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BOPHELO

Life

THE COMMUNITY ISSUE



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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 includes how we take care of our health. The work of taking care of our health requires having the right information on hand, even from the research science that informs solutions. 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. Doing this in a country facing numerous challenges, including high rates of HIV/AIDS, tuberculosis, and non-communicable diseases while still trying to recover from the Coronavirus pandemic.

The SAMRC plays a crucial role in addressing these challenges through its research and science advocacy. Efforts made to lead in this area, and also in such a pivotal time demands cutting across communication lines in order 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 translates in the most possible simplicity. Bophelo meaning Life, is one way of building on the idea that health research science concerns us all, enabling conversations where there's an understanding on the kind of research being done on health and related social issues.

Yours in service:

The South African Medical Research Council

VALUES

Pioneering

Partnering

Excellence

Respect

Integrity

Citizenship

Ukusungula/ubuvulindlela

ukubambisana/intsebenziswano

Ukugqwesa/ubuchule

Intlonipho

Intembeko

Ubunini

Boitsanaape

Kamano

Bokgabane

Tlotlo/Tlotla

Botsitso

Bodudi

VISION

Building a healthy nation through research, innovation and transformation.

Sakha izizwe esisempilweni ngophando-nzulu, ngobuchule nokuqwalasela inguqu

Go aga sechaba seo se itekanetseng ebile se fetogare ikaegile ka dipatlisiso, bonetsetsi le boitlhamoledi.

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 tswelletsapele boitekanelo le boleng jwa matshelo a setshaba ka go samaga le gosalekalekaneng, re tswelletsapele dipatlisiso tsa maphelo tse di nepagatseng, di bontsha dikatlego, ikgodiso le boitlhamoledi mme ebile re diatswa le go ditshegetska ka matlole.

ABOUT SAMRC

OUR MANDATE

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

WHO WE ARE?

The SAMRC was established in 1969 and is dedicated to improving the health of people in South Africa, through research, innovation, development, and technology transfer. The scope of research includes laboratory investigations, clinical research, and public health studies. We conduct research on South Africa's quadruple burden of disease: maternal, newborn and child health, HIV/AIDS and TB, non-communicable diseases, and interpersonal violence. Our work is to acquire evidence-based information to inform health policy and practice and improve the quality and health status of people in South Africa. We are the largest local funder of health research, medical diagnostics, medical devices, and therapeutics. We are pioneers in cutting edge medical innovations focusing on genomic research, the development of novel treatment regimens, vaccine development, diagnostic tools, and developing new drugs and devices. Transformation remains an integral part of building sustainable health research capacity in South Africa. Through Self-Initiated Research (SIR) grants, the Mid-Career Scientist programme, the Bongani Mayosi National Health Scholars Programme, and other programmes and platforms, the SAMRC will continue to address gender, racial, institutional, and geographic parity, and strengthen our capacity to flourish in the 21st century. As a custodian of health research, the SAMRC is building a healthy nation through research and innovation.

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SAMRC

PRESIDENT & CEO

Foreword

SAMRC BRINGS YOU BOPHELO

In a world where health is both a personal pursuit and a global priority, the convergence of scientific advancements, social responsibility, and collective action has never been more crucial. This edition of Bophelo is a beacon meant to draw your attention to some of the research conducted by the South African Medical Council (SAMRC) and its impact.

Why a magazine named Bophelo? Well, that's easy. "Bophelo" is a word from the Sotho language, spoken in South Africa and it means "life" or "health." It's a term that encompasses the overall well-being and vitality of an individual. In the context of health, "bophelo" refers to not just the absence of illness but also the state of being physically, mentally, and socially well.

Through this publication, we invite you on a journey through the intricacies of health, guided by a tapestry of topics that underscore the depth and breadth of our efforts toward a healthier society. Our mandate as the SAMRC is to improve the nation's health and quality of life through research, development and innovation.

Some of the issues we cover are about sustainable health and the pervasive impact of diabetes in South Africa, unraveling the threads that weave together the challenges, opportunities, and imperatives of addressing this growing health concern. It's a call to action, emphasising not only treatment but also prevention, education, and sustainable approaches that transcend the individual to embrace the collective well-being of communities.

Smoking tobacco or vaping, once glamorised and misunderstood, now stands exposed as a real threat to the life—a habit that erodes health and

vitality. In this edition of Bophelo, we cover why the choice to abstain from these habits is not just a personal decision but a collective responsibility toward public health and well-being.

As we navigate the landscape of infectious diseases, the triumphant strides toward the elimination of malaria and the ongoing battle against HIV come to the forefront. SAMRC has been active in this area of research, and we are happy to share some of the outcomes of our research in these areas.

Technology, a catalyst for change in the modern era, takes center stage in the quest to increase access to effective mental health treatments. This book sheds light on the transformative power of technology, showcasing its potential to bridge gaps, destigmatise mental health, and empower individuals with access to much-needed care and support.

I invite you to interact with the content of this publication. I urge you to contemplate the words on these pages and see how you too can contribute to the improved health of yourself and loved ones. Bophelo is a testament to our collective commitment—a commitment to a healthier, more equitable world. It's an invitation to engage, learn, and act—to be catalysts for change in our communities, nations, and beyond.

Together, let us turn the pages of this book with open minds and compassionate hearts, embracing the wealth of knowledge inspiration and challenge it offers. For in these insights lie the seeds of a healthier tomorrow—for ourselves, for our communities, and for generations yet to come.

Happy reading.

Prof Glenda Gray
President and CEO of the SAMRC



**DISEASES OF
LIFESTYLE**
& your health

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ORAL HEALTH

Unraveling the link between Oral Health and Diabetes: A Microbial Perspective

In South Africa, the rise in lifestyle diseases, notably diabetes, has become an alarming trend. Surprisingly, gum disease often precedes the diagnosis of diabetes, sparking debates on causality. Scientists from the SAMRC/CPUT Cardiometabolic Health Research Unit are examining the complex world of oral microbiota, seeking answers that could transform healthcare practices.

Researchers have unveiled a diverse community of over 700 microorganisms thriving harmoniously in our mouths, contributing to our health. Yet, when imbalance strikes, propelled by changes in the oral environment, harmful bacteria assert dominance, laying the groundwork for diseases like diabetes.

Cutting-edge technologies like 16S ribosomal RNA (16S rRNA) analysis have unveiled crucial insights into this microbial ecosystem. A groundbreaking study conducted within the Bellville South

community revealed startling correlations. Individuals with elevated blood sugar levels showed a staggering 75% prevalence of bleeding gums. Analysing plaque DNA uncovered distinct bacterial distributions, notably Actinobacteria and Fusobacteria, significantly elevating diabetes risk. Meanwhile, Bacteroidetes predominance correlated with advanced gum disease.

“These findings spotlight a disruptive narrative,” emphasises Davison. “Oral dysbiosis doesn’t just trigger gum ailments; it orchestrates systemic inflammation, paving the way for diabetes, atherosclerosis, and heart disease.”

The implications for community health are profound. While the diabetes-periodontal disease puzzle remains unsolved, empowering the community with knowledge proves pivotal. Regular dental check-ups, prudent plaque management, and dietary consciousness stand as barriers against oral imbalance. Drastic measures like excessive antibacterial mouthwash, smoking, and alcohol must be curbed to prevent an oral environment shift that fuels microbial imbalances and ensuing diseases.



DIABETES

Diabetes Epidemic in South Africa: A Call for Sustainable Health Initiatives

The South African Medical Research Council's (SAMRC) Biomedical Research and Innovation Platform (BRIP) and Non-Communicable Diseases Research Unit (NCDRU) performs research on diabetes, which is a global health issue that affects

millions of people worldwide, and South Africa is no exception. According to the International Diabetes Federation (IDF), South Africa has the highest number of people living with diabetes in sub-Saharan Africa. South Africa had an estimated 4.2 million people living with diabetes in 2021, and this number is projected to increase to 6.9 million by 2045 if current trends continue. This dramatic rise in diabetes in South Africa has significant implications for both public health and the economy. It is crucial to address this public health challenge through a sustainable health approach.



