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# BOPHELO life

## THE COMMUNITY ISSUE

saMRC advancinglife

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## WHY BOPHELO?

The ability to preserve time can be attributed to a number of things: matters that are within our control, and those things we cannot control. Within this, our biggest consideration is how we care for our well-being. Taking care of our well-being requires access to the right health information, particularly from evidence-based research. Most of the time, acquiring that information occurs when our health is already compromised, and we need to know how to deal with the outcome. We preserve time so that we can experience more of life, sustainably. Applying sustainable solutions in a country facing numerous challenges, including high rates of HIV/AIDS, tuberculosis, and non-communicable diseases. The SAMRC plays a crucial role in addressing these challenges through its research and science advocacy. Efforts to lead in this area, particularly at such a pivotal time, demand cutting across communication lines to reach the South African population. This magazine is a SAMRC Corporate Marketing and Communications effort to reach you with the research science that will equip you with health information to advance your life. Taking up a new strategic approach to speak to various audiences in what we hope makes an impact on you and those around you. Bophelo, meaning life, is one way of building on the idea that health research science concerns us all, enabling conversations on health and related social issues.

*Yours in service:*
**The South African Medical Research Council**

| English | isiXhosa | SeTswana |
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## VALUES

| | | |
|---|---|---|
| Pioneering | Ukusungula/ubuvulindlela | Boitsanaape |
| Partnering | ukubambisana/intsebenziswano | Tirisano |
| Excellence | Ukugqwesa/ubuchule | Bokgabane |
| Respect | Intlonipho | Tlhompo/Tlotla |
| Integrity | Intembeko | Botsitso |
| Citizenship | Ubunini | Bodudi |

## VISION

| | | |
|---|---|---|
| Building a healthy nation through research, innovation and transformation. | Sakha isizwe esisempilweni ngophando-nzulu, ngobuchule nokuqwalasela inguqu | Go aga sechaba seo se itekanetseng ebile se ikaegile ka dipatlisiso, bonetsetsi le boitlhamololedi. |

## MISSION

| | | |
|---|---|---|
| To advance the nation's health and quality of life and address inequality by conducting and funding relevant and responsive health research, capacity development, innovation, and research translation | Ukuphucula impilo nobomi besizwe ngokulinganayo, siqwalasela iimfuno zempilo ngokwenza uphando-nzulu, songeze amathuba ngezimali ukwandisa uqeqesho nenguqu kwezenzulu-lwazi. | Go tsweletsa pele boitekanelo le boleng jwa matshelo a setshaba ka go samaga le gosalekalekaneng, re tsweletsapele dipatlisiso tsa maphelo tse di nepagatseng, di bontsha dikatlego, ikgodiso le boitlhamololedi mme ebile re diatswa le go ditshegetsa ka matlole. |

# THE SOUTH AFRICAN MEDICAL RESEARCH COUNCIL

## 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 is realised through research, development, and technology transfer.

## WHO WE ARE

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

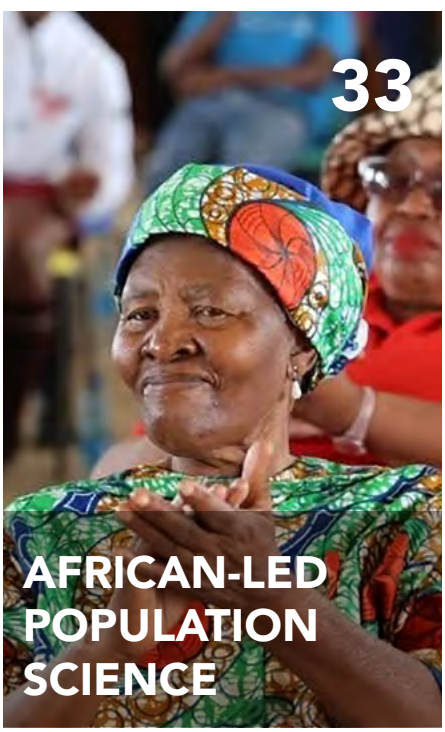
We conduct research on South Africa's quadruple burden of disease: maternal, newborn, and child health, HIV/AIDS and TB, non-communicable diseases, and interpersonal violence. Our work is to acquire evidence-based information to inform health policy and practice and improve the quality and health status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

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

Transformation remains an integral part of building sustainable health research capacity in South Africa. Through Self-Initiated Research (SIR) grants, the Mid-Career Scientist programme, the Bongani Mayosi National Health Scholars Programme, and other programmes and platforms, the SAMRC will continue to address gender, racial, institutional, and geographic parity and strengthen our capacity to flourish in the 21st century. As a custodian of health research, the SAMRC is building a healthy nation through research and innovation.

## *In this issue...*





PRESIDENT & CEO

# *Foreword*

*Africa stands at a defining moment in its health and development journey. Across our continent, the scale and complexity of the disease burden are undeniable: persistent endemic infectious diseases, a rapidly rising tide of non-communicable conditions including mental health, the health consequences of climate change, deep social disparities and economic inequality, the enduring effects of historical underinvestment in research capacity, and decreasing global solidarity and multilateralism with devastating consequence on health and research financing architecture. Yet, alongside these seemingly intractable challenges, there is an equally powerful truth that Africa has the knowledge, talent, lived experience, demographic potential, and scientific capability to shape its own health future and health outcomes.*

The theme of this edition of Bophelo magazine, "African Solutions in Africa," speaks directly to this moment. It reflects a growing and necessary imperative that Africa's health challenges are best understood, interrogated, and addressed through African-led research, insight, and innovation. Solutions informed by our experience and realities, that emerge from our contexts and our communities, are more likely to be effective, sustainable, and transformative.

For too long, much of the global health agenda has been driven by evidence generated from other geographies, often in vastly different social, genetic, environmental, and health system contexts. While such knowledge has value, it cannot fully capture the nuances of African populations or the structural realities of African health systems. Imported models, tools, and policies, when applied without adaptation, risk misdiagnosis, ineffective interventions, and missed opportunities for impact, and, at worst, may lead to adverse outcomes.

The mandate of the SAMRC is clear: to improve the health and quality of life of people through research, development, and innovation. This mandate extends beyond national borders. As one of the continent's leading health research institutions, the SAMRC recognises its responsibility to meet the continent's needs and to contribute to Africa's collective scientific strength and support solutions that resonate across diverse African settings.

