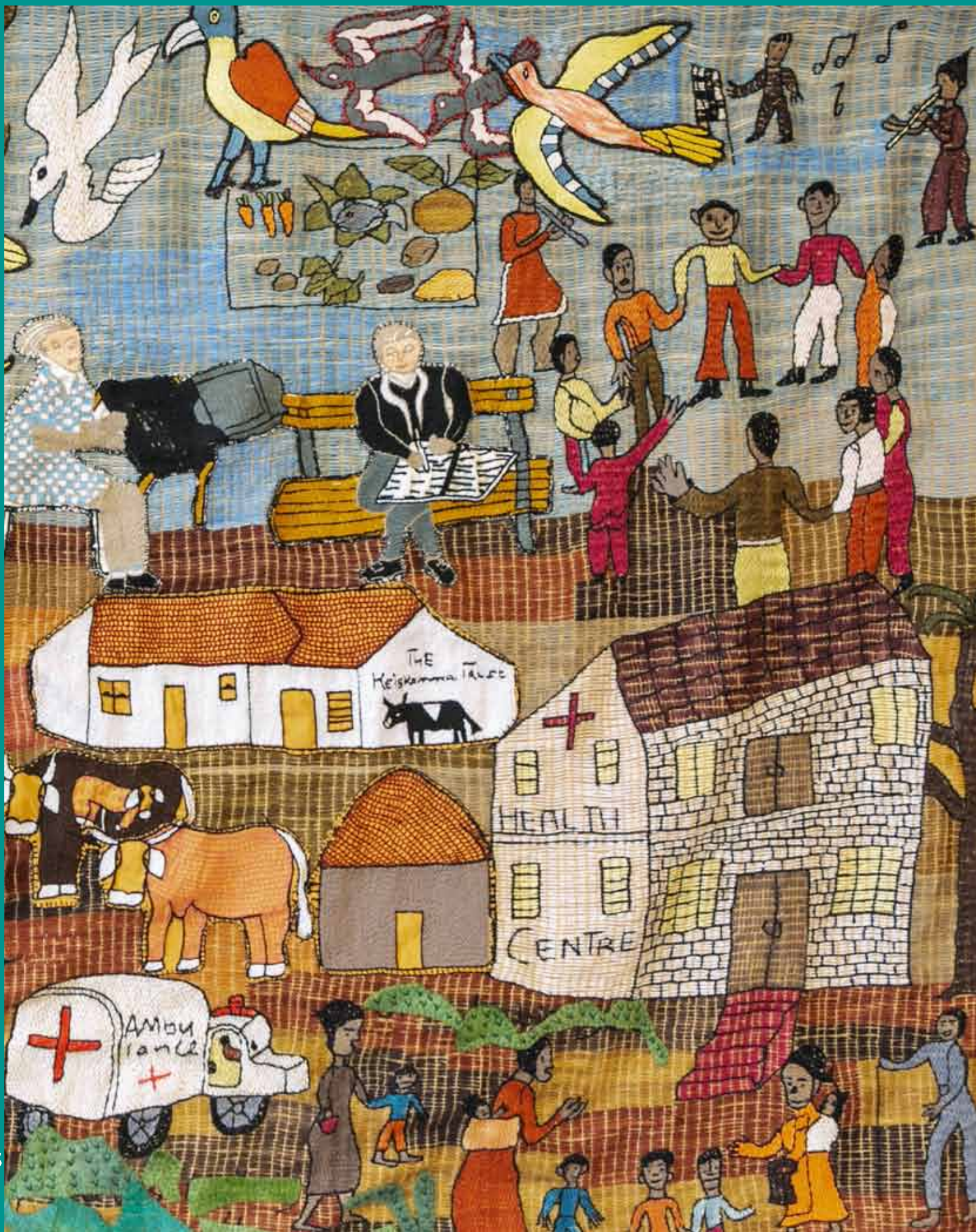
South African Health Review 2018



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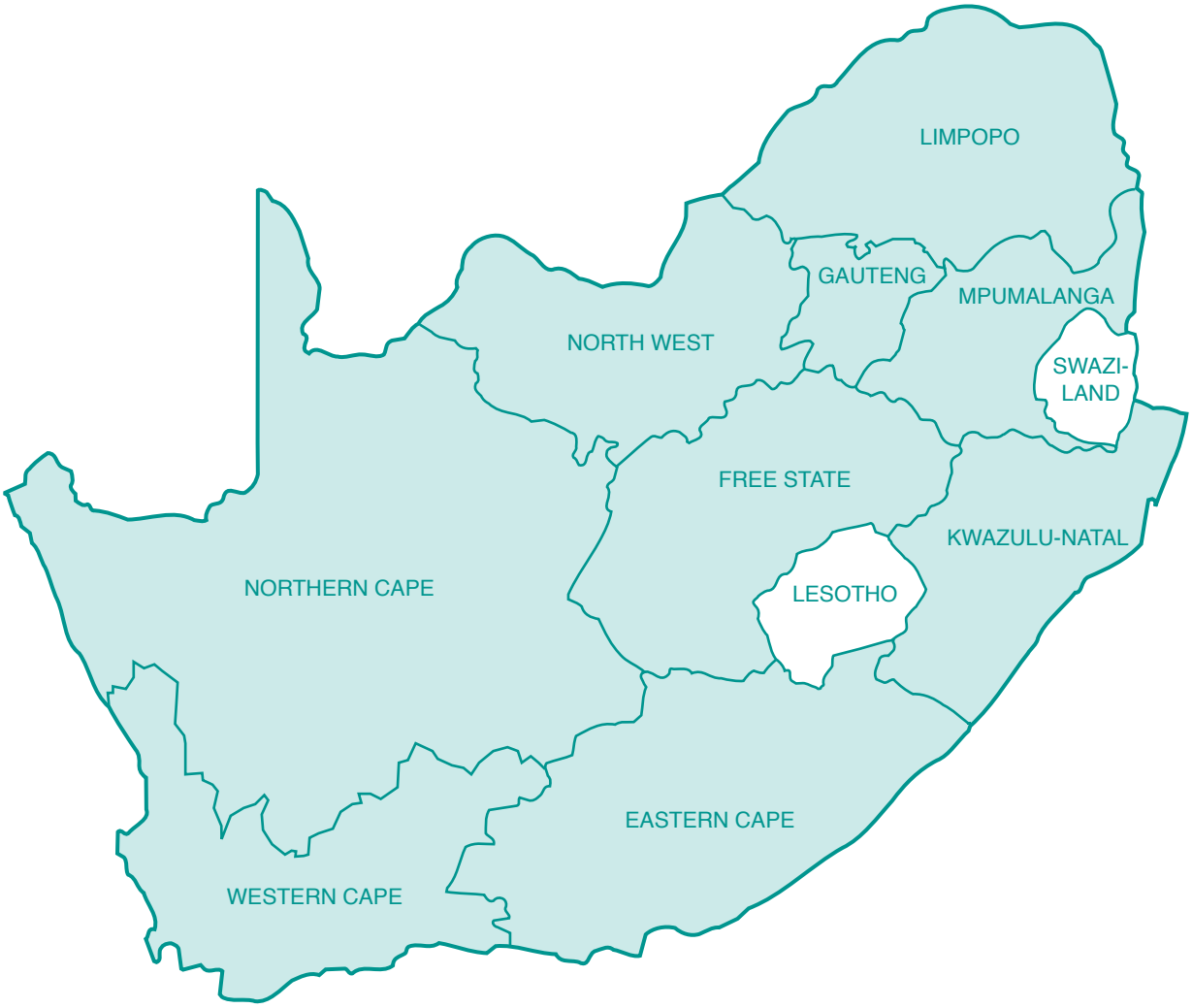

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Foreword

It is my pleasure to introduce the 21st edition of the *South African Health Review (SAHR)*, the Health Systems Trust's annual flagship publication that curates knowledge from a wide variety of sources to provide an overview of health systems issues in the country.