WHAT IS DIABETES?

Diabetes is a chronic medical condition characterised by elevated blood glucose (sugar) levels. Diabetes can be broadly classified into two main types: Type 1 and Type 2 diabetes. Type 1 diabetes is an autoimmune condition that typically manifests in childhood. Autoimmune referring to how the immune system mistakenly attacks healthy cells in the body. People living with type 1 diabetes are not able to produce insulin, the hormone that transports glucose from the circulation into the cells and are therefore required to inject insulin to maintain a healthy life. In contrast to Type 1 diabetes, people living with Type 2 diabetes are able to produce insulin, but their cells are resistant to the effect of the insulin, this meaning that insulin doesn't work effectively. The body produces more and more insulin to compensate for this, until the cells that produce insulin burn out and this is when Type 2 diabetes develops. Type 2 diabetes mostly presents in adults, although the prevalence in children and adolescents is on the rise. Type 2 diabetes is often associated with lifestyle factors such as being overweight or obese, poor diet, lack of physical activity and increased sedentary behaviours. Finally, gestational diabetes refers to elevated blood glucose that develops during pregnancy which is associated with high risk of complications during pregnancy and delivery, and to the offspring. As Type 2 diabetes represents 90% of all diabetes cases, it will be the focus of this article.

THE IMPACT OF DIABETES ON HEALTH AND WELL-BEING

Diabetes poses a significant threat to the health and well-being of individuals in South Africa.

Uncontrolled diabetes can lead to a host of complications, including:

Cardiovascular Disease: People with diabetes are at a higher risk of heart disease, stroke, and hypertension, which can result in premature death.

Kidney Disease: Diabetes is a leading cause of kidney failure, necessitating dialysis or transplantation.

Blindness: Diabetic retinopathy is a major cause of blindness in adults, affecting their quality of life.

Neuropathy: Nerve damage can lead to pain, tingling, and loss of sensation in the extremities, potentially resulting in foot ulcers and amputations.

Cancer: Diabetes is associated with certain types of cancers, such as liver, pancreas, endometrium, breast, and liver cancers.

Mental Health: Diabetes is associated with an increased risk of depression and anxiety due to the emotional and psychological toll of managing the disease.

THE ECONOMIC BURDEN OF DIABETES

In addition to its toll on individual health, diabetes places a considerable economic burden on South Africa. The costs associated with diabetes include:

Healthcare Expenditure: The management and treatment of diabetes and its complications require a substantial portion of the country's healthcare budget.

Productivity Loss: Diabetes-related absenteeism and reduced productivity among affected individuals contribute to economic losses.

Disability and Premature Death: Diabetes-related disabilities and premature deaths further strain the workforce and social support systems.

SUSTAINABLE HEALTH AND DIABETES PREVENTION

To combat the diabetes epidemic in South Africa, a sustainable health approach that is accessible to all is essential. Sustainable health encompasses strategies that promote well-being, prevent illness, and reduce healthcare costs over the long term. Below are some key components of a sustainable health approach to diabetes that are required to prevent diabetes in South Africa:

Health Education: Raising awareness about diabetes, its risk factors, and prevention measures is crucial. Educational campaigns targeting schools, workplaces, health care clinics and communities can empower individuals to make healthier choices.

Nutrition: Promoting a balanced and nutritious diet is fundamental in preventing and managing diabetes. Access to affordable fresh fruits and vegetables, as well as reduced consumption of sugary beverages and processed foods, can play a significant role.

Physical Activity and sedentary behaviours: Encouraging regular physical activity is essential. Initiatives that promote active lifestyles, such as walkable communities and accessible recreational spaces, can make exercise more accessible to all. Awareness of the importance of reducing sedentary behaviours (e.g. sitting while working, watching TV) using simple strategies to break up prolonged periods of sitting may make a small but significant impact on diabetes risk.

Early Detection: Approximately 52% of people living with Type 2 diabetes in South Africa are

unaware of their condition. Routine screening for diabetes and prediabetes can identify individuals at risk and enable early intervention. Regular check-ups, symptom awareness and accessible healthcare services are vital in this regard.

Holistic Care: A holistic and integrated approach to diabetes management within the existing health care system that is focused on HIV should be encouraged. This holistic approach should also include mental health support and addressing social determinants of health, such as poverty and access to healthcare.

Technology: Leveraging digital tools and telehealth services can improve access to healthcare and diabetes management, especially in underserved areas.

Policy Interventions: Government policies can and should play a significant role in creating a sustainable health environment. Sugar taxes, bans on advertising unhealthy foods, food labelling regulations, and incentives for healthy behaviours are examples of policy interventions that can influence health outcomes.

COMMUNITY ENGAGEMENT AND PARTNERSHIPS

To achieve sustainable health outcomes in South Africa, it is essential to engage communities, healthcare providers, government agencies, and non-governmental organisations in collaborative efforts. These partnerships can facilitate the development and implementation of comprehensive diabetes prevention and management programs. Additionally, community support groups can offer emotional and practical assistance to individuals living with diabetes, promoting better self-management.



MALARIA

Malaria's Ongoing Battle: Human Efforts and Challenges in South Africa

In the fight against malaria, the SAMRC's Malaria Research Group is at the forefront, tackling an ancient disease that persists in devastating ways. Prof Rajendra Maharaj, Director of Malaria Research Group stated, "Malaria is an age-old disease of poverty that continues to claim lives, with 608,000 deaths reported globally in 2022." The carrier, a seemingly insignificant mosquito, evolves relentlessly, eluding human efforts to control it effectively. Despite challenges like insecticide resistance and changing mosquito behavior, the quest for elimination perseveres.

The struggle for malaria eradication in South Africa faces multifaceted hurdles. It's widely agreed among national and international stakeholders that an innovative, integrated approach is vital. As Prof Maharaj emphasises, "Funding and political commitment are critical to our elimination agenda." However, diminishing disease burdens in certain areas risk reducing funding for control activities. Moreover, declining awareness among residents in endemic districts poses a challenge, as dwindling cases lead to lowered perception of the disease's severity.

The SAMRC's Malaria Research Group collaborates extensively, evaluating novel insecticide combinations and employing cutting-edge technologies like drones to identify mosquito breeding sites. This data is crucial for evidence-based decision-making, it aids in refining control strategies. Yet, community involvement remains paramount. Communities not only permit control measures but actively participate in research and surveys crucial for understanding the effectiveness of interventions.

Cross-border malaria complicates elimination efforts, with porous borders facilitating the entry of asymptomatic carriers. Collaborations between South Africa, eSwatini, and Mozambique health departments, led by the Malaria Research Group, aim to tackle these challenges. However, even amid the COVID-19 pandemic, which disrupted diagnosis and treatment, illegal migrants continued to contribute to malaria transmission across provinces.

The road to elimination, strewn with emerging diseases, competing health priorities, and resource scarcity, demands unwavering commitment from all stakeholders. As Prof Maharaj asserts, "Sustained commitment is key," reflecting on the ongoing battle against malaria the ongoing battle against malaria.

Through concerted efforts, innovative strategies, and community engagement, the SAMRC's Malaria Research Group strives to pave a way forward in the arduous journey toward malaria elimination in South Africa and beyond.



VAPING

Dangers made ‘popular’: A Tale of Tobacco and Vaping

The SAMRC’s Mental Health, Alcohol, Substance Use & Tobacco Research Unit (MAST-RU) recent project sheds light on the dark truths that lurk behind the enticing façade of smoking and vaping.

