

Proceedings from the Inaugural South African Field Epidemiology Training Programme Alumni Symposium, Pretoria, May 2024

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Summary

South Africa (SA) has complex disease epidemiology. Syndemics, quadruple burden of disease, changing demographic profiles, and health system reforms in an uncertain economy make the evidence from which public health decisions are made especially important. Epidemiologists provide evidence for decisions by analysing surveillance data, engaging in research, detecting and responding to outbreaks, and communicating findings to key stakeholders. A symposium for field epidemiologists and various stakeholders to foster collaboration in South Africa was held in Pretoria in May 2024. Here, we summarise key discussions about communicable and non-communicable diseases, One Health surveillance, and epidemiology capacity in South Africa. Topical issues include the development of the National Public Health Institute of South Africa (NAPHISA), the National Health Insurance (NHI), and the role of epidemiologists in tackling the complexities of diseases in South Africa.

Background

South Africa (SA) has complex disease epidemiology, with health problems affecting low- and high-income groups differently. The interplay of these diseases with lifestyle and social determinants, as well as environmental factors, is becoming increasingly apparent. In 2014, Prof. Bongani Mayosi, former dean of the Faculty of Health Sciences at the University of Cape Town, drew attention to the quadruple burden of disease and colliding epidemics.¹ Coexisting infectious diseases and non-communicable diseases (NCDs) in people living with HIV/AIDS are now widespread.² Achoki *et al.*³ state that in SA, “from 1990 to 2019, risk factor burdens generally shifted from communicable and nutritional disease risks to non-communicable disease and injury risks; unsafe sex remained the top risk factor [for all-cause mortality].”

Epidemiologists study the occurrence and trends of disease to provide critical information for action. With multiple diseases and epidemics colliding in SA, epidemiologists need to provide sound evidence, interpretation, and actionable recommendations for public health policy and practice. The WHO recommends one epidemiologist for every 200 000 population.⁴ Improving epidemiological capacity, encouraging cross-cutting skills, and providing collaboration opportunities to public health researchers, stakeholders, and policymakers are key to responding to SA's current and future health problems.⁵

The South African Field Epidemiology Training Programme (SAFETP) aims to increase epidemiological capacity in SA and provides a full complement of basic, intermediate, and advanced field epidemiology training programmes. By the end of 2023, the programme had trained 134 advanced-tier residents (since 2007), 234 frontline residents (since 2016), and 34 intermediate residents (since 2021).

The SAFETP alumni association held its inaugural symposium on 13 and 14 May 2024 in Pretoria, SA. The objectives of the symposium were to promote the sharing of public health knowledge among alumni and other public health colleagues, to reflect on progress made, to guide future directions, and to foster collaboration and networking opportunities among public health professionals and policymakers. Prominent speakers shared insights on recent events in their scope of expertise. FETP graduates presented recent research projects, outbreak investigations, or surveillance system evaluations. Talks and presentations followed three general themes (Table 1), which all encompassed the overarching theme of the National Public Health Institute of South Africa (NAPHISA): Connecting Public Health.



Table 1. Themes and guest speakers for the South African Field Epidemiology Training Programme alumni association symposium, 13-14 May 2023, Pretoria, South Africa.

Themes	Speakers
Public Health Systems: NAPHISA & NHI*	Dr Alex van den Heever, Dr Natalie Mayet
One Health in South Africa	Dr Jacqueline Weyer, Ms Babongile Mhlongo
Non-communicable disease surveillance: cancer, lifestyle, injury and violence	Dr Mazvita Muchengeti, Mr Patrick Magodzho, Prof. Ashley van Niekerk, Ms Najuwa Arendse

*NAPHISA = National Public Health Institute of South Africa; NHI = National Health Insurance

Public health systems in South Africa: NAPHISA & NHI

Dr Natalie Mayet, Deputy Director of the National Institute for Communicable Diseases (NICD), a division of the National Health Laboratory Service (NHLS), introduced work published by an SAFETP alumnus, Brett Archer (Epidemiologist, World Health Organization (WHO)), on collaborative surveillance.^{6,7} She indicated that Africa is moving towards having fully functioning, cross-cutting public health institutes.⁸ A fundamental principle for such collaboration is the need to build relationships within a legal framework for long-lasting collaboration. In South Africa, there are pockets of excellence for communicable and non-communicable disease, injury and violence, and event-based surveillance. There is, however, a need for a transversal umbrella to encompass these pockets and create a more sustainable framework for collaboration. The NAPHISA Act was signed in 2020⁹ and provides the legal framework under which these pockets of excellence can share transversal services and foster collaboration. The act stipulates that functions of surveillance, research, and capacity building for communicable diseases, non-communicable diseases, occupational health, cancer surveillance, injury and violence prevention, and environmental health are optimised under a single public health institution. NAPHISA could be the “business intelligence” arm of the National Health Insurance (NHI) and would provide evidence for decision-making.

