset. Certain assets have been allocated specifically for the purpose of covering the post retirement medical aid defined benefit liability. The defined benefit medical liability has been recognised and accounted for under the requirements of GRAP 25 - Employee Benefits. The assets have been accounted for in terms of the requirements of the accounting standards to which they relate and not in terms of GRAP 25 because the plan is not registered. The relevant assets are included in investments and cash balances.

Pension funds

SAMRC personnel are members of the following pension funds

- State Pension Fund (Associated institutions - AIPF) (Act No. 51 of1963)
- State Pension fund for temporary employees (Act No. 75 of1979)
- MRC 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 MRC Pension fund was actuarially valued at 1 April 2017. Next statutory valuation for the fund is 1 April 2020.
(c) The first two funds offer defined benefits to staff. With regard to the MRC Pension fund, some members are on a defined benefit scheme, while the remainder are on a defined contributionscheme.

The MRC Pension Fund and the Post retirement Medical Aid Plan is valued annually in compliance with GRAP 25.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS CONTINUED

15. EMPLOYEE BENEFIT OBLIGATIONS (CONTINUED)

	2019 R	2018 R
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	(1,231,000)	(1,326,000)
Present value of the defined benefit obligation-partly or wholly funded	(24,753,000)	(26,667,000)
Fair value of plan assets	17,512,000	17,581,000
Net liability	**(8,472,000)**	**(10,412,000)**
Changes in the present value of the defined benefit obligation are as follows:		
Opening balance	27,993,000	23,371,000
Interest costs	2,159,000	1,996,000
Benefits paid	(2,508,000)	(2,235,000)
Actuarial (gain) loss	(1,660,000)	4,861,000
Closing balance	**25,984,000**	**27,993,000**

15. EMPLOYEE BENEFIT OBLIGATIONS (CONTINUED)

	2019 R	2018 R
Net expense recognised in the statement of financial performance		
Interest cost	2,159,000	1,996,000
Expected return on plan assets	(1,323,000)	(1,358,000)
Contribution paid	(1,360,000)	(836,000)
Recognised actuarial (gain) loss	(1,416,000)	3,445,000
Total included in employee related cost	**(1,940,000)**	**3,247,000**
Calculation of actuarial gains and losses		
Actuarial (gains) losses – Obligation	(1,660,000)	4,861,000
Actuarial losses (gains) – Plan assets	244,000	(1,416,000)
	(1,416,000)	**3,445,000**
Changes in the fair value of plan assets are as follows:		
Opening balance	17,581,000	16,206,000
Actuarial (losses) gains	(244,000)	1,416,000
Expected return on plan assets	1,323,000	1,358,000
Contributions by employer	1,360,000	836,000
Benefits paid	(2,508,000)	(2,235,000)
Closing balance	**17,512,000**	**17,581,000**
The entity will investigate the options available to eliminate the net liability as far as possible.		
Key assumptions used		
Assumptions used at the reporting date:		
Discount rates used	8.90 %	8.10 %
General increases to medical aid subsidy	6.80 %	7.40 %
Expected rate of return on assets	8.90 %	8.10 %
Proportion 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 to 1 May 1998	65	65

The expected rate of return on plan assets is based on market expectations, at the beginning of the period, for returns over the entire life of the related obligation.

The discount rate has been determined by reference to market yields at the balance sheet date of South African long-term bonds.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS CONTINUED

15. EMPLOYEE BENEFIT OBLIGATIONS (CONTINUED)

Other assumptions

Assumed healthcare cost trends rates have a significant effect on the amounts recognised in surplus or deficit. A one percentage point change in assumed healthcare cost trends rates would have the following effects:

	IMPACT ON LIABILTY RM	% INCREASE/ DECREASE
March 2019 Assumptions as above	25,984	
Discount rate - increases by 1% p.a.	24,092	(7)
Discount rate - decreases by 1% p.a.	27,958	8
Medical inflation - increases by 1% p.a.	27,817	7
Medical inflation - decreases by 1% p.a.	24,190	(7)
March 2018 Assumptions as above	27,993	
Discount rate - increases by 1% p.a.	25,823	(8)
Discount rate - decreases by 1% p.a.	30,523	9
Medical inflation - increases by 1% p.a.	30,322	8
Medical inflation - decreases by 1% p.a.	25,962	(7)

Amounts for the current period and previous four years are as follows:

	2019	2018	2017	2016	2015
	R	R	R	R	R
Defined benefit obligation - partially or wholly unfunded	24,753,000	26,667,000	22,177,000	21,505,000	21,763,000
Defined benefit obligation wholly unfunded	1,231,000	1,326,000	1,194,000	1,144,000	1,067,000
Plan assets	17,512,000	17,581,000	16,206,000	17,217,000	18,825,000