“Tobacco use is the single highest preventable cause of death and disease in the world,” declares Dr. Catherine Egbe, Specialist Scientist at MAST-

RU. In South Africa alone, a staggering 31,000 lives are claimed annually by tobacco-related diseases, a chilling reminder of the grim toll these products exact on human health.

Nicotine, the addictive substance found in these products, emerges as a formidable foe, its addictive prowess likened to that of cocaine. With an emphasis on understanding the prevalence and risk factors associated with tobacco and nicotine use, MAST-RU aims to unravel the mystery of why people succumb to these addictive vices and how best to guide them towards cessation.

The Global Adult Tobacco Survey (GATS) conducted by MAST-RU in South Africa uncovered that—nearly 30% of individuals aged 15 and above use tobacco or nicotine products. Alarming, 75% of adult smokers develop an addiction during their teenage years, a time when awareness of the harm is often overshadowed by youthful naivety.

Dr. Egbe explains the insidious targeting of young minds by the marketing machinery, emphasising, “Once they get hooked on nicotine, they are likely to continue using these products because of the addiction.”

The revelation that many young people are oblivious to the dangers of hookah—a tobacco product—adds another layer to the narrative. Deceived by pleasant aromas and the illusion of safety conferred by water filtration, they remain unaware of the addictive nature and health hazards posed by hookah. Headaches, vomiting, and fainting, reported by participants in MAST-

RU’s study, underline the grim toll exacted by this seemingly harmless pastime.

Electronic cigarettes that are heralded as a ‘safer’ alternative and smoking cessation aid, have become a troubling trend in schools. Dr. Egbe cautions, “E-cigarettes serve as a gateway to cigarette smoking, inducing DNA damage and associated with asthma, and other health issues.” The deceptive allure of flavours conceals a toxic reality—nickel, tin, arsenic, cadmium, and lead lurk within, jeopardising the health of unsuspecting young bodies.

MAST-RU’s clarion call resonates, urging society to safeguard its most precious asset by rejecting the toxic embrace of tobacco and nicotine products. Only by putting the right comprehensive tobacco control laws in place and unmasking the dangers of these products can we empower the youth to make informed choices and protect the invaluable currency of life—health.



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THE ROAD *to* ENDING HIV

HIV / AIDS

South Africa's HIV Research Evolution: From Microbicides to Vaccine Quest

In the pursuit of ending the AIDS epidemic by 2030, South Africa's health initiatives have been at the forefront of combating HIV, a virus that has long plagued the nation and the world. The Sustainable Development Goals (SDGs) set the ambitious target to eradicate AIDS, sparking significant research efforts, particularly in South Africa, which bears the heaviest burden of this disease globally.

In 2002, the SAMRC initiated the HIV Prevention Research Unit. Initially concentrating on microbicides to prevent HIV infections, their efforts culminated in groundbreaking trials such as the ASPIRE and HOPE studies with Microbicides Trial Network (MTN). These trials showcased the dapivarine vaginal ring, demonstrating efficacy rates between 30-60% in preventing HIV infections. However, despite registration in South Africa, this product remains inaccessible to the public.

The SAMRC's focus shifted over time, collaborating with the HIV Vaccines Trial Network (HVTN) in pioneering phase 2b/3 HIV vaccine studies—AMP, uhambo, and Imbhokodo. These studies, albeit revealing what didn't work for HIV vaccines and accentuates the importance of failures in guiding further research.

Amidst setbacks, the HIV Prevention Trials Network (HPTN) conducted the LIFE study, testing injectable long-acting Cabotegravir (CABLA) for pre-exposure prophylaxis (PrEP). This study marked a significant breakthrough, showing an

88% efficacy rate, surpassing oral Truvada for PrEP. Explaining PrEP as a method to prevent HIV infection through blocking the virus, the study found the 2-monthly depot injection of Cabotegravir acceptable among young women in high-risk areas across sub-Saharan Africa.

However, despite its registration in South Africa by the South African Health Products Regulatory Authority, the current manufacturer's reluctance to scale up production necessitates a 3-4 year wait for a generic product via the World Health Organization (WHO) Medicines Patent Pool, dampening initial hopes of timely rollout.

Nevertheless, resilience remains the driving force behind ongoing research. Lenacapavir, a long-acting antiretroviral drug, is undergoing testing across various sites in sub-Saharan Africa in the PURPOSE-1 study, including five SAMRC research sites in Durban. Simultaneously, new phase 1 HIV vaccine and antibody studies continue at SAMRC sites, while efforts against tuberculosis (TB), a prominent co-infection with HIV, persist through Phase 1-3 TB vaccine studies at SAMRC clinical trial sites in Durban.

The SAMRC's clinical trials unit, with a two-decade legacy in HIV trials, extended its expertise to join the COVID-19 response by facilitating testing and rollout of the J&J Covid vaccine in South Africa. Furthermore, ongoing efforts at the Botha's Hill site test a new potential Coronavirus vaccine, potentially aiding in future pandemic preparedness. Consequently, the unit rebranded in 2022 as the HIV and other Infectious Diseases Unit (HIDRU) to encompass a broader scope of infectious disease trials.

Highlighting the importance of vaccines in combatting infectious diseases, the quest for an effective HIV vaccine persists, following the successful elimination of smallpox.

PedMAB1 Study Aims to Reduce Breastmilk Transmission of HIV Among Babies

A groundbreaking initiative, the PedMAB1 study, is underway to address the persisting challenge of HIV transmission through breastfeeding, a significant contributor to infections among infants. Despite breastmilk's pivotal role in child survival, the risk of HIV transmission remains a concern in high HIV prevalence settings.

This Phase 1 study, PedMAB1, represents a pioneering effort in pediatric HIV prevention. It focuses on investigating the safety and pharmacokinetics of two long-acting broadly neutralising monoclonal antibodies (bNAbs)—VRC07-523LS and CAP256V2LS—to eliminate the risk of HIV transmission via breastmilk. The study's primary objective is to determine optimal dosage, timing, and combinations of bNAbs for breastfeeding infants born to HIV-infected mothers.

Conducted collaboratively by the SAMRC's HIV and other Infectious Diseases Unit (HIDRU), along with international partners from Italy, France, and Norway, the study receives funding from the European and Developing Countries Clinical Trials Partnership (EDCTP), SAMRC HIDRU and SAMRC Biostatistics Research Unit (BRU). Situated at the SAMRC Chatsworth Clinical Research Site within the RK Khan Hospital premises, the study has enrolled infants across different arms, with ongoing safety assessments demonstrating positive outcomes.

Meanwhile, in South Africa, where HIV prevalence remains high, SAMRC researchers are conducting an observational study in the iLembe and eThekweni Districts of KwaZulu-Natal. This

study, spanning from June 2022 to September 2023, focuses on the implementation of pre-exposure prophylaxis (PrEP) for pregnant and postpartum women across 40 primary healthcare and community centers.

Having enrolled nearly two thousand participants, the study aims to assess PrEP uptake and factors influencing its utilisation, acceptance, and adherence among pregnant and postpartum women. Funded by The United Nations Children's Fund (UNICEF) and conducted in collaboration with the KwaZulu-Natal KZN Provincial Department of Health, this initiative holds the promise of optimising PrEP implementation for this vulnerable population.

These studies mark significant strides in combating HIV transmission among infants and vulnerable women, offering hope for a future where such infections can be drastically reduced or eliminated.



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Surveying Pediatric Antimicrobial Use in South African Academic Hospitals

A comprehensive survey conducted by the SAMRC HIV and Other Infectious Diseases Unit (HIDRU), in conjunction with several universities, delved into the usage of antimicrobial treatments among hospitalised children in South Africa. This survey, funded by UNICEF, aimed to assess the utilisation of antimicrobials for treating infections acquired either within the community or during healthcare stays, as well as for preventive measures, across three academic hospitals in KwaZulu-Natal and Gauteng.