We are proud to have Professor Laetitia C. Rispel as the guest editor of this edition. Professor Rispel was involved in conceptualising and contributing to the first *SAHR* in 1995, and it is fitting that she serves as the guest editor of this 21st edition.

While the central focus of the 2018 *Review* is human resources for health (HRH), this edition also provides analysis and commentary on other important topics in our national discourse on citizen health and the responsiveness of the health system. Chapters on mental health, quality improvement, management of infectious and communicable diseases, and increase in 'obesogenic' environments have been included. These illustrate the complexity of health systems and the range of issues that need to be addressed in order to achieve universal health coverage in South Africa.

A strong group within the HST, supported by a cadre of highly regarded peer reviewers and authors, have worked through the year to bring the *Review* to completion. On behalf of the Board, I extend our deep appreciation to all HST staff involved in producing the *Review*, to the authors and peer reviewers, and the *SAHR* Editorial Advisory Committee members who provided oversight and direction to the editorial team.

The collective input of internal and external peer reviewers, and the willingness of authors to accommodate collegial feedback and editorial comment, have strengthened the publication.

As always, we are grateful to the South African National Department of Health for supporting the production of the *Review*.

We feel confident that the 2018 *SAHR* will serve as a key resource and departure point in advancing the development of HRH in the journey to universal health coverage.

Flavia Senkubuge

Chairperson of the Board of Trustees,
Health Systems Trust

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Acknowledgements

Editors

Laetitia C. Rispel and Ashnie Padarath.

Project Coordinator

Emma-Louise Mackie.

Editorial Advisory Committee

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Their contributions helped to guide the development of the *Review* and uphold high standards of academic rigour.

Contributing authors

We appreciate the individual authors' commitment to the success of the *Review* and their co-operation in responding to editing requirements, often at short notice.

Peer reviewers

We extend our thanks to the peer reviewers for their insightful comments which strengthened the quality of the chapters in this *Review*.

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This publication was supported by a grant from the South African National Department of Health.

Cover art

Entitled 'Hope to the World', this tapestry was designed by Nozeti Makubalo, and embroidered by Ndileka Mapuma, Novukile Ndamo and Monfusi Deliwe of the Bodium Studio. The felt-work was done by Constance Gxamza. The tapestry was facilitated by the Art Project of the Keiskamma Trust, based in the Eastern Cape and currently hangs in the St. Thomas' Anglican Church Brooklin in Ontario, Canada. The tapestry was commissioned specifically for the church as an initiative of the St Thomas' AIDS Response Team. Special thanks are due to Carol Baker, Cathy Stanley, Robyn Bennett and the Reverend Claire Wade for assisting us in sourcing a picture and description of this rich piece of art.

Editorial

Human Resources for Health (HRH) are the personification of a health system, yet there is relative neglect of, and insufficient investment in the people who work to improve community health and wellbeing. This 21st edition of the *South African Health Review (SAHR)* begins to tackle the seemingly intractable challenge of how to ensure adequate HRH in South Africa – a challenge that requires innovative and practical solutions to enable sustainable progress towards universal health coverage (UHC).

In addition, authors interrogate a raft of salient health system issues facing South Africa today. For instance, could an overall quality-of-care framework reduce the gap between policy and implementation of quality improvements? Although the listeriosis outbreak that claimed many lives captured the public's attention, what surveillance systems are in place for major communicable diseases? How do we contextualise the Gauteng Mental Health Marathon Project (aka Life Esidimeni) within the quest for UHC in South Africa? What needs to be done to ensure that rehabilitation therapists utilise stroke guidelines in rural areas of South Africa? Could the assessment of food environments and access to healthy food outlets be used as a tool for public health action to ameliorate the structural drivers of non-communicable diseases? How does the performance of South Africa's research system compare with that of other countries in the Africa region?