This edition of Bophelo showcases what African-led science looks like in practice. From cutting-edge genomic and multi-omics research that reflects Africa's unparalleled genetic diversity, to context-responsive approaches to hypertension, chronic kidney disease, and malaria elimination, the work highlighted here demonstrates the power of research, rooted in local evidence. It illustrates how African scientists are not merely participating in global conversations but actively shaping them.

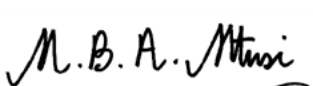
Equally important is the emphasis on innovation that bridges science and lived experience. Tools such as AfriCAT, developed specifically for African adolescents, show how technology, data science, and participatory research can be combined to address mental health needs in ways that are culturally relevant and scalable. Population-based research platforms like SAPRIN remind us that understanding communities over time is essential for health equity, policy relevance, and system-level change.

The theme "African Solutions in Africa" does not suggest isolationism or disengagement from the global scientific community. On the contrary, Africa benefits enormously from international collaboration, shared learning, and equitable partnerships. The SAMRC values and actively pursues partnerships with institutions, funders, and researchers across the world. However, partnership must be grounded in mutual respect, shared values, collaborative leadership, and recognition of African expertise. True collaboration amplifies local capacity rather than substituting for it and strengthens African institutions as centres of excellence in their own right.

Another defining feature of African-led health research is its holistic nature. Health on this continent cannot be separated from social conditions, culture, environment, or history. Indigenous knowledge systems, community practices, and social structures all influence health behaviours and outcomes. Integrating these dimensions with biomedical science enriches our understanding and expands the range of possible solutions. It allows research to speak not only to clinics and laboratories, but also to households, villages, and policymakers.

As Africa confronts the health impacts of climate change, urbanisation, demographic shifts, and economic inequality, the need for locally generated evidence will only intensify. We must continue to invest in research infrastructure, human capital, and innovation ecosystems that enable African scientists, particularly early-career researchers and women, to thrive. Transformation, equity, and sustainability are not peripheral goals; they are central to building resilient health research systems for the future.

As you read this edition, I invite you to reflect on the possibilities that emerge when Africa leads its own health agenda. African solutions, grounded in African realities and strengthened through global partnership, are not only possible, but they are also essential.



**Professor Ntobeko Ntusi**
**President and CEO**
**South African Medical Research Council**

# Africa and the Quest for an HIV Vaccine

South Africa has taken a historic step in the global effort to develop an HIV vaccine targeting strains circulating in Southern Africa, with the launch of the BRILLIANT 011 first-in-human clinical trial at the Desmond Tutu HIV Foundation (DTHF) site at Groote Schuur Hospital.

For more than four decades, HIV has remained one of the world's most formidable public health challenges. Despite remarkable advances in treatment and prevention, a safe and effective vaccine has remained elusive. Now, a groundbreaking clinical trial led by African scientists is reshaping the global HIV vaccine landscape and positioning South Africa and the continent at the forefront of innovation.

The BRILLIANT-011 HIV vaccine trial, led by the South African Medical Research Council (SAMRC) in partnership with the Desmond Tutu Health Foundation and the Wits Health Consortium, is being described as a historic milestone. It is the first HIV vaccine to enter a first-in-human clinical trial designed by African scientists using vaccine products originally discovered in African trial participants and tailored specifically to HIV strains circulating in Southern Africa.

What sets BRILLIANT-011 apart from previous HIV vaccine efforts is both its scientific strategy and its context. HIV's ability to mutate rapidly has long frustrated vaccine development, allowing the virus to evade immune

responses. BRILLIANT-011 responds to this challenge with a novel "cocktail" approach, administering two vaccine products together to stimulate the immune system to produce broadly neutralising antibodies capable of targeting multiple HIV variants.

The trial also uses a new adjuvant, a substance that boosts immune responses, that has never before been tested with this specific combination of immunogens. This rational, data-driven approach reflects how HIV vaccine science has evolved over the past two decades, moving away from trial-and-error toward precision design informed by advanced genetic and immune sequencing technologies.

Crucially, the trial acknowledges both viral and human diversity. Africa is home to the most genetically diverse populations in the world, a factor that significantly influences immune responses. Testing vaccines in the populations where they are intended to work is therefore not optional but essential.

The scientific foundations of BRILLIANT-011 were laid through years of research involving African trial participants. Vaccine candidates were first identified in Africa, further developed internationally, and are now being tested under African leadership.

As an early-phase trial, BRILLIANT-011 is not designed to prove vaccine effectiveness. Its primary goals are safety and immune response. Success at this stage would mean demonstrating that the vaccine regimen can safely trigger early immune responses, precursors to broadly neutralising antibodies.

Participant safety and ethical conduct are central to the trial. As a first-in-human study, BRILLIANT-011 follows rigorous ethical standards, with robust informed consent processes and continuous safety monitoring.

Equally important is community engagement. Researchers work closely with community advisory groups, sharing regular updates and incorporating community input into trial design. This partnership approach helps build trust and ensures that science remains responsive to the needs of those most affected by HIV.

South Africa is entering a pivotal period in HIV prevention, with plans to roll out long-acting pre-exposure prophylaxis (PrEP) using lenacapavir. While such tools are highly effective, vaccines remain the most sustainable long-term solution for controlling infectious diseases.

The future of BRILLIANT-011 and similar trials depends on sustained funding and political commitment. Following abrupt funding cuts to major international programmes in early 2025, support from the Gates Foundation has enabled the continuation of BRILLIANT-011 and a companion study.

Long-term success, however, will require greater investment from African governments and stakeholders, not only to advance HIV vaccine research, but to strengthen scientific capacity and train the next generation of African researchers.

# ‘Umlawulo wee ntombi ezincinci nama khwenkwe’:

## Alcohol provision for adolescent girls and boys during celebrations in rural villages in the Eastern Cape

In many black communities in South Africa, particularly among Nguni-speaking communities in the Eastern Cape, the December holiday period remains a culturally significant time for the observance of traditional practices and rituals. These include *ulwaluko* (traditional male circumcision), *intonjane* (a young girl’s transition into womanhood), *ukwendisa* (the accompaniment of a bride to her marital home), *ukuqatywa komntwana* (the introduction of a child to the ancestors), and *isazimzi* (the ritual introduction of a newly established household to the ancestors and wider clan).