The survey revealed that out of 1,191 children, 22.9% received at least one of the 1,946 prescribed antimicrobials. Notably, 45.6% of antimicrobials were prescribed to address healthcare-associated infections (HAIs), indicating a concerning prevalence within academic hospital settings in South Africa.

Addressing this challenge requires concerted efforts to fortify infection prevention and control measures at the hospital level. It's imperative to implement effective antibiotic stewardship programs to ensure prudent antimicrobial use and preserve these resources within hospital settings.

COVICIS INITIATIVE: UNDERSTANDING SARS-COV-2 EVOLUTION AND IMPACT

CoVICIS, a collaborative effort spanning three countries—South Africa, Italy, and Switzerland—has set out to investigate crucial aspects of the SARS-CoV-2 pandemic. Its primary objective is to generate scientific insights that aid in pandemic

control, focusing on monitoring the emergence and spread of concerning variants in both the general population (adults and children) and specific groups like vaccinated individuals, post-COVID-19 patients, and immunocompromised individuals, including those with HIV.

In South Africa, the COVICIS study, facilitated by projects like COVID KIDS and CoKiDSS, examines clinical and immune response variations among unvaccinated children infected with different SARS-CoV-2 variants.

COVID KIDS Initiative

Led by the SAMRC's HIDRU, this study spans multiple countries in Africa and Asia. Its overarching goal is to understand the clinical characteristics of SARS-CoV-2 infections among neonates, children, and adolescents in low- and middle-income countries. In South Africa, data collection occurred across 15 hospitals in four provinces, with ongoing research extended to a subset of hospitals alongside an immunological sub-study.

COVID Kids School Study (CoKiDSS)

Focusing on low and middle-income countries like South Africa, CoKiDSS aims to fill the gap in data concerning SARS-CoV-2 infections among school-going children. This pilot study, conducted in selected primary schools, assesses seroprevalence, transmission dynamics, and the impact of SARS-CoV-2 on learners, parents, and teachers, shedding light on both short and long-term effects. Preliminary findings indicate substantial seroprevalence among participants, offering insights into prior infections and adaptive immune responses.



Women & CHILD HEALTH



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CONGENITAL HEART DEFECTS

Understanding Congenital Heart Defects: Early Detection and Lifelong Care

Congenital heart defects (CHD) represent a critical challenge in pediatric healthcare globally. These defects, affecting the structure of the heart or its blood vessels, are the most prevalent birth anomalies and are identified as the primary cause of infant mortality in high-income countries and one of the top causes of infant mortality in low- and middle-income countries (LMICs). The normal heart comprises four chambers and two major vessels, but in cases of CHD, this structure is compromised, necessitating immediate attention and care.

Critical congenital heart disease are those severe cardiac abnormalities that are immediately life-

threatening to newborns. Statistics indicate an incidence of CHD ranging from 1 in 100 to 1 in 150 births, although an accepted figure globally is around 8 in 1000 births. However, in regions where universal antenatal screening is not standard practice, including in certain parts of South Africa, the birth prevalence could be higher, influenced by factors like inadequate maternal rubella immunisation. While these defects are present at birth, some may remain undetected for weeks, months, or even years, amplifying the complexity of prognosis and treatment options. There is a pressing need to raise awareness about cardiac defects, stressing the significance of post-natal screenings and routine check-ups within the first six weeks of a baby's life.

Delayed diagnoses often result in missed opportunities for timely interventions, potentially rendering surgical solutions unfeasible and lead to fatalities before diagnosis. A shortage of pediatric cardiologists and skilled cardiac surgeons exacerbates this issue, with South Africa having a stark deficit, with less than 50 paediatric

cardiologist (and less than 10 paediatric cardiac surgeons) whereas global estimates suggest a requirement of at least 100 to address the population's needs adequately.

Critical congenital heart diseases often reveal themselves shortly after birth, typically through cyanosis (blueness of the lips and tissues due to decreased oxygenation or perfusion). Recognising signs such as persistent blue lips or tongue, rapid heartbeat, accelerated breathing, cold extremities, or weak pulses is crucial. Additionally, any murmurs accompanied by symptoms or cardiac enlargement warrant immediate referral to a paediatric cardiologist.

Early detection and prompt treatment significantly enhance a child's chances of survival and minimise long-term complications. However, it is imperative to acknowledge that even after corrective surgery, ongoing care and regular consultations with cardiologists are imperative, with a new discipline known as Adults with Congenital Heart Disease (ACHD) as a result.

Local research has delved into the genetic underpinnings of CHD, revealing unique patterns in patient presentations and profiles within specific regions. Understanding these distinctions can guide more tailored approaches to diagnosis and treatment.

Key Takeaways:

- Timely detection and intervention significantly improve survival rates and reduce long-term complications associated with CHD.
- CHDs remain the most prevalent birth anomaly, contributing substantially to infant mortality in globally, including in South Africa.
- Recognisable danger signs encompass persistent blueness, rapid heartbeat, accelerated breathing, and cold extremities.

- Most heart conditions, if diagnosed early, can be managed, but necessitate lifelong care to mitigate long-term complications.

The ongoing pursuit of knowledge, increased awareness, and enhanced medical resources are pivotal in tackling the challenges posed by congenital heart defects, ensuring a healthier future for affected children and adults alike.

South African Adolescent Girls and Young Women Struggle Amidst Educational Disparity During and Post COVID-19 School Closures

A recent study conducted by the SAMRC's Health Systems Research Unit has shed light on the deepening educational disparity among adolescent girls and young women (AGYW) in South Africa during and post COVID-19 school closures. The findings reveal a concerning reality where socio-economic status, lack of resources, and a deepening digital divide continue to impede access to education, particularly for the most vulnerable.

Even before the COVID-19 pandemic, South Africa struggled with a high dropout rate among its youth, with around 60% leaving school without a qualification. Factors such as socio-economic status, school quality, and gender disproportionately influenced this trend. However, COVID-19 exacerbated these challenges, especially for AGYW, amplifying the existing disparities.

The closure of schools in March 2020 was a pivotal part of the government's strategy to curb the spread



of COVID-19. This led to a swift transition to remote learning, however the digital divide – unequal access to digital technology - and limited access to reliable internet meant that not all learners in South Africa were able to access remote learning. The SAMRC study, covering six districts characterised by high rates of HIV, teenage pregnancy, and socio-economic hardships, highlighted that over half of the surveyed AGYW enrolled in education faced disruptions in their studies.

Key factors contributing to this disruption included low socio-economic status, lack of access to cell phones, household food insecurity, and challenges with online learning exacerbated by the absence of adequate support from schools, teachers and family. The disparity in technology access widened the gap, making online learning unfeasible for many from poorer backgrounds, therefore deepening inequality.

The study emphasised that the digital divide is not merely about access to technology; it's about the entrenched inequality in educational

opportunities. Disparities between government and private schools were stark even before the pandemic, with under-resourced schools ill-prepared for online teaching. The historical roots of resource disparity, dating back to the apartheid era, continue to haunt the education system, further perpetuating the cycle of poverty.

However, amidst these challenges, stories of resilience emerged. Some AGYW showed resourcefulness and creativity, finding ways to minimise disruption to their education, often with the support of family or partners. Understanding these resilience factors could inform strategies to bolster educational interventions.

The findings amplify the urgency of addressing these disparities. The authors emphasised that the closure of educational institutions, compounded by challenging home environments and lack of technology access, disproportionately impacts vulnerable AGYW, exacerbating pre-existing educational inequalities. The repercussions of school disengagement and dropouts among

female learners from disadvantaged backgrounds are significant, impacting their future earning potential and socio-economic status.