	2019 R	2018 R
15. EMPLOYEE BENEFIT OBLIGATIONS (CONTINUED)		
Pension funds		
Defined benefit obligation - Wholly funded		
Present value of obligation	(98,927,000)	(111,435,000)
Fair value of plan assets	98,604,000	99,663,000
Net (Liability)	**(323,000)**	**(11,772,000)**
Changes in the present value of the defined benefit obligation are as follows:		
Opening defined benefit obligation	111,435,000	105,379,000
Benefits paid	(13,457,000)	(11,012,000)
Service cost	3,773,000	3,717,000
Interest cost	9,628,000	10,032,000
Actuarial (gain) loss	(13,386,000)	2,411,000
Member contributions	1,352,000	1,353,000
Re-insurance premiums	(210,000)	(210,000)
Expenses	(208,000)	(235,000)
Closed defined benefit obligation closing balance	**98,927,000**	**111,435,000**
Changes in the fair value of plan assets are as follows:		
Opening fair value of plan assets after limitation	99,663,000	100,508,000
Contributions	5,239,000	5,245,000
Benefits paid	(13,457,000)	(11,012,000)
Expected return on plan assets	8,390,000	9,351,000
Actuarial (loss)	(813,000)	(3,984,000)
Re-insurance premiums	(210,000)	(210,000)
Expenses	(208,000)	(235,000)
Closing fair value of plan assets	**98,604,000**	**99,663,000**
Calculation of actuarial gains and losses		
Actuarial (gains) losses - Obligation	(13,386,000)	2,411,000
Actuarial losses - Plan assets	813,000	3,984,000
	(12,573,000)	**6,395,000**
Staff costs includes the following in respect of the defined benefit pension plan:		
Current service cost	3,773,000	3,717,000
Interest cost	9,628,000	10,032,000
Expected return on plan assets	(8,390,000)	(9,351,000)
Net actuarial gains (losses) recognised in current year	(12,573,000)	6,395,000
Contribution paid	(3,887,000)	(3,892,000)
	(11,449,000)	**6,901,000**
The principal actuarial assumptions used in determining the pension plan per annum were:		
General inflation rate	5.70%	6.00%
Discount rate	9.60%	8.80%
Expected return on plan assets	8.80%	8.80%
Salary inflation- percentage plus merit increase	6.70%	7.00%

NOTES TO THE ANNUAL FINANCIAL STATEMENTS CONTINUED

15. EMPLOYEE BENEFIT OBLIGATIONS (CONTINUED)

	2019 R	2018 R	2017 R	2016 R	2015 R
Defined benefit obligation	98,927,000	111,435,000	105,379,000	95,825,000	106,556,000
Plan assets	98,604,000	99,663,000	100,508,000	95,473,000	98,377,000

16. EARMARKED FUNDS

	2019 R	2018 R
Botha trust	151,636	151,636
Bruhns trust	1,237,964	1,169,925
Melville Douglas trust	13,325	13,325
Q&S Abdool Karim trust	2,578,691	2,399,824
FJ Kleynhans trust	111,442	111,442
MF Ramashala trust	-	100,000
	4,093,058	**3,946,152**

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.

17. ACCUMULATED SURPLUS

Accumulated surplus	286,569,029	289,755,468

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.

18. REVENUE (2018 RESTATED)

Income from contracts, grants and services rendered (exchange)	437,493,176	403,918,948
Rental income	7,185,956	5,660,631
Bad debt recovered	1,457	-
Other income	3,756,009	2,608,554
Interest received - investment	34,417,767	42,152,540
Dividends received	129,723	117,690
Fair value adjustments	143,986	246,091
Gain on Foreign Exchange	8,998,973	-
Government grants & subsidies	543,329,565	539,439,474
Income from contracts and grants (non-exchange)	72,578,536	57,498,648
	1,108,035,148	**1,051,642,576**

18. REVENUE (2018 RESTATED) (CONTINUED)

	2019 R	2018 R
The amount included in revenue arising from exchanges of goods or services are as follows:		
Income from contracts, grants and services rendered (exchange)	437,493,176	403,918,948
Rental income	7,185,956	5,660,631
Bad debt recovered	1,457	-
Gain on foreign exchange	8,998,973	-
Fair value adjustments	143,986	246,091
Other income	3,756,009	2,608,554
Interest received - investment	34,417,767	42,152,540
Dividends received	129,723	117,690
	492,127,047	**454,704,454**
The amount included in revenue arising from non-exchange transactions is as follows:		
Baseline grant	543,329,565	539,439,474
Income from contracts and grants (non-exchange)	72,578,536	57,498,648
	615,908,101	**596,938,122**
Revenue		
Income from contracts, grants and services rendered	510,071,712	461,417,596
Government grants	543,329,565	539,439,474
	1,053,401,277	**1,000,857,070**

19. OTHER INCOME

Rental income	7,185,956	5,660,631
Debt impairment recovered	1,457	-
Gain on foreign exchange	8,998,973	-
Other income	3,756,009	2,608,554
	19,942,395	**8,269,185**

20. INVESTMENT INCOME

Dividend revenue Listed financial assets - Local	129,723	117,690
Interest revenue		
Unit trusts	29,932	22,660
Bank	673,577	504,171
Interest charged on trade and other receivables	10,415	6,426
Corporation for public deposits	33,703,843	41,619,283
	34,417,767	**42,152,540**
	34,547,490	**42,270,230**

NOTES TO THE ANNUAL FINANCIAL STATEMENTS CONTINUED

21. EMPLOYEE RELATED COSTS (2018 RESTATED)

	2019 R	2018 R
Basic	214,054,191	194,735,640
Other non pensionable allowances	101,014,899	91,511,698
Bonus	4,982,502	4,527,346
UIF	1,292,657	1,182,603
Leave payments	2,498,978	2,599,639
Adjustments from the application of GRAP 25	(13,389,000)	10,148,000
Other salary related costs	7,760,132	9,203,083
Defined pension benefit plan expense - current service cost	4,069,471	4,062,776
Overtime payments	1,106,657	902,053
Temporary staff	23,085,073	16,824,995
Defined pension contribution plan expense	22,208,559	20,036,533
Post retirement medical aid contribution	1,360,461	836,113
	370,044,580	**356,570,479**

The increase in employee related costs can mainly be attributed to normal salary increases. The liability in respect of the post retirement medical aid plan of R1,940,000 and the defined benefit pension fund of R11,449,000 decreased during the year under review. The number of appointments relating to research funded contracts increased and the number of temporary staff appointments also increased during the year in line with contract income recognised.