December is especially conducive to these practices as family members working in urban centres return to their rural homes, allowing ceremonies to be conducted with the full presence of kin, neighbours, and the broader community. These rituals play a vital role in reinforcing identity, intergenerational continuity, and social cohesion. Celebrations marking the successful completion of these rites are central to village life. Traditionally, preparations included the slaughtering of livestock such as cattle, sheep, or goats, alongside the brewing of umqombothi, a traditional beer made from maize meal, sorghum malt, yeast, and water. While these practices continue, contemporary celebrations increasingly include commercially produced alcohol such as beer, brandy, and whisky. In many settings, alcohol provision has become a significant feature of ceremonies, and for some attendees a primary incentive for participation.

## When celebration becomes early exposure to alcohol

Within village structures, the provision and distribution of food and alcohol during ceremonies is carefully regulated. This responsibility rests with Injoli Zelali, an adult circumcised man appointed by the community to divide meat and alcohol into agreed portions. These portions are served according to recognised social categories (amahlelo), which reflect age, gender, status, and social position within the village.

An emerging and concerning shift has been observed in some rural communities: underage adolescent girls (iintombi ezincinci) are increasingly recognised as one such category and allocated alcohol during ceremonies, a practice referred to as umlawulo wee ntombi ezincinci. It is no longer uncommon for school-going girls to send representatives to request their portion of alcohol from ceremony hosts or iinjoli zelali, and for these requests to be granted.

Alongside this development is the longstanding practice of ukukhutshwa kotywala bamakhwenkwe, in which uncircumcised underage adolescent boys receive umqombothi as a gesture of appreciation for assisting with its preparation. During the brewing process, adolescent boys are often tasked with filtering umqombothi, separating the liquid from the solid residue (intsipho). Once fermentation is complete, it is customary for these boys to be given large quantities of umqombothi, typically in five-litre containers (iibhekile), as compensation for their labour.

While culturally embedded, these practices have increasingly resulted in adolescents consuming large volumes of alcohol during celebrations. Observations from multiple villages over time suggest that intoxication among underage boys and girls during ceremonies is not uncommon and is frequently met with amusement or indifference by adults. Such responses signal a degree of social acceptance and normalisation of underage drinking within ceremonial contexts.

## Normalisation, risk and the adolescent body

For many adolescents in rural villages, ceremonial alcohol provision represents their first exposure to drinking. This initiation occurs in a highly sanctioned cultural setting,

which implicitly frames alcohol use as acceptable and even expected. Crucially, this early exposure often involves binge drinking, defined as the consumption of large quantities of alcohol within a short period. Extensive South African and international research demonstrates that early alcohol use has significant developmental consequences. Adolescence is a critical period of neurological, emotional, and social development. Alcohol consumption during this stage disrupts brain maturation and is associated with long-term impairments in cognitive function, emotional regulation, and decision-making. Educational outcomes are also affected. Consistent alcohol misuse among adolescents is strongly linked to poor school attendance, declining academic performance, and increased dropout rates, patterns that have been documented in many rural communities in the Eastern Cape. These outcomes further constrain future employment prospects and perpetuate cycles of poverty and marginalisation.

The risks are not evenly distributed. Research shows that underage drinking among boys is associated with heightened aggression and physical violence, including weapon-related assaults involving knives, machetes, or axes. Among adolescent girls and young women, harmful alcohol use significantly increases vulnerability to sexual violence and coercion. Lowered inhibitions associated with intoxication are linked to unplanned sexual activity, multiple concurrent partnerships, reduced condom use, and increased risk of unintended pregnancy and sexually transmitted infections, including HIV.

Within this context, the ceremonial provision of alcohol does more than mark celebration; it becomes a pathway into sustained patterns of risk that extend well beyond the event itself.

## Community leadership as prevention

Providing alcohol to minors communicates a powerful social message: that underage drinking is permissible within the community. This perception persists even though many elders do not support or condone the practice. The contradiction between private disapproval and public practice emphasises the need for collective dialogue and leadership.

There is an urgent role for Injoli Zelali, ceremony hosts, traditional leaders, councillors, and faith leaders to initiate community-wide discussions aimed at discontinuing the provision of alcohol to minors. Such action should not be framed as an erosion of culture, but rather as a reaffirmation of cultural values that prioritise the protection, dignity, and future well-being of young people. Health authorities also have a critical role to play. The Department of Health and healthcare practitioners serving rural villages, including nurses and health promoters, should strengthen targeted health education initiatives that address the risks of early alcohol exposure. These efforts are most effective when undertaken in partnership with communities, respecting cultural contexts while clearly communicating scientific evidence.

Safeguarding adolescents does not require abandoning tradition. Rather, it calls for thoughtful adaptation, ensuring that cultural practices continue to serve their intended purpose: strengthening communities, honouring heritage, and supporting the healthy transition of young people into adulthood.

# AfriCAT:

## A Smart, African-Led Innovation to Transform Adolescent Mental Health Care

Depression and anxiety are among the leading causes of disability for adolescents worldwide. In Africa, these conditions are often under-identified and under-treated. Health systems face persistent challenges, including limited specialist staff, high patient volumes, weak referral pathways, and insufficient access to culturally appropriate tools. Many adolescents with significant symptoms are never formally assessed, leaving them without the support they need.

In South Africa, studies estimate that 20–30% of adolescents experience symptoms consistent with depression or anxiety. Similar patterns have been reported across the continent. Despite this, routine mental health assessments in schools, primary care clinics, or community programmes remain uncommon. Where assessments do occur, the tools used are often developed outside Africa and may not accurately reflect local cultural contexts or differences in symptom severity. This can make it difficult

for healthcare providers to determine which adolescents need urgent care and which require monitoring or lighter interventions.

AfriCAT, short for African Computerised Adaptive Test, was developed specifically for African adolescents to address these gaps. A Computerised Adaptive Test (CAT) is a type of assessment that adapts in real time: it selects questions based on a person's previous answers, allowing for faster and more precise measurement of symptoms. Unlike traditional questionnaires that ask the same questions to everyone, CAT focuses on what is most relevant for each adolescent, reducing the time needed and minimising fatigue or frustration.

Led by Dr Bianca Moffett at the SAMRC/Wits-Agincourt Unit, and supported by the inaugural Mental Health Data Prize Africa, AfriCAT applies advanced psychometric modelling and data science to identify, triage, and monitor adolescent depression and anxiety. The project uses large-scale population data from the Kenya National Adolescent Mental Health Survey, which provides one of the most comprehensive datasets on adolescent mental health in Africa. Machine learning helps select the most informative questions, while stopping rules ensure accurate results with minimal assessment length.

