



THE SOUTH AFRICAN

**PRECISION
MEDICINE
PROGRAM**



science & innovation

Department:
Science and Innovation
REPUBLIC OF SOUTH AFRICA



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WHO WE ARE

The South African Medical Research Council (SAMRC) was established in 1969 with a mandate to improve the health of the country's population, through research, development and technology transfer, so that people can enjoy a better quality of life. The SAMRC aligns to health mandate set by the South African Department of Health to conduct relevant medical research and innovation.

The scope of the organization's research projects includes tuberculosis, HIV/AIDS, non-communicable diseases and, gender and health, and alcohol and other drug abuse. A key strategic objective is to help strengthen the health systems of the country.

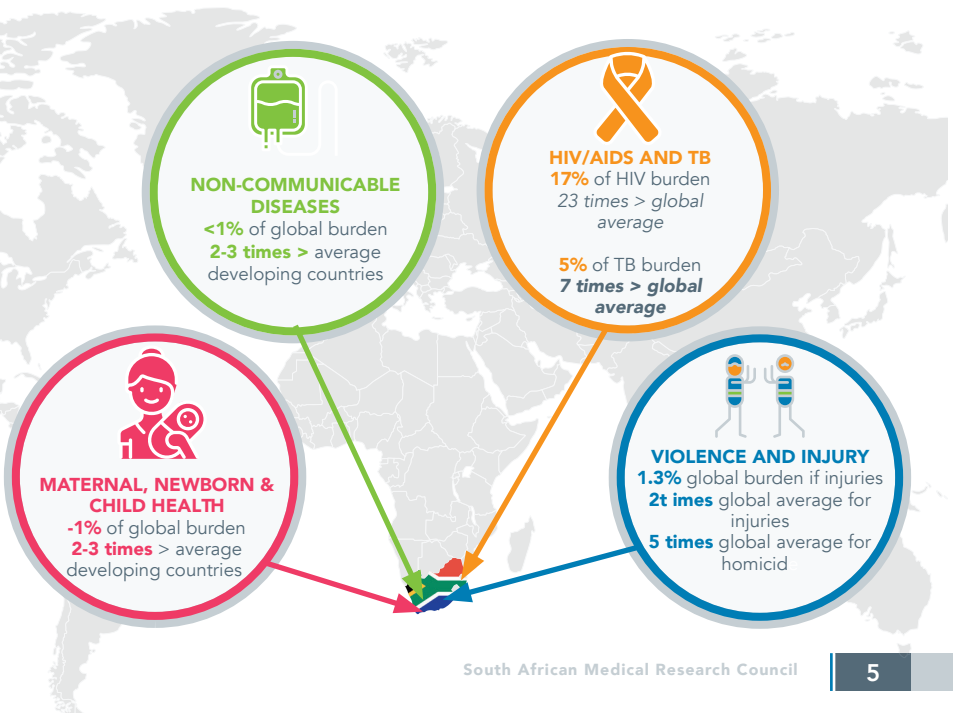


INTRODUCTION

Precision or Personalised medicine (PM) is an emerging field that utilizes advanced technologies and data analysis to tailor medical treatment and prevention strategies to individual patients based on their unique genetic, environmental, and lifestyle factors. Since, 2016, The South African Medical Research Council (SAMRC) in collaboration with the Department of Science and Innovation (DSI) has been driving the genomic/ precision medicine initiative in South Africa. Furthermore, the SAMRC as the secretariat of the South African Precision Medicine Think Tank and active participant of the EU Africa PerMed Consortium, has been involved in developing an interdisciplinary research and innovation programme to catalyse precision medicine in South Africa, to address the significant healthcare challenges faced by South Africa, with a rising prevalence of non-communicable diseases like cardiovascular diseases, diabetes, and cancer as well as host genomic influences on susceptibility for infectious diseases (HIV/ TB).

The Quadruple Burden of Disease in South Africa:

A Cocktail of Four Colliding Epidemics



OUR GENETICS

In addition to South Africa's high infectious disease rate – there is an ever-increasing non-communicable disease burden:

- Cancer, Cardiovascular Disease and Diabetes are the main disease areas to focus on
- Many HIV infected individuals living on ARV treatment also present with many non-communicable and drug induced conditions.
- Newborn screening and childhood disease interventions are also necessary.

South Africa has a diverse population with a broad range of ethnic groups and genetic variations. However, there is a lack of representation of South African populations in genomic research and databases, which are primarily focused on populations of European/ Asian descent. This limits the understanding of genetic variations and their impact on health and disease-specific to the South African population.