The bonus amount includes the 2018/2019 provision for performance bonus of R 4,918,964 and an amount of R63,538 relating to the 2017/2018 bonus payment.

The 2018 figures have been amended due to the reclassification of SDL which was previously included as employee related costs now being classified as general expenses.

22. FINANCE COSTS

Other interest paid	**313,018**	**749,868**

SAMRC had to refund interest due to its funders for monies received in advance (March 2019: R65,847 ; March 2018: R136,655), to the earmarked funds (March 2019: R246,906 ; March 2018: R242,277). 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 2019: R265; March 2018: R210). During 2017/2018 SARS reassessed the September 2016 vat period in October 2017 and levied interest amounting to R370,726. SAMRC has raised an objection with SARS and is awaiting the outcome.

23. DEBT IMPAIRMENT

Debt impairment	3,479	-
Provision / (Reversal) of debt impairment	(7,248)	(259,206)
	(3,769)	**(259,206)**

The debt impairment reflected above include the current periods provision for bad debt of R34,198 (including VAT of R1,950) and reversal of the previous year's provision (March 2018 provision for bad debts of R40,991(including VAT of R1,495).

The debt written off relates to an amount owed by BWK Conference and Events, SAMRC has subsequently recovered R1,457 from BWK Conference and Events.

24. GENERAL EXPENSES (2018 RESTATED)

	2019 R	2018 R
Advertising	1,761,354	1,828,523
Auditors remuneration	2,296,300	2,369,821
Bank charges	545,001	551,866
Cleaning consumables	2,694,681	-
Computer expenses	22,369,499	20,633,830
Consulting and professional fees	7,660,711	12,561,801
Fines and penalties	-	294,150
Insurance	2,126,970	2,458,649
Magazines, books and periodicals	5,073,577	4,218,700
Postage and courier	485,689	685,349
Printing, stationery and publication costs	7,964,007	8,833,165
Security	9,428,709	8,885,877
Subscriptions and membership fees	1,154,782	856,296
Telephone and fax	2,463,595	3,009,067
Training	3,089,512	1,596,772
Travel, subsistence and conference attendance	46,922,623	42,724,613
Utilities	14,394,950	13,440,219
Laboratory operating cost	52,192,071	45,420,169
Skills Development levies	2,679,055	2,497,595
Collaborative research	515,617,938	513,098,915
Other expenses	6,640,672	11,164,074
	707,561,696	**697,129,451**

Cleaning consumables are being disclosed separately in 2019.

The 2018 figures have been amended due to the reclassification of SDL which was previously included as employee related costs now being classified as general expenses.

Travel, subsistence and conference attendance		
Local travel	7,167,310	6,693,869
Overseas travel	9,561,372	9,667,883
Accommodation - local and overseas	10,089,303	8,052,866
Subsistence and travel expenditure	7,850,409	7,172,355
Conference expenditure	6,487,606	6,133,527
Participant incentives	5,766,623	5,004,113
	46,922,623	**42,724,613**
Other expenses		
Canteen costs	1,764,485	1,346,744
Personnel teas	954,961	803,784
Hire of premises and equipment	3,397,388	8,560,434
Licences	146,430	438,499
Staff recruitment costs	101,460	14,613
Rental of pot plants	225,781	-
Uniforms	50,167	-
	6,640,672	**11,164,074**

The increase in travel and subsistence costs is attributed to the number of national studies conducted by SAMRC research units (for example South African prevention of mother to child transmission evaluation study) and the increase in the number of participant trials conducted during the year. The participant re-imbursement previously included in local travel and subsistence is reflected separately.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS CONTINUED

24. GENERAL EXPENSES (2018 RESTATED) (CONTINUED)

Collaborative research costs include amounts that were paid to research institutions which relates to tranche payments of contractual agreements signed with institutions who will conduct research on behalf of the SAMRC as part of the entity's mandate. No goods or services are received for these payments as they relate to start-up costs for research, the 2018/2019 amount is R226,862,229 (2018 amount is R315,185,216).

25. FAIR VALUE ADJUSTMENTS

	2019 R	2018 R
Biological assets - (Fair value model)	151,200	-
Other financial assets		
Other financial assets at fair value	(7,214)	246,091
	143,986	**246,091**

26. AUDITORS' REMUNERATION

Fees	2,296,300	2,369,821

27. OPERATING (DEFICIT)

Operating (deficit) for the year is stated after accounting for the following:		
Operating lease charges		
Premises		
Contractual amounts	5,902,210	5,660,661
Loss on sale of property, plant and equipment	645,767	638,021
(Gains) Loss on exchange differences	(8,998,973)	2,153,763
Amortisation on intangible assets	1,632,725	1,596,186
Depreciation on property, plant and equipment	12,958,770	19,744,267
Employee costs	370,044,580	356,570,479
General expenses	707,561,696	697,129,451

28. CASH GENERATED FROM (USED IN) OPERATIONS

Deficit	(3,186,435)	(46,480,447)
Adjustments for:		
Depreciation and amortisation	14,591,495	21,340,453
Loss on sale of assets	645,767	638,021
(Gain)/ Loss on foreign exchange	(8,998,973)	2,153,763
Fair value adjustments	(143,986)	(246,091)
Debt impairment	(3,769)	(259,206)
Movements in retirement benefit assets and liabilities	(13,389,000)	10,148,000
Movements in provisions	2,258,738	9,531,765
Capitalisation of financial assets	(185,862)	(113,089)
Changes in working capital:		
Receivables from exchange transactions	(37,179,285)	(8,735,685)
Prepayments	(1,010,767)	(1,267,311)
Payables from exchange transactions	23,395,776	14,238,660
VAT	9,483,496	(3,297,423)
Deferred income	31,329,704	(9,545,255)
	17,606,899	**(11,893,845)**