Discussions on the NAPHISA flowed into a talk about the NHI, which was scheduled to be signed into law two days later¹⁰ (the NHI has since been signed into law amidst some criticism). Prof. Alex van den Heever, Chair of the Social Security Systems Administration and Management studies at the University of the Witwatersrand, began by painting the picture of the health sector as an exceptionally broad service sector—from porters to lawyers, information technology to physiotherapy. The health sector requires vast and broad knowledge and consumes ~6% of the country's gross domestic product (GDP).¹¹ It is, therefore, an exceptionally complicated system, and, post-apartheid, the divide between the services afforded by those with access and those without access to medical insurance is stark. Approximately 16% of the privately insured population has access to 70% of the country's health professionals¹, leaving many people and areas under-serviced.

While the principle of universal health care (UHC) intends to benefit all by redirecting resources from super-specialised care towards improving primary healthcare. The NHI's planned implementation to realise these benefits has been criticised over its aggressive tax restructuring, which aims to raise approximately R250 billion primarily through tax increases. The Laffer-curve¹¹ was used to demonstrate the impracticality of increasing tax revenue by simply increasing the tax rate, since increasing tax rates increases the incentive for taxpayers to avoid



tax or to find other non-financial remuneration, which causes tax revenue to decrease. Prof. van den Heever argued that while the current health system in SA was inherited by a system that systematically excluded the majority of the population, its primary problem is not necessarily funding, nor that its current structure is incapable of realising UHC, but rather that the system is under poor leadership and lacks accountability, making it vulnerable to corruption. Aggregation of audit reports by research groups have shown the high cost of corruption at provincial-level health departments.¹² Prof. van den Heever highlighted the importance of collating publicly available information on financial records or audit reports and health outcomes of facilities in order to demonstrate associations between management and health outcomes.¹³ As health investigators and health data analysts, epidemiologists can play a key role in promoting the transparency of institutions. Prof. van den Heever encouraged projects focussed on facility management and health outcomes. Placing residents in units where they have exposure to economic analysis, perhaps including this in epidemiological curricula, could encourage these projects. Projects don't have to be limited to essays, reports, or publications; curated open-source datasets are also of value.

One Health in South Africa

Dr Jacqueline Weyer, head of the Centre for Emerging Zoonotic and Parasitic Diseases, NICD/NHLS, explained that the implementation of One Health, although not a new concept, may be suboptimal in South Africa.¹⁴ The Hanoi declaration¹⁵ and, more recently, the One Health High-Level Expert Panel (OHHELP)¹⁶ frameworks were established to guide the practical implementation of One Health. OHHELP includes a theory of change and action tracks, including strengthening health systems and addressing antimicrobial resistance. One Health has no legal framework in South Africa, even though the COVID-19 response had an overarching One Health aspect. Current initiatives for One Health include drafting a regional One Health programme for Southern Africa together with other Southern African Development Community (SADC) member states.

Ms Babongile Mhlongo, Director of Environmental Health at the KwaZulu-Natal Department of Health, a province that has experienced numerous natural disasters in recent years and is endemic for malaria and rabies, painted a pathway towards NAPHISA that involves a strong framework for integrating surveillance of both humans and animals for cost-effective information for action. A current limitation was highlighted where environmental surveillance is being conducted with a vast amount of data generated but not being accessed or analysed to its full potential. SAFETP residents were encouraged to integrate human, animal, and environmental health into projects like surveillance evaluations, which may provide evidence for improving collaboration within a One Health framework.

Non-communicable disease surveillance in South Africa: cancer, lifestyle, injury, and violence

South Africa is going through an epidemiological transition, with deaths from infections declining while deaths from NCDs continue to rise, surpassing deaths from infectious diseases since 2010²⁰.

Day two began with a presentation from Dr Mazvita Muchengeti, head of the National Cancer Registry (NCR), NICD/NHLS. Cancer is the only non-communicable disease with a formal surveillance system in South Africa. Since there is no non-communicable disease institute in South Africa, the NCR was established under the NICD to



leverage existing communicable disease surveillance systems. Interestingly, there is an interplay between cancer and infectious disease, as it was an AIDS-defining illness, Kaposi Sarcoma, in otherwise healthy men, which caused the initial concern about HIV/AIDS in the 1980s. HIV and AIDS remain a key risk factor, and the effect on cervical cancers is an example of the disproportionate burden of cancer in South Africa and the interplay between communicable and non-communicable diseases.

The NCR serves as South Africa's main source of national cancer incidence data. In 2011, Regulation No. 380 of the National Health Act No. 61 of 2003 was created to legally establish the NCR and make cancer reportable. Now healthcare workers are obliged to report confirmed cancers to the NCR. The regulation provided a mandate for the NCR to establish population-based cancer registries (PBCR). The first to be established was the Ekurhuleni population-based cancer registry (EPBCR) in 2017.¹⁷ This registry meets the gold standard criteria for cancer registration worldwide, as data on all cancers that are diagnosed clinically, radiologically, or pathologically are collected.¹⁸ The NCR aims to establish 4 PBCRs in South Africa.