Moving forward, the study investigators urge immediate action to bridge the digital gap and tackle structural barriers to educational equity. Ensuring universal access to technology and the internet for learners, especially those from marginalised communities, remains an urgent priority to prevent further widening of social inequalities and perpetuation of the cycle of disadvantage within the South African education system.

Empowering Women Caregivers: A Transformative Approach in South Africa

In the heart of South Africa's KwaZulu-Natal province, a pioneering initiative spearheaded by the SAMRC's Health Systems Research Unit (HSRU) is making strides in improving the lives of women caregivers and their children affected by HIV. The project, known as CWEL+ (Caregivers

Wellbeing Plus), represents a groundbreaking effort to address the health, social, and economic challenges faced by these caregivers, particularly in the wake of the COVID-19 pandemic.

"At the core of our mission is the empowerment of women caregivers and the enhancement of their well-being," expresses Dr. Darshini Govindasamy, Specialist Scientist at HSRU. "We're striving to bridge the gaps in support for these caregivers, recognising their crucial role in the lives of children and adolescents living with HIV."

Collaborating across borders, the project is led in partnership with Professor Angela Kaida from Simon Fraser University in Canada, emphasising a global effort to tackle the challenges faced by caregivers.

At the core of the initiative lies the innovative integration of economic empowerment and gender-transformative programmes. The team piloted an economic-incentive package during the pandemic, which showcased promising effects. This success led to a substantial grant of nearly \$1 million (CAD) from Canada's International Development Research Centre (IDRC) through the



Women RISE initiative, enabling the expansion of the trial into the CWEL+ project.

“We recognised the disproportionate impact of the pandemic on women caregivers, both in terms of their livelihoods and health,” notes Dr. Govindasamy. “CWEL+ seeks not only to alleviate these burdens but also to collect evidence that will guide future interventions, making women better equipped to face health emergencies.”

The upcoming mixed-methods approach of the CWEL+ project promises a comprehensive evaluation. Employing a cluster-randomised trial evaluating a cash transfer plus gender transformative economic livelihood intervention, the study aims to significantly enhance psychological well-being and gender equality among women caregivers in KwaZulu-Natal.

“We are seeking to enhance the government’s COVID-19 post-recovery strategy with a tailored empowerment program for caregivers,” explains Dr. Govindasamy. “This includes a rigorous economic evaluation and qualitative interviews to assess the intervention’s cost-effectiveness and acceptability.”

Recent strides have seen the development and piloting of a ten-session economic empowerment programme crafted in collaboration with caregiver advisory board members. This programme covers coping strategies, communication in relationships, parenting tips, and entrepreneurial guidance. To date, approximately 85 caregivers have graduated from the CWEL+ economic empowerment programme.

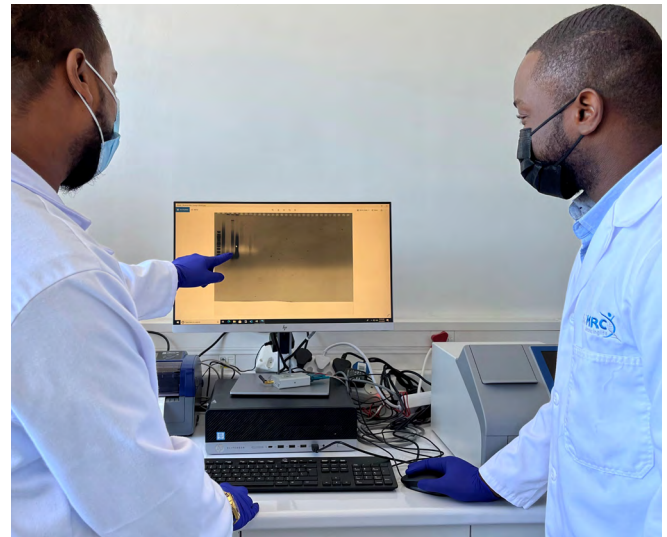
“Leading this initiative and mentoring the next generation of scientists has been an incredible journey, marked by notable milestones,” reflects Dr. Govindasamy. “Being part of this transformative work is not just about the immediate impact; it’s about paving the way for a future where women caregivers are better supported, resilient, and empowered.”

As the CWEL+ project progresses, it carries the promise of not only improving the lives of women caregivers and children affected by HIV but also shaping future policies and interventions that champion gender equality and health equity worldwide.



The caregiver advisory board and team members after an intense three-part co-development workshop series at the field office in Durban.

IMPROVING HEALTH *through* TECHNOLOGY



TECHNOLOGY AND HEALTH

The SAMRC Genomics Platform: On precision medicine and pandemic preparedness in Africa

Genomics, a crucial component of precision medicine and pandemic readiness, has surged into a dynamic and pivotal phase. Defined as the study of genomes' structure, function, evolution, and mapping, genomics has revolutionised healthcare and scientific innovation. At the helm of this transformative technology in Africa stands the SAMRC Genomics Platform, established in

July 2019 to empower African scientists with next-generation sequencing (NGS) capabilities.

Comprising state-of-the-art laboratories and expertly trained scientists, this purpose-built facility fills a critical technological void. Its primary aim? Accelerating precision medicine and fortifying Africa's readiness against pandemics. Precision medicine tailors healthcare based on an individual's genetic blueprint and environmental influences, enhancing diagnoses, prognoses, and treatment strategies.

PRECISION MEDICINE ADVANCES

The SAMRC Genomics Platform is instrumental in advancing precision medicine, offering NGS

services for four key technologies - genomics, transcriptomics, epigenomics, and metagenomics. These fields delve into RNA transcripts, genetic modifications, and environmental genetic material, unraveling insights into developmental disorders, inborn errors of immunity, cancer, and Tuberculosis susceptibilities.

Moreover, recognising the scarcity of African genomic data as a barrier to understanding health and disease, the Genomics Platform participates in collaborative efforts like the Deciphering Developmental Disorders in Africa (DDD-Africa), Evaporative Demand Drought Index (EDDI) and Primary Immunodeficiency Genetics Network (PIDGEN) studies. These initiatives unite multidisciplinary experts to enhance diagnostic and clinical genetic services for rare diseases in Africa.

GENOMICS FOR PANDEMIC VIGILANCE

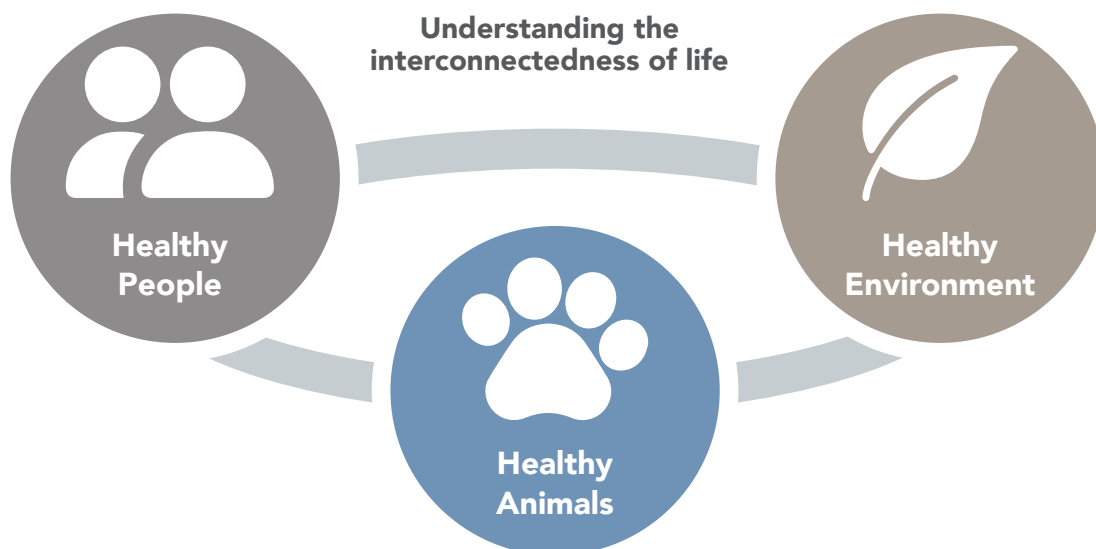
The Genomics Platform extends its reach beyond precision medicine, actively supporting local scientists in pathogen detection, vaccine development, and clinical trials. The profound

impact of genomics surfaced during South Africa's battle with COVID-19. Early identification of the Beta and Omicron variants, spearheaded by South African and Botswanan scientists, showcased genomics' prowess in tracking mutations affecting virus transmission and vaccine responses.