29. FINANCIAL INSTRUMENTS DISCLOSURE

Categories of financial instruments

March 2019 (R)

Financial assets

	AT FAIR VALUE	AT AMORTISED COST	AT COST	TOTAL
Receivables from exchange transactions	-	89,082,829	-	89,082,829
Cash and cash equivalents	-	463,366,711	-	463,366,711
Investment in controlled entities	-	-	2	2
Financial assets	6,968,351	-	-	6,968,351
	6,968,351	**552,449,540**	**2**	**559,417,893**

Financial liabilities

	AT AMORTISED COST	TOTAL
Payables from exchange transactions	141,671,156	141,671,156

March 2018 (R)

Financial assets

	AT FAIR VALUE	AT AMORTISED COST	AT COST	TOTAL
Receivables from exchange transactions	-	42,900,802	-	42,900,802
Cash and cash equivalents	-	491,211,168	-	491,211,168
Investment in controlled entities	-	-	2	2
Financial assets	6,789,704	-	-	6,789,704
	6,789,704	**534,111,970**	**2**	**540,901,676**

Financial liabilities

	AT AMORTISED COST	TOTAL
Payables from exchange transactions	118,275,377	118,275,377

NOTES TO THE ANNUAL FINANCIAL STATEMENTS CONTINUED

	2019 R	2018 R
30. COMMITMENTS		
Authorised commitments		
Already contracted for but not provided for		
Property, plant and equipment	7,698,667	3,463,413
Goods and services	13,677,248	9,647,226
Research grants	8,215,722	3,500,000
Operating leases	2,630,088	4,812,535
	32,221,725	**21,423,174**
Already contracted for but not provided for	32,221,725	21,423,174

This committed expenditure relates to property, plant and equipment, goods and services and research grants and will be financed by retained surpluses, existing cash resources, funds internally generated, etc.

Operating leases - as lessee (expense)

Minimum lease payments due		
- within one year	1,837,236	2,503,475
- in second to fifth year inclusive	792,852	2,309,060
	2,630,088	**4,812,535**

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	3,950,274	2,685,505
- in second to fifth year inclusive	3,635,069	3,988,643
- later than five years	1,018,814	1,334,852
	8,604,157	**8,009,000**

Certain of the entity's buildings generate rental income. Lease agreements have terms from 12 months to 9 years and eleven months.

31. CONTINGENCIES

Contingent liabilities

There are no contingent liabilities at the reporting date.

Contingent assets

In October 2017 and November 2017 the South African Revenue Services (SARS) re-assessed the September 2016 vat period. Output vat amounting to R2,824,561 was disallowed and interest and penalties were levied amounting to R370,726 and R294,150 respectively. The amount of R3,492,222 was deducted from a refund due to SAMRC. SAMRC has lodged a dispute with SARS for the disallowed output vat and the interest and penalties. The output vat is valid and this amount has been included in the current assets. SAMRC anticipates to recover the interest and penalties amounting R 664,876 from SARS.

32. RELATED PARTIES

Executive authority	Dept. of Health (DOH)
Other government departments	Dept. of Science & Technology Dept. of Social Development
Controlled entities	Medres (Pty) Ltd Refer to note11 Jirehsa Medical (Pty) Ltd Refer to note 5
Members of key management	Prof G Gray (President appointed 1 April 2014) (Wits Health Consortium - Perinatal HIV Research Unit researcher and NIH and NRF grant recipient; director Hutchinson Centre Research Institute of SA; University of Cape Town - Audit committee member; National Research Foundation (NRF) - Board member from 1 October2018) Mr. N Buick (Chief Financial Officer appointed 16 July 2012. Western Cape Education Department - Audit Committee member. University of Western Cape - Audit Committee member) Medres (Pty) Ltd - Director Dr. R Gordon (Ex officio Executive Management Committee member from 1 April 2013.Consulting services provided to Afrigen Biologics and Vaccines ended June 2017 (rental tenant) ;Medres (Pty) Ltd - Director Prof. R Jewkes (Executive scientist research strategy in the office of the president appointed 1 June 2017) Adv. N Bhuka appointed an EMC member from 1 October 2014, resignation date 31 May 2018) Prof. MJ Mphahlele (Vice President appointed 1 October 2014 and extra mural unit director at Sefako Makgatho Health Sciences University (SAMRC supplier); Medical science committee member at the Health Professions Council of South Africa (SAMRC supplier) and SA deputy representative in the General Assembly of the European and Developing Countries Clinical Trials Partnership (EDCTP) (SAMRC debtor). Mr. B Spies (Executive Director Human Capacity Development appointed 1 August 2016) Dr. M Mdhluli (Chief research operations officer appointed 1 September 2017).
Board member:	Board members are employed by Universities who contract with SA Medical Research Council for grant income or collaborativeresearch Prof. M Sathekge (University of Pretoria - grant recipient and debtor, director of College of Medicine SA) Dr. Z Kwitshana (Univ. KwaZulu Natal - supplier and debtor till 31 March 2016; Mangosuthu University of Technology grant recipient and debtor) Prof. Q Abdool Karim (CAPRISA - extramural unit, grant recipient and debtor; donor to SAMRC for the the Q&S Abdool Karim fund) Prof. L Skaal and Prof. T Sodi (University of Limpopo -grant recipient and debtor) Prof. M Cotton (University of Stellenbosch - grant recipient and debtor) Prof, S Velaphi and Prof. J Mahlangu (University of Witwatersrand - grant recipient and debtor) Prof. L Zungu (University of South Africa - supplier and debtor) Prof. B Shaw (University of Johannesburg - grant recipient, supplier and debtor till March 2018; University of Zululand from 1 April 2018) Prof. W Rae (University of Free State - grant recipient and debtor till 31 March 2018) Dr. R Chikwamba (CSIR - supplier and debtor)
Employee: Mr P Charls	Tertiary Education and Research Network of South Africa (TENET) (SAMRC internet service provider, the staff member is a co-opted director on the TENET Board effective 30 April2015)
Employee: Dr N Abrahams	Sonke Gender Justice Network (service provider, staff member is adirector)
Employee: Prof. MA Dhansay	National Science and Technology Forum (SAMRC supplier, the staff member is adirector)
Employee: Ms Y Singh	One Voice South Africa (SAMRC supplier, the staff member is adirector)
Employee: Ms N Naicker	Public Health Association of South Africa (PHASA) (SAMRC supplier and debtor, the staff member is a director)
Employee: Dr R Maharaj	Lubombo Spatial Development Iniative 2 (SAMRC debtor, the staff member is a director)