AfriCAT is designed for use by clinicians, lay counsellors, and other frontline workers. The tool is mobile-compatible and web-based, featuring a youth-friendly interface design and culturally contextualised language. It can rapidly estimate the severity of depression, anxiety, social anxiety, and suicidal ideation, and track symptoms over time, enabling healthcare providers to make informed, evidence-based decisions.

## From Measurement to Meaningful Care

AfriCAT is more than a testing tool; it is a bridge to effective mental health care. The platform supports measurement-based care, an approach where interventions are guided by systematic symptom monitoring rather than guesswork. Repeated assessments allow for early detection of worsening symptoms and ensure adolescents receive the appropriate level of support.

The development process involved extensive participatory design. Adolescents, caregivers, educators, healthcare workers, and policymakers in South Africa and Kenya contributed through workshops, interviews, and focus group discussions. Adolescents with lived experience of depression or anxiety were employed as co-researchers, providing insight into question phrasing, interface usability, and the overall assessment experience. This ensures the tool resonates with the young people it aims to serve.

Data from AfriCAT can also support health system planning. Aggregated, anonymised results may help clinics identify service gaps, inform stepped-care models, and prioritise resources where they are most needed. The tool follows an open science model, making algorithms, item banks, and code freely available to other African research teams, promoting adaptation and expansion in different contexts. By combining science, technological innovation, and youth participation, AfriCAT represents an African-led solution to a critical mental health challenge. It brings precision, efficiency, and relevance to adolescent mental health assessment, making it easier for health systems to reach those most in need and ultimately improving care outcomes across the continent.

# Health Approaches to Human and Equine Medicine

Humans and horses share many biological and physiological characteristics. These similarities make horses valuable models for understanding human health. Anatomy, organ systems, and how drugs are processed in the body often show parallels, creating opportunities to learn from one species to benefit the other.

The One Health framework highlights the connections between human, animal, and environmental health. By studying horses alongside humans, researchers can explore disease mechanisms, treatments, and preventive strategies that may help both species. For example, therapies developed for musculoskeletal injuries in horses have informed approaches in human orthopaedics and regenerative medicine.

## Research and Therapeutic Advances

Comparative research has practical applications in medicine. Stem cell therapies, gene modification, and adoptive cell treatments that are widely used in humans have parallels in veterinary medicine. Similarly, knowledge from human viral diseases, such as HIV and influenza, can inform understanding and management of equine viral diseases, like African horse sickness.

Horses are also used in studies of orthopaedics, tendon and ligament injuries, and cartilage repair. Because their size and physiology are closer to humans than those of smaller lab animals, insights gained from horse studies often translate more effectively to human medicine. Beyond physical health, horses are involved in therapeutic programmes for mental health, supporting conditions like post-traumatic stress disorder (PTSD) and autism spectrum disorder (ASD).

## Environment and Health Systems

Horse health is closely linked to environmental factors such as clean water, nutritious feed, and safe housing. Managing these conditions benefits both the animals and the humans who rely on them. The horse industry supports livelihoods, providing employment and economic opportunities for communities. Integrating human and equine health research within the One Health framework encourages holistic approaches. Comparative studies can improve disease management, inform preventive strategies, and support the development of therapies that address the needs of both humans and horses. Environmental stewardship, combined with biomedical research, strengthens health outcomes across species.

# Decoding Genomes for Safer Medicines in Africa

*Medicines are essential for modern healthcare, but the same drug can work very differently for different people. Some patients may respond well, others may experience little benefit, and a few may have serious side effects. Much of this variation comes from genetic differences, the unique way each person's body absorbs, metabolises, and clears drugs.*

Understanding these differences is especially important in Africa. The continent has the world's most genetically diverse populations, yet most research on drug safety and effectiveness has focused on European and Asian populations. This leaves a gap: many medicines prescribed in Africa may not work as intended, increasing risks of side effects, treatment failure, and wasted healthcare resources.

## African-Led Pharmacogenomics Research

Pharmacogenomics is the study of how genes affect a person's response to medicine. By identifying genetic markers linked to better or worse outcomes with specific drugs, healthcare providers can select the safest and most effective treatment from the start.

At the University of Cape Town, the SAMRC–PREMED Unit, led by Professor Collet Dandara and Associate Professor Phumla Sinxadi, is generating African pharmacogenomic evidence to improve prescribing. Their work spans a wide range of conditions, including cancer, HIV, malaria, hypertension, diabetes, and pregnancy-related complications like pre-eclampsia. For example, in breast cancer treatment, the team studies how genetic differences influence response to drugs like tamoxifen, helping clinicians identify who will benefit most and who may need alternative therapy.

The unit also trains the next generation of African scientists through hands-on research, mentorship, and collaborations across the continent. Students gain expertise in genomics, data analysis, and clinical translation, ensuring sustainable African leadership in precision medicine.

## From Research to Health Impact

African pharmacogenomic research has real-world implications. By tailoring treatments to local populations, it reduces preventable side effects, improves treatment success, and saves health system resources. Beyond individual care, these insights inform national treatment guidelines and public health strategies.


Collaboration is key. The unit works with clinicians, policymakers, and researchers across Africa through networks like the African Pharmacogenomics Network. Open sharing of knowledge ensures African perspectives guide the development of medicines that are both effective and safe for local populations.

By generating African-specific evidence, the SAMRC–PREMED Unit is transforming precision medicine from a global concept into a practical reality on the continent. Patients, clinicians, and health systems all benefit from treatments that are safer, more effective, and informed by African science.

# Addressing Hypertension in Africa Through Context-Responsive Research

## The Growing Challenge

High blood pressure, or hypertension, is one of Africa's most widespread health problems. Across the continent, rates are rising, and in South Africa, roughly one in three adults has elevated blood pressure. Many people do not know they have the condition, and even fewer receive effective treatment. This combination of high prevalence and low awareness puts individuals at risk for stroke, heart failure, kidney disease, and other serious complications.

Part of the challenge is that hypertension is often treated based on guidelines developed outside Africa, in Europe or North America. While these guidelines are scientifically sound in their original settings, they may not work as well for African populations. People of African ancestry often develop high blood pressure earlier and experience more severe complications. Some commonly prescribed medicines, such as ACE inhibitors or beta-blockers, may be less effective as first-line treatments, leaving patients cycling through multiple drugs without optimal control.