Notably, the SAMRC's Wastewater Surveillance Programme emerged as a vital tool in pandemic response. By analysing sewage samples for viral RNA, this initiative provided an early warning system, detecting viral prevalence spikes before clinical cases surged. Retrospective sequencing even revealed the presence of the Omicron variant in South Africa before its formal announcement, highlighting the program's foresight.

GENOMICS FOR ONE HEALTH

Embracing the One Health approach, which emphasises the interconnectedness of human, animal, and environmental health, the Genomics Platform extends its focus to genomic research across these domains. Partnering with the Africa BioGenome Project, the initiative seeks to map the genetic diversity of 100,000 African



species, addressing biodiversity threats due to climate change and population growth. This comprehensive genomic endeavor extends to plants, animals, fungi, and other eukaryotes, with a keen eye on conservation, restoration, and understanding African Traditional Medicines.

In the realm of One Health, genomics stands as a potent tool to unravel genetic factors behind zoonotic diseases and antibiotic resistance, benefitting both human and animal health. The SAMRC Genomics Platform's involvement in this paradigm shift marks a concerted effort toward a holistic approach to healthcare and biodiversity conservation.

The SAMRC Genomics Platform stands tall as a beacon of scientific advancement in Africa, wielding genomics not just for precision medicine and pandemic preparedness but also for fostering a harmonious coexistence of human, animal, and environmental health through the One Health approach. As it continues to sequencing services and pioneer groundbreaking research, its contributions promise a brighter, healthier future for the continent and beyond.

SAMRC in Digital Mental Health Interventions for South African Students

In an initiative aimed at addressing the pressing mental health needs of university students, the SAMRC has spearheaded an innovative approach leveraging technology to provide effective mental health treatments. The SAMRC's collaboration with international experts and local researchers and stakeholders has resulted in the development and testing of digital mental health

interventions, particularly targeting the mental well-being of students across South Africa.

This initiative was prompted by the findings of a comprehensive national student mental health survey conducted across 23 universities in South Africa. This survey, recognised as one of the largest globally, uncovered a substantial unmet need for mental health services among students coupled with significant barriers hindering their access to treatment. The survey revealed that while 16.3% of students displayed symptoms of a mood disorder, only a mere 21.3% of those with mental health problems received treatment. Barriers to accessing care included high costs, scheduling difficulties, reluctance to access help from professionals and students' desire to deal with problems on their own. The magnitude of the issue reinforces the urgency for accessible and effective mental health interventions which overcome the treatment barriers students typically face.

Recognising the potential of digital platforms in overcoming barriers to mental health care, SAMRC researchers collaborated with esteemed institutions such as Harvard University (USA), University of the Western Cape, University of the Free State, Stellenbosch University, and University of Cape Town. Together, they devised and evaluated innovative solutions, including an online group intervention and a gamified self-guided app, designed to address symptoms of depression and anxiety among university students.

Following a rigorous randomised control trial (RCT) conducted across three universities in South Africa, the results proved groundbreaking. Both the self-guided app and the online group intervention significantly outperformed the active control condition over 3-month and 6-month follow-up periods in treating students with clinically significant anxiety and/or depression.



These findings not only validate the efficacy of these digital interventions but also highlight their potential to revolutionise mental health care among university students. Importantly the research has also highlighted students' willingness to access mental health support on digital platforms.

The success of these interventions has extended beyond South Africa's borders, with ongoing clinical trials in Brazil, Romania, and New Zealand. This global expansion emphasises the universal relevance and potential impact of these technological interventions in addressing mental health challenges.

The next phase of research will focus on assessing the long-term effects of these interventions.

Additionally, the team aims to develop individualised treatment protocols within a precision medicine framework, enabling targeted and optimised interventions for those who stand to benefit most from these digital mental health solutions.

This pioneering initiative by the SAMRC marks a significant stride in leveraging technology to address mental health challenges among students, offering hope for improved access to effective, scalable and affordable mental health care.

As the world grapples with the escalating mental health crisis, initiatives like these signal a promising future where technology plays a pivotal role in enhancing mental well-being globally.

LOAD-SHEDDING & *air pollution*

ENVIRONMENTAL HEALTH

South Africa Faces Air Quality Data Scarcity Amid Rising Power Interruptions

Air pollution remains a critical concern globally, impacting public health significantly, with an estimated 6.7 million premature deaths annually due to both indoor and outdoor air pollution. In 2019, air pollution accounted for roughly 6% of all deaths in South Africa.

The country already struggles with a scarcity of accurate air quality data, a problem exacerbated by frequent power outages attributed to Load Shedding (LS). These interruptions disrupt monitoring equipment, creating a substantial gap in collecting vital data necessary for research, policy-making, and environmental management.

A recent study, led by Prof Caradee Wright from the SAMRC's Environment and Health Research Unit (EHRU) in collaboration with other institutions,



sheds light on how LS impacts our understanding of air quality.

Key Insights from the study were:

- Load Shedding significantly hampers the acquisition of reliable air pollution data, particularly during higher stages, rendering monitoring equipment inoperable during power cuts.
- Accurate air quality data are imperative for managing and reducing the health impacts of air pollution, crucial for fields like epidemiology, chemistry, and atmospheric science, and integral in guiding air quality management strategies.
- Addressing these data collection challenges necessitates adopting dependable and eco-



friendly air quality monitoring technologies such as passive samples, rechargeable battery-powered sensors, and renewable energy-driven sensors to ensure continuous data collection.

- The government aims to gradually implement solutions like solar voltaic panels and battery-powered sensors at monitoring stations to mitigate power-related disruptions.
- Quality air pollution data is vital for understanding long-term trends and assessing the effectiveness of policies aimed at curbing air pollution.

The South African Air Quality Information System (SAAQIS) data are instrumental in calculating the National Air Quality Indicator, essential for

determining compliance with National Ambient Air Quality Standards (NAAQS) and guiding necessary interventions.

EHRU is advocating for a shift to renewable energy sources to ensure uninterrupted functionality of air quality monitoring stations, especially during power disruptions. Urgent measures are crucial to bridge the data gaps and ensure a healthier environment for South Africans, free from the adverse effects of air pollution.

With the escalating power interruptions and a scarcity of air quality data, swift action is imperative to ensure continuous and accurate monitoring. These data not only safeguard public health but also steer effective environmental policies for a safer environment for all citizens.

Advancing **SCIENCE**



INVESTING IN HEALTH

SAMRC's Research Capacity Development Division drives breakthroughs in health research and academic excellence

In a significant stride toward enhancing health research sustainability, the South African Medical Research Council's Division of Research Capacity Development (RCD) is fostering advancements in health sciences by leading programmes that aim to directly contribute to national research needs, and to contribute to national targets for research capacity and career development.