NOTES TO THE ANNUAL FINANCIAL STATEMENTS CONTINUED

32. RELATED PARTIES (CONTINUED)

Related party balances

	2019 R	2018 R
Loan accounts - Owing (to) by related parties		
Medres (Pty) Ltd (The loan is not considered to be recoverable and has been written off.)	205,415	199,949
Amounts included in Trade receivable (Trade Payable) regarding related parties		
Dept. of Science and Technology (DST)	-	125,927
Hutchinson Centre Research Institute of SA	-	(1,154,102)
Health Professions Council of South Africa	(2,055)	(1,048)
University of Stellenbosch	171,612	49,963
University of Cape Town	(8,842,631)	(3,559,496)
University of Pretoria	73,556	-
University of Limpopo	(230,000)	-
University of Witwatersrand	(23,000)	-
Sonke Gender Justice Network	-	(1,425,923)
University of Stellenbosch	(1,414,614)	(77,940)
Wits Health Consortium	-	841,310
University of Western Cape	(16,820)	-
University of Pretoria	(378,430)	-
University of Witwatersrand	7,198	-
University of Cape Town	96,043	33,680
Wits Health Consortium	(16,260,151)	(5,531,273)
European and Developing Countries Clinical Trials Partnership (EDCTP)	423	-
Sefako Makgatho University	(3,848,251)	-
University of Western Cape	427,685	2,982
Tertiary Education and Research Networkof South Africa (TENET)	(77,646)	-
Lubombo Spatial Development Initiative 2	808,681	-
Deferred Income (grants received in advance from government)		
Dept. of Health (DOH)	25,756,834	24,916,896
Dept. of Science and Technology (DST)	94,259,975	77,293,298
Committments		
Wits Health Consortium	4,801,204	-
University of Cape Town	2,575,639	-
Sefako Makgatho University	846,379	-

32. RELATED PARTIES (CONTINUED)

	2019 R	2018 R
Revenue - grants received and services rendered to related parties		
Dept. of Health (DOH, revenue from non- exchange)	543,329,565	539,439,474
Dept. of Health (DOH) Contracts, revenue from exchange	17,531,574	456,140
National Research Foundation	3,542,091	-
University of Stellenbosch	486,271	175,793
Council for Scientific and Industrial Research (CSIR)	850,989	1,148,350
University of Witwatersrand	82,679	11,579
Dept. of Science and Technology (DST)	118,067,176	85,645,485
Public Health Association of South Africa (PHASA)	-	218,564
Wits Health Consortium	(231,703)	737,991
Afrigen Biologics and Vaccines	-	75,534
European and Developing Countries Clinical Trials Partnership (EDCTP)	13,969,770	6,499,441
Lubombo Spatial Development Iniative	703,201	-
University of Pretoria	67,131	130,208
UNISA	86,957	123,051
University of Free State	-	23,907
Sefako Makgatho Health Sciences University	-	622,749
University of Cape Town	1,254,482	106,733
Hutchinson Centre Research Institute of SA	-	63,683
University of Western Cape	627,634	293,435
	700,367,817	**635,772,117**
Expenditure such as grants awarded, extra-mural unit grants and collaborative research grants incurred with related party suppliers		
Health Professions Council of South Africa	42,858	13,410
University of Pretoria	11,669,145	7,124,277
UNISA	714,576	729,507
College of Medicine of South Africa	-	1,000
University of Limpopo	14,511,200	13,536,358
CAPRISA	21,133,182	33,692,909
Wits Health Consortium	62,470,511	61,148,587
University of Witwatersrand	22,968,592	23,179,393
University of Zululand	832,190	-
University of Western Cape	11,855,760	7,768,078
University of Free State	-	1,323,464
University of Cape Town	76,634,622	90,642,532
University of Stellenbosch	26,683,149	29,990,772
University of Johannesburg	-	200,000
Mangosuthu University of Technology	1,700,652	5,648,333
Tertiary Education and Research Networkof South Africa (TENET)	876,357	979,683
Sefako Makgatho Health Sciences University	5,826,305	9,726,923
Sonke Gender Justice Network	1,665,053	5,473,961
Hutchinson Centre Research Institute of SA	-	1,154,102
National Science and Technology Forum	26,400	41,100
Public Health Association of South Africa (PHASA)	21,470	112,900
	259,632,022	**292,487,289**