The NCR is also the IARC-GICR Centre of Expertise for cervical cancer in sub-Saharan Africa. Cervical cancer is preventable and known to be caused by persistent infection with the Oncogenic Human Papillomavirus (HPV).¹⁸ Cervical cancer can be prevented through HPV vaccination, screening, and excision where indicated, and is therefore targeted for elimination by the WHO (the only cancer to be targeted for elimination). Effective surveillance of both the HIV/AIDS care cascade and HPV vaccination and screening will be critical for cervical cancer elimination in South Africa.¹⁹

Mr Patrick Magodzho, Deputy Director for Non-Communicable Diseases at the Gauteng Department of Health, shared insights on non-communicable disease (NCD) in SA. South Africa now has an NCD strategic plan with a two-pronged approach: the 5x5 and 90-60-50 approaches.²⁰ The 5x5 approach outlines five groups of NCDs and five modifiable risk factors. This proposes that the burden of cardiovascular disease, cancer, chronic respiratory conditions, diabetes, and mental health, including neurological disorders, can be reduced by modifying tobacco use, an unhealthy diet, physical inactivity, alcohol abuse, and air pollution. The 90-60-50 approach is reminiscent of the UNAIDS 95-95-95 approach, i.e., 90% of people over 18 years of age will know their blood pressure and blood glucose status, 60% with adverse findings will receive treatment, and 50% of those receiving interventions will have their condition controlled. Mr Maghodzo highlighted that while these are useful goals, surveillance of these indicators is lacking. NAPHISA may be the vehicle for adequate NCD surveillance necessary to realise the goals of the strategic framework.

A pocket of excellence mentioned during Dr Mayet's opening speech was that of injury and violence surveillance - a group led by Dr Ashley van Niekerk (acting head) and Ms Najuja Arendse (project manager and PhD candidate),^{21,22} of the Institute for Social and Health Sciences, University of South Africa (UNISA) and the South African Medical Research Council—Unisa Violence, Injury, and Social Asymmetries Research Unit (VASRU). The group has used relationships with the Mpumalanga Department of Health to build an electronic National Injury Mortality Surveillance System (eNIMSS). They are able to provide granular injury and violence mortality information for 2023, providing a proof-of-concept in re-engineering cause-of-death reporting in South Africa. Official cause-of-death reports, published by Statistics South Africa, currently have a five-year delay but are reported annually, making real-time action challenging. Residents and epidemiologists could collaborate with this group, especially those with an interest in mortality surveillance in Mpumalanga Province.



Abstract presentations

The symposium also provided an opportunity for alumni to showcase their research. Topics ranged from wastewater surveillance of SARS-CoV-2 to schistosomiasis surveillance and outbreak investigations, and there was even a project on stress in laboratory professionals during the COVID-19 pandemic. Ms Siphwokuhle Hloniphile Mkhonza, an alumna of the SAFETP 2023 Mpumalanga intermediate cohort, was awarded best oral presentation for her talk titled "Evaluation of a maternal death surveillance system in a district hospital, Mpumalanga Province, South Africa, January 2018-November 2022." Mr Maxwell Mabona, from the 2021 advanced-level cohort, was awarded best rapid fire presentation for his talk on "A review of malaria trends in South Africa for the 2022-2023 malaria season based on the Notifiable Medical Conditions Surveillance System (NMC-SS)."

Conclusions

The SAFETP alumni symposium provided a platform for junior and senior public health stakeholders to come together, share ideas, network, and discuss key public health issues being faced in South Africa, Africa, and globally. Communicable and non-communicable diseases can occur in the same person, and yet surveillance systems offer little to holistically address this intersection. Public health systems tend to exist in silos or in specific pockets of excellence. However, the NAPHISA is expected to improve surveillance in SA for NCDs, One Health, and infectious diseases through information sharing and transversal functions, and it could also provide business intelligence for the NHL.

Recommendations

The presentations highlighted the current siloed approach of public health research and surveillance in South Africa, a limiting factor in addressing the transitioning epidemiology of disease in the country. Until a public health institute (such as NAPHISA) is established, forums can provide interim platforms for cross-cutting collaboration for public health researchers, stakeholders, and policymakers. Epidemiologists are encouraged to collaborate with existing pockets of excellence for proofs of concept that lead to legal frameworks and sustainable collaborations. Symposia should be attended by policy stakeholders from the country's legislative arms. In this case, attendance by the National Department of Health (NDoH) may improve the translation of data towards policy in South Africa. FETPs should include cross-cutting themes and economic evaluation topics in their curricula. Epidemiologists can play a role in maintaining the transparency of public institutions through analysis or curating open-source datasets that link health facilities' financial and audit records with health outcomes.

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Conflicts of interest

Jackie Kleynhans was the organiser of the event and serves as the president of the SAFETP alumni association.



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