## Understanding African Biology

To provide better care, researchers are examining how genetics, environment, and lifestyle factors influence hypertension in African populations. The South African Medical Research Council (SAMRC) is leading large-scale studies that look at epigenetics, changes in gene activity caused by factors such as diet, stress, and environment, without altering the DNA sequence itself. These studies help identify patterns that increase the risk of developing hypertension and may reveal which treatments are most effective for specific groups. By studying these patterns in local populations, scientists can offer evidence that is directly relevant to African communities. This research supports earlier detection, more effective treatment selection, and better long-term management. For example, identifying high-risk individuals before they develop severe disease allows healthcare workers to provide targeted advice, monitor progress, and intervene early.

## From Research to Implementation

Research findings are guiding new approaches to screening, prevention, and care. Schools, workplaces, and clinics can use biological and lifestyle information to focus attention on those most at risk. Health systems can design programmes that are tailored to African patients, rather than applying international guidelines without modification.

The broader goal is to reduce preventable complications, improve quality of life, and make health services more efficient. Hypertension is no longer just a medical issue; it is a public health concern that requires policies, community engagement, and care models that respond to local realities. By generating African evidence and integrating it into practice, researchers and health professionals are helping communities manage blood pressure more effectively and safely.

# Understanding Chronic Kidney Disease in African Populations

Chronic kidney disease (CKD) is becoming a major health problem in Africa, yet it often goes unrecognised until it is at an advanced stage. Across the continent, CKD affects many adults in their most productive years, creating serious health, social, and economic challenges. Late diagnosis is common, which means treatment options are limited and costly. For families and health systems with scarce resources, this can be devastating.

The causes of CKD are complex. High blood pressure, diabetes, obesity, and urban lifestyle changes all play a role. Infectious diseases such as HIV, certain medications, and widespread use of traditional or herbal remedies also contribute. Genetic factors increase the risk for some populations, while in many cases, the cause remains unknown. These overlapping factors highlight the need for local research that takes African contexts into account.

## Why Imported Models Fall Short

Currently, the equations and diagnostic tools used to detect CKD in African settings are often developed in Europe, North America, or Asia. These tools do not always reflect the genetic, dietary, and environmental differences present in African populations. For example, creatinine-based equations used to estimate kidney function can be influenced by muscle mass and nutrition, leading to inaccurate results if applied without adjustment.

When diagnostic tools are not tailored to local populations, people may be misclassified, either falsely reassured or incorrectly diagnosed. Misdiagnosis delays early treatment, wastes limited resources, and can worsen health outcomes. Accurate, locally validated tools are critical for timely detection and effective intervention.

## Building African Solutions

Addressing CKD requires African-led research that generates context-specific evidence. The CKD-Africa Collaboration, led by the SAMRC Non-Communicable Diseases Research Unit, is working to harmonise data from across the continent. By standardising definitions, measuring kidney function consistently, and tracking trends over time, the collaboration aims to provide reliable information for policymakers, clinicians, and communities. Researchers are also developing biobanks and exploring population-specific biomarkers to support early diagnosis and risk prediction. This approach allows interventions to be better targeted, reducing preventable complications and treatment costs. Strengthening genomic and epidemiological capacity ensures that solutions are sustainable and locally driven.

For individuals and communities, these efforts mean earlier detection, better access to care, and improved understanding of how lifestyle, environment, and genetics interact to affect kidney health. CKD in Africa illustrates a broader lesson: health solutions are most effective when they are developed locally, informed by real-world experience, and supported by strong policy and community engagement.



# Youth Empowerment in African Pharma Manufacturing

The Biomedical Research and Innovation Platform (BRIP) at the SAMRC coordinated the programme, working closely with the bioprocessing departments at Stellenbosch University and the University of Cape Town. This collaboration ensured that academic training reflects what industry expects in practice.

The results speak clearly. From the first three cohorts, more than 70% of participants secured positions in industry, while 18% continued with postgraduate studies. The fourth cohort achieved 85% internship placement in six-month paid roles. Industry participation has also grown. In 2021, only two industry partners were involved.

Today, more than 12 companies collaborate with the programme, showing increasing trust and demand.

Equally important is who the programme reaches. Across four cohorts, 63% of participants have been women. More than 85% came from historically disadvantaged institutions across South Africa. Participants from other African countries, namely Kenya, Malawi, Ethiopia and Nigeria, were also included, making up 5.7% of the total. This diversity strengthens not only representation but also the future of the sector in Africa itself.

## Building a Sustainable Bioeconomy

The success of the CSSFF–SAMRC programme did not happen by chance. It was the result of careful coordination between universities, national research bodies, and private industry. Each partner plays a role. Universities align their teaching with industry needs. Research institutions provide direction, infrastructure, and funding support. Companies offer practical exposure, mentorship, and employment opportunities.

This three-way collaboration builds more than skills. It strengthens the biopharmaceutical ecosystem. The programme continuously evolved, with training modules updated after each cohort based on industry feedback.

A strong soft-skills component has also been added, including CV writing and interview preparation. These are often the practical steps that determine whether a graduate secures employment.

There is no single formula that works for all youth development programmes. However, what this initiative demonstrates is that training must be practical, responsive, and connected to real industry demand. Africa does not need training centres that simply produce certificates. It

needs centres that prepare young professionals to enter, remain in and strengthen the workforce.

Building on this momentum, the SAMRC has launched the Centre for Advanced Training and Innovative Research (CATIR) in Pretoria. This initiative brings together the SAMRC, Thermo Fisher Scientific, and the Department of Science, Technology and Innovation. CATIR provides hands-on training in advanced molecular techniques and laboratory management, further strengthening scientific capacity in South Africa.

If Africa is to manufacture its own medicines and respond effectively to future health challenges, investment must continue in people and partnerships. The CSSFF–SAMRC programme offers a practical example of how collaboration can move beyond theory and produce measurable outcomes. It shows that when institutions share a common goal, young talent can find opportunity, industry can grow, and health systems can become more self-reliant.


# All You Need to Know About Mpox and Its Prevention


As Mpox continues to pose a serious public health challenge across parts of Africa, health authorities are calling for calm, informed action grounded in science. The South African Medical Research Council (SAMRC) is at the forefront of regional efforts to strengthen preparedness, support evidence-based decision-making, and ensure that communities have access to reliable information to prevent the spread of the disease.

## What is Mpox?

Mpox is a viral disease caused by the monkeypox virus, a member of the orthopoxvirus family. It was first identified in humans in 1970 and is endemic in parts of Central and West Africa. While historically linked to animal-to-human transmission, recent outbreaks have highlighted sustained human-to-human spread.