NOTES TO THE ANNUAL FINANCIAL STATEMENTS CONTINUED

32. RELATED PARTIES (CONTINUED)

	2019 R	2018 R
Executive authority information		
Minister: Dr. A Motsoaledi		
No subsistence, travel and other related re-imbursement costs have been paid.		
Director General: Ms. Precious Matsoso		
No subsistence, travel and other related re-imbursement costs have been paid.		
Management information		
Executive Directors/Managers leave balances		
Adv. N Bhuka	-	195,672
Mr. N Buick	154,265	148,332
Dr. R Gordon	99,012	91,237
Prof. G. Gray	360,062	174,537
Prof. M Mphahlele	379,207	313,201
Prof. R Jewkes	172,863	170,126
Dr. M Mdhluli	253,330	222,250
Mr. B Spies	216,344	169,019
	1,635,083	**1,484,374**

33. MEMBER'S EMOLUMENTS

Executive

March 2019 (R)

	EMOLUMENTS	VEHICLE & PARKING & CELLPHONE ALLOWANCE	RE-IMBURSEMENT	ACCOMMODATION AND ENTERTAINMENT	LOCAL AIR TRAVEL AND PARKING	TOTAL
Professor M Sathekge	121,805	14,098	-	5,120	41,185	182,208
Professor E Bukusi	94,148	4,298	-	9,289	191,739	299,474
Doctor P. Hanekom	104,184	-	-	-	62,522	166,706
Doctor Z Kwitshana	144,612	4,580	-	7,374	82,723	239,289
Professor Q Abdool Karim	-	-	-	3,350	-	3,350
Professor M Cotton	44,523	921	-	-	-	45,444
Professor J Mahlangu	55,035	2,763	397	2,440	-29,083	89,718
Advocate N Kadwa	109,282	4,298	-	8,825	83,310	205,715
Doctor R Chikwamba	-	-	-	-	14,340	14,340
Professor W Rae	57,618	3,684	-	8,735	78,611	148,648
Professor B Shaw	141,290	4,298	-	5,351	86,068	237,007
Professor T Sodi	88,910	4,298	-	11,509	85,314	190,031
Professor L Skaal	75,815	6,608	-	8,797	50,725	141,945
Professor S Velaphi	47,006	3,377	-	-	22,705	73,088
Professor L Zungu	70,713	4,623	-	-	41,802	117,138
	1,154,941	**57,846**	**397**	**70,790**	**870,127**	**2,154,101**

March 2018 (R)

	EMOLUMENTS	VEHICLE & PARKING & CELLPHONE ALLOWANCE	RE-IMBURSEMENT	ACCOMMODATION AND ENTERTAINMENT	LOCAL AIR TRAVEL AND PARKING	TOTAL
** Professor M Sathekge	116,817	10,070	-	5,630	46,630	179,147
** Professor E Bukusi	34,762	2,763	-	4,149	66,494	108,168
** Doctor P Hanekom	97,016	-	-	-	46,894	143,910
** Doctor Z Kwitshana	91,908	3,070	-	9,770	101,138	205,886
*** Professor Q Abdool Karim	-	-	-	2,828	9,274	12,102
*** Professor M Cotton	47,567	59	-	-	-	47,626
*** Professor J Mahlangu	70,445	4,522	-	2,828	33,516	111,311
*** Advocate Kadwa	79,149	3,297	-	9,030	61,701	153,177
*** Doctor R Chikwamba	-	-	-	2,828	33,866	36,694
*** Professor WRae	59,592	3,070	-	8,655	16,667	87,984
*** Professor B Shaw	74,490	5,882	-	2,828	34,284	117,484
*** Professor T Sodi	59,722	8,955	400	10,576	45,513	125,166
*** Professor L Skaal	61,119	4,149	233	6,587	23,428	95,516
*** Professor S Velaphi	50,888	5,945	-	1,119	15,596	73,548
*** Professor L Zungu	57,369	3,334	-	1,414	49,136	111,253
	900,844	**55,116**	**633**	**68,242**	**584,137**	**1,608,972**

* Old Board member
** Old and current Board member
*** New Board member

NOTES TO THE ANNUAL FINANCIAL STATEMENTS CONTINUED

33. MEMBER'S EMOLUMENTS (CONTINUED)

EXECUTIVE DIRECTORS EMOLUMENTS

March 2019 (R)

	PACKAGE TOTAL INCL. LEAVE PAYOUT; ALLOWANCES AND LUMP SUMS	BONUS	S & T	COMPANY CONTRIBUTIONS	TOTAL
G Gray (President)	2,796,306	-	42,089	197,552	3,035,947
* N Bhuka (Executive Director)	474,913	-	-	19,900	494,813
N Buick (CFO)	2,622,058	37,335	13,156	252,852	2,925,401
R Gordon (Executive Director)	1,943,411	37,335	34,062	137,490	2,152,298
R Jewkes	1,848,293	37,335	48,868	203,544	2,138,040
MJ Mphahlele (Vice President)	2,287,258	37,335	39,832	161,704	2,526,129
B Spies (Executive Director)	1,514,559	37,335	61,501	193,775	1,807,170
M Mdhluli (CROO)	1,695,008	37,335	2,626	172,258	1,907,227
** M Popo (Executive Director)	229,580	-	-	16,328	245,908
	15,411,386	**224,010**	**242,134**	**1,355,403**	**17,232,933**

* N Bhuka resignation 31 May 2018.
** M Popo appointed 1 February 2019 (Executive Director).