This 2018 edition of the *SAHR* includes 15 chapters, three of which are accompanied by case studies that provide additional insights or ancillary information on the main chapter, from either a practical or complementary perspective.

In Chapter 1, Andy Gray and Yousuf Vawda offer a concise summary of health-related legislative instruments at national level. They provide a critical analysis of some of the landmark developments in the health sector since the 2017 *SAHR*, notably the National Health Insurance and Medical Schemes Amendment Bills that captured much media attention. Using the Gauteng Mental Health Marathon Project (GMHMP) or Life Esidimeni as an exemplar, they reflect on some of the shortcomings of health policy implementation, and highlight the devastating effects of maladministration and blurred boundaries between governance and management in the health system. Other issues covered in this chapter include transformation of the Medicines Control Council into the South African Health Products Regulatory Authority, and the provisional findings of the Competition Commission's inquiry into the private healthcare sector, which called for wide-ranging reforms of the sector.

In Chapter 2, Laetitia C. Rispel and colleagues used a health labour market framework to discuss the progress, complexities and contestations pertaining to HRH. The authors highlight both the strengths and weaknesses in the current HRH foundation, and the importance of addressing these weaknesses, and at times failures, in order to ensure high-quality health systems and the success of National Health Insurance (NHI). Key recommendations include enhancing HRH technical capacity and expertise in the National Department of Health to provide strategic leadership and support for the entire health system; recruitment of public servants with the right skills, competencies, ethos and values; and the equitable allocation of resources to rural and underserved areas.

Chapter 3 entitled, 'Human Resources for Health planning and National Health Insurance: the urgency and the opportunity', makes the case for the institutionalisation of a co-ordinated, comprehensive health workforce planning process in South Africa. After providing a review of selected best practices in health workforce planning, Anja Smith and team call for a centralised database reflecting all cadres of healthcare workers in both the public and private health sectors. They argue for an inclusive approach to HRH planning that incorporates higher education institutions and other stakeholders to ensure greater coherence between the training and the service-delivery platforms.

In Chapter 4, Robert Mash and Klaus von Pressentin focus on family physicians, a health professional category recognised as a new speciality in 2007. They report that family physicians have been deployed in the health care system in a variety of ways. They argue that the various roles of family physicians reflect their breadth of training, but also confusion in national and provincial policy. Citing evidence, the authors suggest that in the short term family physicians have had a positive impact on health system performance and key clinical processes, but that there is little evidence of their impact on health outcomes. Recommendations include ongoing monitoring and evaluation of the impact of family physicians on the district health system in order to inform policymakers, district managers and educational programmes.

In Chapter 5, Steve Reid offers reflections on the evolution, implementation and operational challenges of compulsory community service (CS) for health professionals in South Africa over the past 20 years. He suggests that compulsory CS has been an effective strategy for recruiting professional staff to rural and underserved health facilities, but it has been ineffective in retaining them in the absence of complementary longer-term human resource interventions. Additionally, he points out that while CS has clear positive effects in terms of professional development and social investment, there have been some unintended consequences and a backlash to the compulsory nature of the programme. Reid suggests that current development of the National Strategic Plan for Human Resources for Health 2019/20–2024/25 provides a strategic entry point for developing a comprehensive long-term strategy ensuring access to health professionals in rural and underserved areas.

In Chapter 6, entitled 'A rural scholarship model addressing the shortage of healthcare workers in rural areas', Richard Gavin MacGregor and co-authors argue that the experience of the Umthombo Youth Development Fund has demonstrated that rural students from quintile 1 and 2 non-fee-paying schools can succeed at university if provided with the necessary financial, academic and social mentoring support, and that graduates will return to work in their local hospitals if it is a condition of support. Furthermore, they suggest that the training of healthcare workers in South Africa is an

economic investment, particularly if they are committed to public and rural service. The authors conclude that extension of the model may increase the number of health workers in rural areas, which is promising given that staffing rural areas is likely to be a major challenge in the successful implementation of the NHI system.