Mpox typically presents with symptoms such as fever, headache, muscle aches, back pain, swollen lymph nodes, fatigue, and a distinctive rash that may progress to lesions. Most people recover fully, but severe illness can occur, particularly among vulnerable groups such as young children, pregnant women, and individuals with weakened immune systems.

## A Concerning Regional Picture

The situation in the Democratic Republic of Congo (DRC) raised alarms among public health experts. Rapid human-to-human transmission, emerging modes of spread, and a disproportionate impact on children under the age of 15.

In response to this growing threat, the Africa Centres for Disease Control and Prevention (Africa CDC) declared Mpox a public health emergency of continental security on 13 August 2024, the first time this designation has been used. This move enables Africa CDC to mobilise resources, coordinate cross-border action, and support affected countries through an Incident Management Team. At the global level, the World Health Organisation (WHO) declared Mpox a Public Health Emergency of International Concern (PHEIC) on 14 August 2024, highlighting the need for international solidarity and a unified response.

## SAMRC's Role in Strengthening the Response

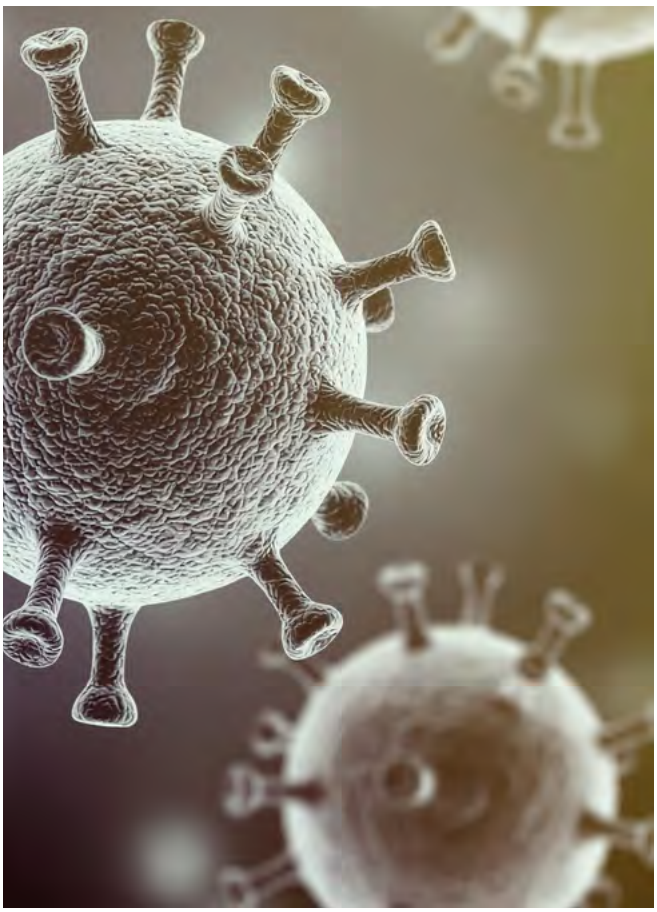
The SAMRC is playing a strategic role in shaping Africa's response to Mpox through research leadership, evidence synthesis, and stakeholder engagement. The Global Research Collaboration for Infectious Disease Preparedness (GloPID-R) Africa Hub, hosted by the SAMRC, has convened key stakeholders and funders to gather real-time intelligence on the outbreak, particularly in the DRC.

These engagements culminated in evidence briefing document developed by GloPID-R Africa Hub in collaboration with the Pandemic PACT programme. The briefing was shared with the European & Developing Countries Clinical Trials Partnership (EDCTP), GloPID-R membership and the SAMRC, outlined priority interventions required to curb the spread of Mpox, including strengthening surveillance and laboratory capacity, improving risk communication and community engagement, ensuring access to medical countermeasures, and enhancing cross-border coordination. Through this work, the Africa Hub has also identified key gaps in the mpox outbreak response, including insufficient real-time data from several Member States, limited operational research to understand circulating clades and transmission pathways, fragmented coordination between national and regional stakeholders, delayed access to diagnostics and vaccines, and persistent gaps in community engagement that contribute to under-reporting and stigma.

"Through these strategic engagements, the SAMRC is better positioned to understand and address research priorities, with the Africa Hub playing a pivotal role in identifying gaps in the response to the outbreak," says Dr Duduzile Ndwandwe, Senior Specialist Scientist leading Vaccine Implementation, Clinical Trial Registration and Pandemic Preparedness research at Cochrane South Africa, an intramural research unit of the SAMRC.

## Informing Vaccine Decisions

Cochrane South Africa has also been involved in a continent-wide initiative to compile and synthesise scientific evidence to support National Immunisation Technical Advisory Groups (NITAGs). This work is critical in helping countries make informed decisions about vaccine introduction and broader public health strategies. "With these initiatives, the SAMRC is poised to ensure a coordinated and effective response to the Mpox outbreak, grounded in the latest scientific research and public health best practices," Dr Ndwandwe explains. "Our objective is to ensure that every individual has access to critical information necessary to curb the spread of this disease. While vigilance remains vital, it is equally



important that we respond with calm, informed actions rather than succumbing to panic or misinformation."

## Vaccine Access: A Major Challenge

Although the Mpox situation has stabilised in several countries, vaccine access remains one of the most critical constraints in sustaining control efforts. At the height of the outbreak, Africa required an estimated 10 million Mpox vaccine doses, yet only around 20,000 doses were initially available. This severe imbalance prompted Africa CDC to declare Mpox a Public Health Emergency of Continental Security (PHECS) in August 2024, a historic first for the continent.

Following months of intensified surveillance, improved coordination, declining transmission rates in several affected regions, and strengthened national response capacities, Africa CDC lifted the continental emergency designation on 22 January 2026. However, the decision to remove the emergency status does not diminish the need for continued investments in vaccine access, diagnostic capacity, and operational readiness. The risk of resurgence, particularly in high-burden settings, remains significant.

Several initiatives are underway to close the Mpox vaccine gap, including the planned distribution of 50,000 doses, the HERA–Bavarian Nordic partnership securing 215,000 doses, and the accelerated WHO EUL process to expand regulatory access. Most recently, Africa CDC received an additional 110,000 MVA-BN doses from Bavarian Nordic, bringing the company's total contributions to 165,000 doses for Africa. Through the Mpox Access and Allocation Mechanism, these newly donated doses have been allocated to Uganda, one of the most affected countries in 2025, strengthening its outbreak response and improving equitable vaccine access across the continent.