March 2018 (R)

	PACKAGE TOTAL INCL. LEAVE PAYOUT; ALLOWANCES AND LUMP SUMS	BONUS	S & T	COMPANY CONTRIBUTIONS	TOTAL
G Gray (President)	2,690,477	37,335	45,374	188,931	2,962,117
N Bhuka (Executive Director)	1,611,218	37,335	52,016	113,888	1,814,457
N Buick (CFO)	2,528,040	37,335	13,471	236,995	2,815,841
R Gordon (Executive Director)	1,870,143	37,335	36,457	131,422	2,075,357
MJ Mphahlele (Vice President)	2,200,807	37,335	40,390	154,662	2,433,194
B Spies (Executive Director)	1,464,515	-	-	178,815	1,643,330
* R Jewkes (Executive Scientist Research Strategy)	1,481,000	45,434	83,204	163,673	1,773,311
** M Mdhluli (CROO)	959,257	22,771	-	96,967	1,078,995
	14,805,457	**254,880**	**270,912**	**1,265,353**	**16,596,602**

* R Jewkes appointed 1 June 2017 (Executive scientist research strategy in the office of the president)
** M Mdhluli appointed 1 September 2017 (Chief research operations officer).

34. 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 12% of SAMRC's Trade Debtors (R10,465,509) are exposed to currency compared to 63% last year (R24,165,274),

SAMRC's project office does a scenario calculation looking at how much would be lost if there was an unfavourable currency change. On the basis of this outcome, it will be decided whether or not to proceed with a particular project.

Market risk

Interest rate risk

In respect of income-earning financial assets interest- bearing financial liabilities, the table below indicates their average effective interest rates at the reporting date and the periods in which they mature.

Cash flow interest rate risk

FINANCIAL INSTRUMENT	CURRENT INTEREST RATE	DUE IN LESS THAN A YEAR	DUE IN ONE TO TWO YEARS	DUE IN TWO TO THREE YEARS	2019 R	2018 R
Trade and other receivables - normal credit terms	10.25 %	89,082,829	-	-	89,082,829	42,900,802
Cash in current banking institutions	- %	463,366,711	-	-	463,366,711	491,211,168
Trade and other payables - extended credit terms	10.25 %	141,671,156	-	-	141,671,156	118,275,377

NOTES TO THE ANNUAL FINANCIAL STATEMENTS CONTINUED

	2019 R	2018 R

34. RISK MANAGEMENT (CONTINUED)

Foreign exchange risk

The entity does not hedge foreign exchange fluctuations.

Exchange rates used for conversion of foreign items were:

USD - ABSA buying	14.2536	-
USD - ABSA Selling	14.6422	-
USD - FNB buying	14.1778	-
USD -FNB selling	14.7915	-
GBP - ABSA buying	18.5124	-
GBP - ABSA selling	19.0874	-
GBP - FNB buying	18.3915	-
GBP - FNB selling	19.4056	-
Euro - ABSA buying	15.9659	-
Euro - ABSA selling	16.4735	-
NGN - ABSA Selling	23.9486	-
USD - SARB	-	11.8128
GBP - SARB	-	16.6018
Euro - SARB	-	14.5410

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.

35. 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.

36. FRUITLESS AND WASTEFUL EXPENDITURE

Fruitless and wasteful expenditure current year	2,220	210
Recovered and approved	(2,128)	(210)
	92	**-**

Expenditure relates to interest on late payment of Telkom and Government Printing Works accounts and on the Standard Bank salary bank account and from traffic fines.

Interest charged due to negligence on the part of the staff members and traffic fines paid is recovered from the employees, an amount of R2,128 was recovered during the period under review and the balance outstanding will be recovered from the responsible staff members.

37. IRREGULAR EXPENDITURE

	2019 R	2018 R
Opening balance	1,217,564	349,238
Add: Irregular Expenditure - current period	151,335	1,655,061
Less: Amounts condoned	(181,585)	(289,340)
Less: Amounts written off by the Board and awaiting condonation by National Treasury	(1,187,314)	(497,395)
	-	**1,217,564**
Analysis of expenditure awaiting condonation per age classification		
Current period	-	1,217,564
Details of irregular expenditure – current year		
Non compliance with Supply Chain Management Practices – National Treasury - TR 16A 6.1; SCM Practice note 8 of 2007/08: Paragraph 3.2 and NT SCM Instruction No. 7 of 2017/2018: Paragraph 4	9,512	188,099
National Treasury - TR 16A 6.1; SCMPractice note 8 of 2007/08: Paragraph 3.3 and NT SCM Instruction No. 7 of 2017/2018 Paragraph 4	141,823	929,623
Preferential Procurement Regulation 2017,Regulation 8(2) and 8(5)	-	269,176
National Treasury - TR 3 of 2016/2017; Paragraph 8.5	-	268,163
	151,335	1,655,061

Details of irregular expenditure condoned

At its meeting on 29 May 2018; 31 July 2018; 31 October 2018 and 31 January 2019 the Board condoned expenditure within its authority, totaling R30,250; R82,000; R59,823 and R9,512 respectively.

At its meeting in May 2018 the Board approved the write-off of irregular expenditure amounts of R918,138 . The expenditure written-off relates to one tender awarded in 2014 where the incorrect points system was used and awards were made tovendors for transactions under R30,000 who were not tax compliant at the date of award. At its meeting in January 2019 the Board approved the write-off of irregular expenditure amounts of R269,176. The expenditure relates to non compliance with the stipulated threshold for local content applicable to office furniture.