RCD's primary focus lies in cultivating a sustainable ecosystem for health research in South Africa, by providing funding for the next generation of health researchers. This drive aligns with SAMRC's overarching goal of building capacity for the long-term sustainability of health research, transforming health research practices, bolstering efficient administration in the field, leading the generation of new knowledge, and supporting innovation and technology development.

ENHANCING RESEARCH SKILLS DEVELOPMENT AND CONTRIBUTION TO THE BODY OF KNOWLEDGE

RCD awards offer resources for training, mentorship, and skill development. This investment has led to substantial improvements in the technical and research skills of grant and scholarship holders, empowering them to conduct more rigorous and high-quality research.

The far-reaching impact of the RCD on grant and scholarship recipients has been profound, advancing their professional growth and significantly augmenting research competencies in South Africa. Through resourceful awards facilitating training, mentorship, and skills development. Grant holders have honed their technical abilities, empowering them to undertake rigorous and high-quality research endeavours.

Career Advancement:

The recognition and support provided by the RCD grants propel grant holders with many ascending to higher academic positions, and several achieving professorships or senior roles within academic/research institutions. The investment in SAMRC intramural unit postdoctoral research fellowships has also resulted in successful job placements, with a notable 70% retention rate within the SAMRC. Former and current RCD beneficiaries have excelled in securing additional research funding, employment, and innovation.

INSTITUTIONAL IMPACT

Beyond individual researchers, RCD's influence extends to institutional capacity building, fostering robust research cultures and infrastructure, particularly in historically disadvantaged institutions, aiming for inclusivity and transformation within the research landscape.

The RCD programmes have yielded remarkable success stories, showcasing individuals who have clinched prestigious positions and spearheaded impactful research initiatives.

CONTRIBUTIONS TO HEALTH RESEARCH AND ACADEMIC EXCELLENCE

The contribution of the RCD grant holders has led to advancements in medical knowledge, innovative interventions, and policies that positively impact public health and healthcare not only in South Africa but potentially globally through local and international collaboration and funding.

The RCD awards have facilitated extensive networking and collaboration opportunities. Through shared expertise and broader research perspectives, funded beneficiaries at historically disadvantaged institutions have seen a marked improvement in the quality and impact of their research outcomes.

DEVELOPING RESEARCH LEADERS OF TOMORROW

Moreover, RCD remains steadfast in its commitment to nurturing the next generation of research leaders, providing scholarships and support to MSc and PhD students in health-related disciplines. The Division's influence is evident in the numerous accolades received by scholars, both on the national and international fronts, recognising their exceptional contributions to research excellence.

The recent media coverage of RCD beneficiaries highlights their pivotal role in advancing health research and academic excellence. From pioneering research initiatives to receiving prestigious awards, the impact of RCD initiatives is palpable and promising.

The success and impact of SAMRC's RCD programme awards:

- SAMRC's 'Early Investigators Programme' beneficiary shines a light on rare disease,
- RCD Empowers Emerging Researchers: Celebrating Success at the 2023 South African Women in Science Awards
- Celebrating Women's Excellence in the SAMRC Research Capacity Development Programmes
- SAMRC Postdoctoral Fellow receives young scientist awarded research excellence for early career
- SAMRC Postdoctoral Fellow receives the SAMRC Intramural Early – Mid Career Researcher Flagship Award
- SAMRC Mid-Career Scientist recognized by World Economic Forum (WEF) as one of 2020 Young Scientists
- SAMRC Postdoctoral Fellow - a real example of research resilience in the time of COVID-19

In essence, SAMRC's RCD stands as a catalyst for improving health and medical advancements by fostering research that positively impacts public health and healthcare, both locally and potentially on a global scale. The media coverage illustrates the impactful outcomes of SAMRC's RCD initiatives, showcasing the achievements and contributions of the RCD grant holders in their specific fields of health research and academic excellence.

PRECISION MEDICINE FOR SUSTAINABLE HEALTHCARE

In the evolving landscape of healthcare, personalised and precision medicine are ushering in a new era of patient-focused care. Promising to customise healthcare based on an individual's genetic makeup and environmental factors,

leading to more accurate diagnoses, prognoses, and treatment plans. This minimises the trial-and-error associated with standard treatments. The ability to enable precision medicine stems from advancements in omics technology and the study of the human genome. Unique population genetic characteristics have advanced the field, allowing the correlation of a patient's genetic profile with clinical and demographic data for diagnosis and treatment. This provides insights into disease mechanisms and better drug targets.

The world is increasingly recognising the value, as advances in genomics, data analytics, and technology have made it possible to collect and interpret vast amounts of patient data. Most countries are embarking on large-scale population genomics programs, by uncovering their population diversity to enable more personalised care. Pharmaceutical companies are investing in targeted drug development, further propelling the shift toward personalised treatments. The future holds the promise of harnessing these advancements for the benefit of individuals worldwide. Despite the global momentum behind precision medicine, to make it accessible to all, in Africa, this poses distinct challenges.

1. Many African countries lack the necessary healthcare infrastructure and technology for personalised medicine. Collaborating with international organisations, research institutions, and pharmaceutical companies can facilitate access to cutting-edge technologies.
2. Access to comprehensive patient data, including genetic information, is limited, hindering the implementation of precision medicine. Scaled national genomics programs and partnerships can address this gap and help reverse the brain drain

of professionals such as geneticists, bioinformaticians, clinical genetics and counselling skills in this field. Other cross-disciplinary skills such as data scientists and computer programmers are necessary to build the core databases required to propel the development of precision medicine tools and solutions

3. Ensuring that advanced healthcare services are accessible and affordable for all Africans is a significant challenge. Policies and strategies must be developed to make these services affordable and accessible.
4. Educating and engaging communities is crucial to build trust and facilitate the adoption of these new approaches. Sharing information is imperative for the development of personalised and precision medicine in African healthcare.

South Africa stands out as one of the leading nations in Sub-Saharan Africa spearheading advancements to enable a precision medicine future. This emanates within the country's strategic objectives in health innovation. The SAMRC's Grants Innovation and Product Development (GIPD) Unit have been pioneering the development of Precision Medicine Research and Innovation initiatives to enable solutions that will transform healthcare for the country

Personalised and precision medicine represent a healthcare revolution that offers numerous benefits. While adoption is progressing globally, special attention is needed to address the unique challenges in Africa. By investing in infrastructure, data sharing, education, and accessibility, Africa can pave the way in patient-centred clinical healthcare, benefiting its people and contributing to the global progress in medical science.



YOUTH *& Science*

SAMRC's Generation Science Programme Fuels Youth Interest in Science

The one thing that stood out the most to me was the hard work and determination of the people who worked there, and I really enjoyed learning more about foods and how they would benefit the people of our country.



The programme really helps kids to open our eyes and think out of the box of what is really out there.

OUR FUTURE LEADERS IN SCIENCE

With South Africa experiencing a critical skills shortage in almost all sectors, the SAMRC is taking proactive steps to shape the future of science through its Generation Science (Gen S) Programme.

Gen S, an initiative which takes place during Youth Month in South Africa, aims to provide high school learners from STEM schools (Science, Technology, Engineering, and Math) in Grades 10-12 with a firsthand experience of SAMRC's day-to-day work in scientific research. "We are immensely proud of our contribution to youth development through this programme," remarked Tendani Tsedu, SAMRC's Head of Corporate and Marketing Communications. "It offers a unique opportunity for learners to engage with our organisation, understand our research units, and witness the impactful work we do."

Commencing at the Cape Town, Parow head office in 2022, during the July school holidays, the programme was met with resounding success, prompting SAMRC's commitment to its continuity annually. Tsedu expressed, "The primary goal is to equip learners with a deeper understanding of the work environment, necessary skillsets, and how SAMRC contributes to improving the health of all South Africans."