While these efforts reflect growing momentum, they also underscore the continued need for sustained financing, regional manufacturing, and fair procurement mechanisms to secure long-term vaccine readiness for Africa.

## What Can the Public Do?

Public awareness and prevention remain key pillars of Mpox control. Individuals can reduce their risk by:

- Avoiding close contact with people who have a rash or symptoms consistent with Mpox
- Practising good hand hygiene, including regular handwashing
- Seeking medical advice promptly if symptoms develop
- Relying on credible sources of information and avoiding the spread of misinformation

Education, early detection, and community engagement are essential to breaking chains of transmission.

*"The focus remains on educating the public, ensuring access to vaccines, and coordinating a robust international response to contain the outbreak and prevent further spread,"*
*says Dr Ndwandwe.*


# Strengthening Cross-Border Efforts to Reduce Malaria

*Malaria continues to affect the youngest and most vulnerable communities in Africa. Transmission is shaped by environmental, social, and regional factors, making it difficult to address with a single approach. Eliminating malaria requires strategies that are evidence-based, locally informed, and coordinated across borders.*

South Africa is committed to malaria elimination following agreements made by the African Union, the World Health Assembly, and the Southern African Development Community (SADC). National efforts began in 2012, with the first elimination target set for 2018 and revised for 2030. Progress is challenged by insecticide and drug resistance, climate change, vector adaptation, and movement across borders, particularly from high-burden provinces in southern Mozambique.

## Regional Collaboration and Evidence

Effective malaria control relies on regional partnerships. The Lubombo Spatial Development Initiative (LSDI), launched in 1999, brought South Africa, Mozambique, and Eswatini together to coordinate interventions. Through combined vector control, the use of effective insecticides, and introducing combination therapy, malaria prevalence

dropped by 75% in southern Mozambique and approached elimination in Eswatini and South Africa.

Building on this foundation, the SAMRC Malaria Research Group (MRG) now monitors and evaluates malaria reduction in border areas. Their work combines decades of expertise, long-term data, and partnerships with local communities to ensure that interventions are both effective and sustainable. These efforts show that African-led research and regional cooperation can achieve significant public health outcomes.

## Sustaining Progress

Malaria elimination is not a one-time effort; it requires ongoing commitment from governments, health systems, and communities. Continuous monitoring, innovation, and adaptive strategies are needed to respond to evolving challenges, such as vector resistance or climate impacts. By focusing on evidence-based interventions, cross-border coordination, and locally led research, South Africa and its regional partners demonstrate how malaria elimination is possible. Success depends on keeping communities engaged, maintaining political will, and integrating scientific knowledge into everyday policy and practice. The lessons learned provide a model for other regions facing persistent infectious disease challenges, highlighting the value of African leadership in public health.

# Building Africa's Multi-Omics Future:

## The Role of the SAMRC Genomics Platform in Advancing African-Led Health Innovation

The South African Medical Research Council (SAMRC) Genomics Platform (GP) was created to give African scientists access to advanced sequencing technologies and infrastructure, allowing them to lead research relevant to the continent. As a national core facility operating on a not-for-profit model, it enables local researchers to perform large-scale genomic studies in South Africa rather than sending samples abroad. Recent upgrades, including the ultra-high-throughput DNBSEQ-T7 sequencer, allow for rapid, high-resolution studies across genomics, transcriptomics (gene activity), epigenomics (chemical changes to DNA that influence gene activity), and other molecular layers collectively known as multi-omics. By integrating these approaches, scientists can study diseases in ways that are specific to African populations, which is essential given the continent's genetic diversity and unique disease burdens.

## Closing the African Genomics Gap

Despite Africa's rich genetic diversity, most genomic research has focused on European and Asian populations. This underrepresentation limits understanding of how medicines work, how diseases develop, and how interventions should be tailored for African communities.
The GP addresses this gap by producing population-representative datasets that reflect African biology, empowering local scientists to become knowledge producers rather than just users of international data. Collaborative projects include studies on rare diseases, cancer, infectious diseases, and other health challenges, ensuring that research translates into practical benefits for African patients.


## Training, Innovation, and Health Impact

The GP is also a hub for training, giving students, interns, and laboratory scientists hands-on experience across the full sequencing workflow, from sample preparation to data analysis. This builds local expertise and creates a pipeline of professionals capable of sustaining Africa's growing multi-omics ecosystem. Beyond healthcare, multi-omics research has applications in agriculture, biotechnology, and bioeconomics, linking genomic insights to food security, medicinal plant research, and industrial growth. By localising advanced genomic tools, the GP enables African researchers to lead studies that drive health innovation, support precision medicine, and strengthen the continent's scientific independence.


Through technology, training, and collaboration, the SAMRC Genomics Platform ensures Africa contributes actively to global genomics while generating solutions tailored to its own population. In doing so, it positions the continent not as a follower, but as a leader in multi-omics research and precision health.

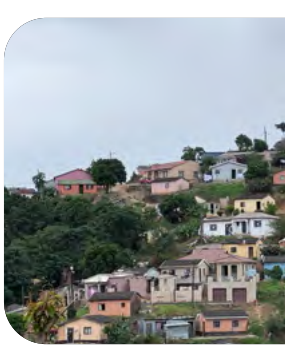
# African-Led Population Science Thrusts Health Equity

## Understanding Communities Over Time

Population-based science follows entire communities over time to understand patterns of health and disease. Unlike one-off studies, this approach collects continuous information about births, deaths, migration, health events, and social changes. In South Africa, the South African Population Research Infrastructure Network (SAPRIN) uses Health and Demographic Surveillance System (HDSS) nodes. Nodes are specific geographic areas or communities where researchers regularly collect data to track households multiple times a year, providing locally grounded and reliable data for planning and policy.By observing communities rather than isolated individuals, researchers can detect emerging health trends early and evaluate interventions in real-world contexts. This is particularly important where routine health information systems are incomplete, as in rural areas where civil registration or health facility data may underreport key events. Longitudinal population data fills these gaps and allows for more accurate, evidence-based decisions.

## Revealing Inequalities, Facilitating Impact

Population-based research is uniquely positioned to show inequalities and identify groups at risk of being overlooked. SAPRIN's data combines demographic, clinical, and social information, highlighting how factors such as gender, migration, social stressors, and access to healthcare influence outcomes.