In Chapter 7, Helen Schneider and colleagues interrogate the developments, challenges and future trajectory of ward-based primary health care outreach teams (WBPHCOTs) in the country. They recap the history of the community health worker (CHW) programme in South Africa and review key dimensions of the 2017 WBPHCOT Policy Framework and Strategy. The chapter concludes with a set of recommendations addressing a number of significant constraints on performance and future development of WBPHCOTs in light of their intended role in NHI. Some of these recommendations have been earmarked for immediate attention, namely defining relationships between WBPHCOTs and governance structures at community level, defining realistic scopes of work for WBPHCOTs, and instituting systems of programme governance that enable feedback and learning across the system.

This chapter is accompanied by a case study written by Selby Maboko et al. who offer some perspectives on the factors influencing the motivation of CHWs in the Vhembe district. The case study shows that CHWs play an active role in the delivery of community-based primary health care (PHC) interventions linked to their local health facilities, but that their motivation is affected by a mix of monetary and non-monetary incentives. The authors conclude the case study with a call for adequate remuneration for CHWs, advanced training and clear career development pathways.

In Chapter 8, Andrew Scheibe et al. provide a synopsis of the global and local context for transgender women (TGW) from an HIV perspective. They describe the role of TGW outreach workers (a form of CHW) in South Africa's HIV response. They present three case studies to provide insight into how TGW outreach workers support their clients to cope with stigma and discrimination; the consequences of non-conforming gender expression; scarce employment opportunities; the inadequacies of bio-medically focused HIV services; and limited resource allocation for TGW programming. Using the case studies, the authors highlight how outreach can comprise mentorship between older and younger TGW and support community building among the women, and they conclude by identifying the uncertain funding landscape; limited interventions for socio-economic empowerment and harm reduction around substance use; and lack of access to hormone therapy and gender-affirming surgery. Recommendations are made for increased support of outreach services and initiatives that take a more multi-sectoral and comprehensive approach to TGW.

Recognising that quality initiatives to date have been uncoordinated and fragmented across the public and private health sectors, Kerrin Begg and colleagues report on the development process and content of a proposed strategic framework designed to improve co-ordination and implementation of quality strategies, including metrics to monitor and measure outcomes. They postulate that their proposed framework builds on and complements current policies and initiatives and provides stakeholders with a common language of quality, as well as a tool to facilitate policy coherence and locate initiatives in the quality cycle. Acknowledging that a significant limitation of their tool is that it remains untested, they remain optimistic about its value in reducing the policy implementation gap. They assert that the tool's strength lies in its incorporation of the full spectrum of quality planning, control and improvement.

Chapter 10 provides an overview of surveillance of communicable diseases affecting South Africa. Vanessa Quan and Kerrigan McCarthy point out that communicable diseases constitute a significant disease burden, and they underscore the contribution of surveillance activities in strengthening health systems through providing data for action, monitoring progress, planning for service delivery, and allocation of resources. They advocate for greater surveillance of non-communicable diseases, including morbidity and mortality due to environmental and occupational harms, injury and violence. Finally, they reflect on the potential impact of the National Public Health Institute of South Africa Bill, which will broaden the activities of the National Institute of Communicable Diseases through the inclusion of public health monitoring activities that focus on non-communicable diseases and conditions.

In Chapter 11, Lesley Jane Robertson and co-authors offer a perspective on how to ensure UHC for people living with serious mental illness. They speculate that given the multiple competing health priorities in South Africa, there is a risk that the needs of those living with serious mental illness may not be addressed. Recommendations include the need for a paradigm shift in the organisation and financing of mental health services so that specialist-staffed community-based mental health services become the mainstay of psychiatric care; the development of national guidelines that describe pathways to care for people living with mental illness; and the need for health indicators to provide quality assurance regarding care outcomes and not only PHC headcounts or hospital-level data. Finally, the authors call for regular community-based clinical audits incorporating user-level outcome measures to prevent another tragedy such as the GMHMP.