Beyond providing a glimpse into daily operations, the programme aspires to ignite a passion for

science and technology among participants, ultimately leading to improved health outcomes and influencing policy and science communication. Tsedu highlighted, "Engaging with our experts from various fields allows learners to grasp the holistic impact of SAMRC, aligning with our organisational promise."

Through direct interactions with scientists and researchers, learners gain invaluable insights that drive their interest careers in science, specifically in medical research careers. "The Gen S Programme

It was inspiring, because I had to learn that there are different types of science.

I learned new things and different careers in medicine, which I wasn't familiar with before.





I enjoyed being around the clinic and engaging with participants and also going to the labs to see how blood test is done.

not only fosters curiosity but also nurtures a new generation of scientists who will shape the future of healthcare in South Africa," Tsedu concluded.

SAMRC's in partnership with Stellenbosch University, Division of Molecular Biology and Human Genetics | SAMRC Centre for TB Research Department of Biomedical Sciences... the programme stands as a testament to its dedication to fostering a brighter, science-driven future for the nation.

The work of building the future of Science, requires collaborative efforts. If this programme inspires you, and you would like to get involved, please contact us on: info@samrc.ac.za





WHAT'S ON *your plate?*

UNDERSTANDING FOOD COMPOSITION

Unveiling the science behind what's on your plate: Transforming South Africa's health through food composition research

In the heart of South Africa's scientific endeavors lies a profound yet often overlooked field—food composition research. Far from being confined

to laboratories, this domain plays a pivotal role in providing critical information to define the nutritional adequacy of what we consume.

At its core, food composition research mirrors a detective's quest, meticulously analysing various foods to unveil their nutritional secrets. It dissects everything from energy-packed carbohydrates to growth-inducing proteins and vital fats, diving deeper into micronutrients—essential vitamins and minerals that aid our bodies' optimal function. This research doesn't stop there; it scrutinises other beneficial compounds found in food, like dietary fibre and polyphenols.

Why does this matter? The food we eat directly impacts our health, making this research crucial in deciphering the nutritional value of our diets. It guides experts in balancing nutrients and addressing potential deficiencies, laying the foundation for healthier dietary intakes and guidelines.

This impact extends beyond the scientific realm, resonating with our daily concerns about nutrition. Ever wondered if your diet lacks crucial vitamins or if you're consuming excesses harmful to your health? Food composition research answers these questions, shedding light on our eating habits and steering us towards better health. Moreover, food composition data of certain food items inform food labels which unpack the nutrient values of food, guiding the consumers to make healthier choices.

But its significance transcends individual health—it's a cornerstone in combating prevalent public health issues like obesity and diabetes. By dissecting nutritional content, researchers pinpoint problematic areas, contributing to policy changes promoting healthier alternatives and better food choices for the populace.

Yet, its impact reaches far into the future, informing sustainability concerns. By studying nutritional content, scientists identify sustainable

and nutritious food options, aligning with global goals for food security and a healthier planet.

Enter the South African Food Data System (SAFOODS) research team, headquartered in Cape Town, at the forefront of this scientific pursuit. Their mission? Building a comprehensive food composition database to assist the broader nutrition fraternity in the country. Through promoting the science of food composition and advancing responsible nutrient data usage, they're reshaping our understanding of food.

The SAFOODS team conducts physicochemical research projects and sources nutrient information, ensuring data quality, and compiles data on various foods, offering invaluable resources like the Food Composition Tables and Food Quantities Manual. Their cutting-edge software, FoodFinder, merges science with technology, providing real-time dietary analysis reports, empowering researchers with nutritional analyses and insights.

Their influence isn't confined to South Africa; collaborations and expertise extend across Africa. Their work in developing the first ever Malawian Food Composition Table showcases the global impact of this research, empowering nutrition professionals to influence healthier dietary choices and addressing nutritional deficiencies.

Analysing local foods helps discern dietary patterns, aiding in evidence-based guidelines and interventions combating malnutrition. Food composition research provides the foundation to shape a healthier society, ensuring nutritionally sound choices, supporting quality control, and fortifying food to combat specific deficiencies. SAFOODS leads this charge, tirelessly working to assist to make South Africa a healthier and more nutritionally informed nation.

Taking care of your nutrition: Understanding the difference between nutrient dense and energy dense foods

NUTRIENT DENSE FOODS

- Nutrient dense foods are foods with a high amount of healthy nutrients in comparison to calories.
- Nutrient dense foods include fruits, vegetables, whole-grains, lentils, beans, soya, lean meats, nuts and seeds, fortified maize meal and bread.
- Eating more nutrient dense foods could prevent weight gain, promote heart health, and reduce the chances of developing diabetes, and cancer.

WHAT IS A CALORIE?

- A calorie is a unit measure for energy.
- The recommended daily calorie intake is 2000 calories a day for adults.

ENERGY DENSE FOODS

- Energy dense foods are foods with a high number of calories for their weight or volume.
- Energy dense foods are not only high in energy but are also high fat and/or sugar.
- Eating too much energy dense foods could lead to weight gain, poor heart health and the development of diabetes.



1200 calories
Low energy density
One meal



1200 calories
High Energy Density
Meals For The Entire Day

Did you know?

SOUTH AFRICAN DEATH NOTIFICATION FORMS LACK CRITICAL MANNER OF DEATH INFORMATION, HINDERING ACCURATE INJURY MORTALITY STATISTICS

The SAMRC's Burden of Disease Research Unit has raised concerns regarding the inadequacy of South African death notification forms, citing their failure to align with international standards set by the World Health Organization (WHO). Specifically, the omission of the manner of death—such as whether it resulted from homicide, suicide, accident, disease, or remains undetermined—from the DHA 1663 form has emerged as a significant concern. This absence poses a substantial challenge in accurately coding the causes of injury-related deaths.

Under the ICD-10 coding system, when the intent behind injury deaths is unspecified, they default to being categorised as unintentional or accidental. Consequently, instances where death notifications solely report gunshot wounds lead to their categorisation as accidental gunshot fatalities. However, findings from the National Cause of Death Validation Study 2017/8 and the Injury Mortuary Survey 2017 uncovered stark discrepancies. The majority of firearm-related deaths were attributed to homicide (88.5% and 93.1%, respectively), while the official 2017 data from Stats SA classified 98.7% of firearm deaths as accidental.

The prevalence of injuries and violence as major contributors to mortality in South Africa underscores the critical necessity for reliable injury mortality statistics. Accurate data is vital in delineating profiles and trends concerning

intentional (homicide and suicide) and unintentional injuries (such as road traffic incidents, falls, poisoning, drowning, etc.). Moreover, the integration of injury mortality indicators into multiple Sustainable Development Goals (SDGs) accentuates their significance as a focal point for prevention strategies. For instance, SDG targets like 3.6 aiming to reduce road traffic injuries and mortality, and SDG 5 striving for gender equality and empowerment of women and girls, emphasise the relevance of these statistics.

Addressing this predicament demands immediate attention to incorporate the manner of death into the death notification form, aligning with WHO recommendations for effective public health surveillance. Notably, most legislation in South Africa permits exemptions in the interest of public health. Therefore, if legislative barriers hinder obtaining crucial information necessary for public welfare, a review of such legislation within the framework of cooperative governance outlined in the Constitution becomes imperative.

Despite a clear roadmap delineated since 2010 to enhance the quality of injury mortality data, there has been a lack of government action. This inertia is unacceptable in a country grappling with high levels of violence, road traffic fatalities, and a substantial injury burden. Urgent measures are warranted to rectify this situation and enable a more accurate understanding of injury-related mortality for effective public health interventions.



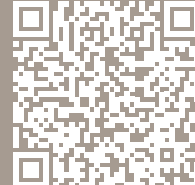
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