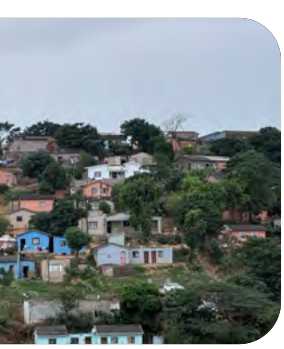
Established in 2017 and hosted by the SAMRC, SAPRIN currently operates seven HDSS nodes across South Africa, monitoring over 600,000 individuals, about 1% of the national population. These insights have contributed to global understanding of HIV incidence, helped design effective prevention strategies, and tracked the impact of non-communicable diseases like diabetes, hypertension, and kidney disease.

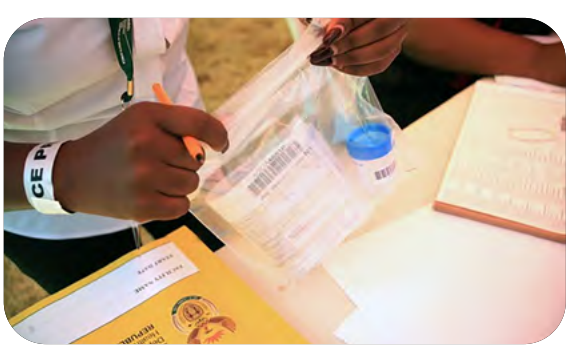
## Technology, Engagement, and Training

SAPRIN integrates technology, including artificial intelligence, wearables, and automation, to improve data quality and expand coverage. The recent addition of the BAMMISHO node enhances representation of historically underserved communities, strengthening the network's ability to deliver equitable insights across the country.

Community engagement is a core principle. HDSS nodes invest in building trust, involve residents in study design, data collection, and sharing results, and maintain advisory boards and open days. This ensures that research is culturally relevant, accountable, and benefits the communities it observes. SAPRIN also serves as a training ground for emerging scientists. Students and early-career researchers gain practical experience in epidemiology, biostatistics, geospatial analysis, and implementation research. Mentorship programmes and workshops equip them with the skills to lead Africa's health research in the future.

Through longitudinal population studies, African researchers are generating evidence that is locally relevant, informs policy, and drives equitable health outcomes. SAPRIN demonstrates that when communities, technology, and research expertise work together, population science can transform health systems and improve the well-being of millions.





# African Leadership in Global Inequality Policy


SAMRC Chief Specialist Scientist Prof Wanga Zembe-Mkabile holding the G20 global inequality report.

In 2024, South Africa took on the Presidency of the G20 for the first time, holding this role from November 2024 to November 2025. During this period, President Cyril Ramaphosa set up a special Committee of Independent Experts to look at global inequality. The Committee included six top experts, such as Nobel Laureate Professor Joseph Stiglitz, Professor Jayati Ghosh, and Winnie Byanyima, along with leading researchers from South Africa , namely, Prof Imraan Valodia and Prof Wanga Zembe-Mkabile, whose work in health equity and social policy brings a critical lens to inequality. The task was clear: produce a detailed report on global inequality in just three months. To do this, the Committee reviewed a huge amount of data, met with experts at the United Nations in New York, spoke with scholars in Paris, and held online discussions with professionals in economics, social policy, health, and politics.

## Understanding Inequality Around the World

Inequality is now at very high levels. The report found that 83% of countries are seeing rising gaps between rich and poor, affecting almost the entire global population. For example, over the past 25 years, the richest 1% captured

Public launch: Prof Zembe-Mkabile pictured with His Excellency President Cyril Ramaphosa, Minister of International Relations Ronald Lamola, Deputy Minister of Health Joe Phaahla, and senior officials from the Presidency and DIRCO.

41% of new wealth, while the bottom 50% gained only $585 per person. That is more than 2,600 times less than the top 1%.

The report also shows that inequality affects many areas of life. Rising prices for basic goods, low incomes, and widespread food insecurity, where one in four people often skip meals, make the problem urgent. It also points out that inequality overlaps with other factors like gender, race, class, and where people live, pointing to the need for solutions that consider these differences.

## Paths to a More Equal Future

The Committee suggested practical steps to reduce inequality. These include fairer taxes and trade rules, improving access to healthcare, education, housing, and income support, and making food systems and jobs more fair and sustainable. South Africa highlighted these findings by launching the report in Parliament, with President Ramaphosa supporting the recommendations. The report was covered by major international media, including The New York Times, Bloomberg, The Economist, The Guardian, BBC, and Reuters. It was also presented at the G20 Social Summit and the G20 World Leaders Summit in Johannesburg in November 2025, giving Africa a strong voice in global economic discussions. Building on this work, 2026 will see the creation of the International Panel on Inequality (IPI), similar to groups like the Intergovernmental Panel on Climate Change. The IPI will collect and analyse data on global income and wealth gaps, look at how these gaps link to education, health, gender, race, and geography, and provide clear guidance for governments and policymakers around the world.

The IPI marks an important step for ongoing, evidence-based action on inequality. It also highlights Africa's leadership in shaping solutions to one of the biggest challenges of our time, ensuring that African experiences and research help guide global decisions.

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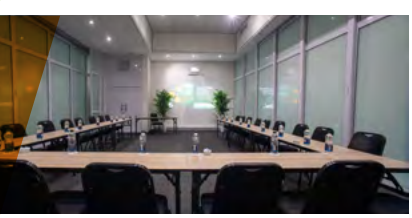

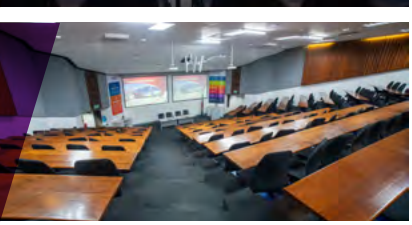

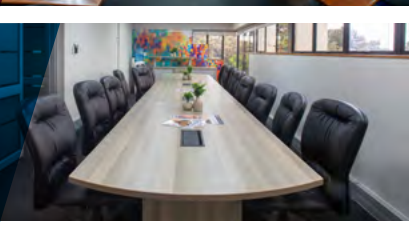

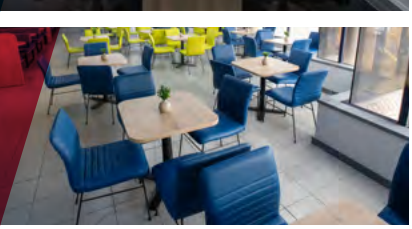

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