Treasury approval was requested to condone irregular expenditure written-off by the Board.

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 incertain circumstances, provided that he records the reasons for any deviations and reports them to the next meeting of ARIC and the Board and includes a note to the annual financial statements.

All deviations were documented and will be submitted to the Accounting Authority or its delegate in terms of the Delegation of Authority Framework. Deviations were motivated in advance and subsequently approved.

NOTES TO THE ANNUAL FINANCIAL STATEMENTS CONTINUED

39. PUBLIC FINANCE MANAGEMENT ACT (PFMA)

Section 55 (2)

No material losses through criminal conduct were incurred during the period ended 31 March 2018. Irregular and fruitless and wasteful expenditure incurred has been disclosed in notes 35 and 36.

Public Finance Management Act (PFMA) (continued)

Section 53 (3)

The entity may not accumulate surpluses unless written approval of the National Treasury has been obtained. Approval for the retention of the accumulated surplus as at 31 March 2019 has been requested from National Treasury.

Section 54 (2)

In terms of the PFMA and Treasury Regulation 28.3 the entity has developed and agreed to a framework of acceptable levels of materiality and significance.

40. BUDGET DIFFERENCES

Material differences between budget and actual amounts

Income from contracts, grants and services rendered and income from contracts and grants (non -exchange) was higher than anticipated due to project timelines and additional grants received

Employee related costs were lower than anticipated due to the adjustments to the post retirement medical aid plan and the defined benefit pension fund as well as the vacant posts not being filled.

Collaborative research costs were lower than anticipated due to delays in finalisation of research outputs.

During the year under review the SAMRC reviewed the useful life of its assets, certain items of property, plant and equipment useful life was changed, resulting in a decrease in depreciation for the year under review. The decrease in depreciation was not taken into account in the budget.

The weakening of the rand had a favourable impact on the foreign grant and contract funds received.

External research support, consulting and internal audit costs; repairs and maintenance and other expenses were lower than anticipated due in part to cost control and efficiency initiatives.

Infra-structural, communication and statutory costs and laboratory operating expenses were higher than anticiated due to a higher contract income being recognised.

Interest received was lower than anticipated due to a decline in the average balance of cash and cash equivalents.

41. COMPARATIVE FIGURES

The 2017/2018 classification of Revenue from exchange - income from contracts, grants and services rendered was different from 2018/2019 classification, where there was evidence that SAMRC responded to to a request to submit a grant proposal and where intellectual property was not owned by the grantor/funder the revenue was classified as exchange. SAMRC has accepted the interpretation of the Auditor General relating to income received for research and other services performed in respect of contract funding where intellectual property is not owned by the grantor/funder to be classified as income from contracts, grants and services rendered (non-exchange). The change in the classification of income solely of the basis of intellectual property has resulted in the reclassification of one contract for the 2017/2018 year.

Skills development levies (SDL) has been reclassified from employee related costs to general expenses.

The effects of the reclassification are as follows:

	2018 AFTER RECLASSIFICATION R	2018 PREVIOUSLY STATED R
Statement of financial position		
Detailed statement of financial performance		
Revenue from exchange transactions - income from contracts, grants and services rendered	403,918,948	412,358,057
Revenue from non-exchange transactions - income from contracts, grants and services rendered	57,498,648	49,059,539
Employee related costs	356,570,479	359,068,074
General Expenses	697,129,451	694,631,856

42. SERVICES-IN-KIND

During the year under review the SAMRC's Environment & Health Research Unit utilised office space at the University of Johannesburg; Health Systems Research Unit utilised space at a clinic in Gugulethu and the Alcohol, Tobacco and Other Drug Research Unit utilised space at various district hospitals at no cost. The deemed fair rental value of the space is computed at R160,542 (2018: R150,744).

In addition a staff member was seconded from Wits Health Consortium to the SAMRC to provide secretarial support to the President. The estimated annual value of this service is R361,043 (2018: R335,494).

DETAILED INCOME STATEMENT

	NOTE(S)	2019 R	2018 R
Revenue			
Revenue from exchange transactions			
Income from contracts, grants and services rendered		437,493,176	403,918,948
Rental income		7,185,956	5,660,631
Recoveries		1,457	-
Other income		3,756,009	2,608,554
Interest received - investment	20	34,417,767	42,152,540
Gain on foreign exchange		8,998,973	-
Fair value adjustments	25	143,986	246,091
Dividends received	20	129,723	117,690
Total revenue from exchange transactions		**492,127,047**	**454,704,454**
Revenue from non-exchange transactions			
Revenue from non -exchange			
Baseline grant		543,329,565	539,439,474
Income from contracts, grants and services rendered (non-exchange)		72,578,536	57,498,648
Total revenue from non-exchange transactions		**615,908,101**	**596,938,122**
Total revenue	**18**	**1,108,035,148**	**1,051,642,576**
Expenditure			
Employee related costs	21	(370,044,580)	(356,570,479)
Depreciation and amortisation		(14,591,495)	(21,340,453)
Finance costs	22	(313,018)	(749,868)
Lease rentals on operating lease		(5,902,210)	(5,660,661)
Debt Impairment	23	3,769	259,206
Repairs and maintenance		(12,166,586)	(14,139,533)
Loss on disposal of assets and liabilities		(645,767)	(638,021)
Loss on foreign exchange		-	(2,153,763)
General Expenses	24	(707,561,696)	(697,129,451)
Total expenditure		**(1,111,221,583)**	**(1,098,123,023)**
Deficit for the period		**(3,186,435)**	**(46,480,447)**

The supplementary information presented does not form part of the financial statements and is unaudited

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