Current medicines that are available seem less effective within African populations. Yet the burden of disease in Africa seems to be higher compared to the rest of the globe. Pharmacogenomics to address adverse drug events on current essential drugs are showing the need to develop treatments relevant for diverse populations.

Partnerships with precision medicine leaders to create solutions for South Africa's precision/ personalised medicine ecosystem is required.

Sub-Saharan Africa has shown the greatest degree of genetic diversity.



THE SA LANDSCAPE

South Africa is the only Sub-Saharan African country with focused national funding to develop Precision/ Personalised medicine. The objective is for South Africa to create an ecosystem that enables a better health outcome for every patient. The program is based on creating solutions across the innovation value chain.

South Africa has a diverse healthcare system, a diverse economy with strong government support for research and innovation. Strong political ties with governments across the globe, with a track record in strong research and innovation collaborations. Good research institutions and the best universities in Africa.

The precision medicine landscape can be characterized as having all the components of an ecosystem, to enable a vision toward equal and more cost effective healthcare. This entails being able to accurately diagnose and treat each patient



This figure highlights the various components that exist to establish an ecosystem that drives the objective of “better healthcare for every patient”

HEALTH SYSTEM

South Africa has a first-class private care health system and government-funded public health system, with a presence in all regions of the country. Public care hosts the best research hospitals with robust clinical training programs. Therefore, allowing good access to tertiary healthcare. The government aims to bridge the private and public systems through its National Health Insurance (NHI) Program. The opportunity lies in partnering to create Health Informatics systems to enable effective public healthcare. The private sector seeks the opportunity to implement better solutions for preventative care. The small capacity developed over the years is yet to be sustained by amalgamating the strengths of both public and private healthcare to develop a sustainable workforce.

INFRASTRUCTURE

Localized infrastructure in Genomic sequencing and established precision medicine platforms now exist. The DSI and SAMRC play a strategic role in aligning the omics landscape through various government support programs.

Expanding access to advanced genomic technologies is crucial. South Africa needs to ensure affordable

and equitable access to technologies such as next-generation sequencing platforms, genotyping arrays, and bioinformatics tools. There is an opportunity to harness the current efforts in big data infrastructure toward a national genomics archive.

RESEARCH & INNOVATION

The country has good basic research scientists across the genomic medicine fields – Genetics, Bioinformatics and Big Data. The SAMRC has been involved in developing interdisciplinary research programs to build close linkages with key government-supported genomics centres and healthcare facilities to offer precision diagnostics in medical care.

The country has the largest number of clinical trial sites within the Sub-Sahara region and therein lies the opportunity to include diverse populations in new therapeutic trials.

The aim is to develop the next generation of scientists with a cross-disciplinary approach:

- To enable the integration of data to knowledge that can drive targeted interventions.
- To strengthen applied and translational research, education and training.

INVESTMENT OPPORTUNITIES

The precision medicine program presents many opportunities for outside investment. The aim is to foster collaborations with interested partners.

Since 2016, the SAMRC/DSI has invested €14 million (Euro) in Precision Medicine projects. This small investment has resulted in spin-out companies and the development of products:

- Breast cancer screening, and other cancer-personalized approaches using organoid and omics technology.
- Infrastructure investments have led to fully capacitated labs that are now able to develop scaled genomics studies.
- Pharmacogenomics projects afford the opportunity to understand treatment failure with known drugs from the country's essential drug list.

The current goal is to develop Collaboration and Partnerships - for a South African Population Genome Program:

This requires investment in:

1. Scaled Genomics Research projects to:
 - Help inform patient treatment strategy and new approaches to

bridge the gap between public and private healthcare

- Ability to create niche knowledge on the African populations and integrate data to develop targeted interventions.
2. Development of a National Genomics Archive
 3. Sustainable capacity development to enable implementation of precision medicine
 4. Seek innovative cost-effective genetic diagnostics to adequately diagnose patients
 5. Opportunity to develop better drug targets for the African Market or repurpose existing drugs
 6. Develop mutually beneficial data sharing regulation and standards.

This will be a stimulus to the advancement of the Precision medicine ecosystem.

The vision for the South African Precision Medicine Program, holds promise for revolutionising healthcare delivery, enabling targeted therapies, and improving the overall health and well-being of the South African population.

We are actively seeking program partners to drive this agenda to develop population-specific genomic studies to move Africa forward and offer an opportunity for the healthcare sector on the continent to incorporate the latest technologies to provide quality care and precision medicine options to African patients.

SOUTH AFRICAN MEDICAL RESEARCH COUNCIL

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