As an adjunct to this chapter, the case study compiled by Romi Blumenau and Laetitia Petersen casts light on how nurses working in mental health wards cope with their jobs. They detail the experiences of nurses employed in the acute mental health care unit at Helen Joseph Hospital, including physical assault; emotional trauma, especially as a consequence of being blamed for the suicide of their patients; and inadequate security. The authors conclude with a call for more therapeutic and professional support for nurses working in psychiatric units.

Chapter 12: This year's winner of our Emerging Public Health Practitioner Award is Kganetso Sekome. He reports on the findings of a study investigating therapist perceptions and quality assessment of stroke clinical practice guidelines in a rural area. The findings suggest that the therapists had poor knowledge of the stroke clinical practice guidelines; they recognised the value of guidelines but there were numerous barriers to utilisation. Furthermore, guideline quality was rated low among all categories of rehabilitation practitioners. Recommendations emanating from the study include review and revision of the stroke clinical practice guidelines provided to rural therapists, taking into account the human and material resources in rural areas; and the development of a clear strategy and plan of action to disseminate and promote implementation of the guidelines.

The nutrition transition has contributed to increased incidence of overweight and obesity, resulting in a major public health risk. This is especially the case where dietary patterns are influenced by the

ready availability of fast foods, resulting in a high intake of fat, sugar and salt. In Chapter 13 entitled, 'Assessment of food environments in obesity reduction: a tool for public health action', Noluthando Ndlovu and co-authors describe their work in calculating the Modified Retail Food Environment Index (mRFEI) and assessing whether food environments change according to socio-economic status in Gauteng Province. The mRFEI is an environmental indicator of food access or the proportion of 'healthy stores' within a defined neighbourhood relative to all accessible stores. The premise of the authors' argument is that by measuring the food environment geographically, healthy food access gaps can be identified and nutrition-sensitive preventive interventions can be developed accordingly. The mRFEI revealed that Gauteng is a highly obesogenic environment: grocery stores are concentrated in higher socio-economic areas and unhealthier food is sold in the inner city and in poorer townships.

In Chapter 14, Flavia Senkubuge and colleagues set out to assess the four main functions of our national health research system (NHRS) in order to reach a composite score. The authors argue that South Africa's pursuit of UHC requires contextualised scientific knowledge to guide development of health system-strengthening strategies and interventions. They found that while South Africa scored considerably higher than other African countries (83.7%), there are deficits in the areas of human, financial and physical resources. They recommend urgent and concerted action to strengthen the NHRS in order to generate high-quality knowledge and promote its utilisation in population health development.

In an accompanying case study, Christopher Colvin and team share insights and lessons learned from a project that collects, synthesises and distributes health information and research to a diverse set of health system and community stakeholders. Hence, they bring together two seemingly disparate areas, namely community engagement, and health information. Insights shared by the authors will help to inform new ways of thinking about the production, circulation and use of health information as well as new forms of engagement between health systems and communities.

Chapter 15 provides a wide range of healthcare indicators, including socio-economic and demographic indicators, and indicators for specific health programmes and diseases such as HIV and maternal and child health, as well as some related to health systems, such as financing and human resources.

A new feature of this chapter is the accompaniment of an infographic for each of the 17 sections, which allows for easy access to and visual representation of key issues and trends. Additionally, Candy Day and team report on the calculation of South Africa's UHC service coverage index of 67 (marginally above the global median of 65), which is one way to measure the progress towards UHC.

While the range of data sources continues to expand, allowing greater opportunities for triangulation of data and attention to issues of data quality, reliability and timeliness, the authors note that one exception is the extent to which an accurate picture of HRH can be gleaned from routine sources. They echo the calls of many other authors for updated and accurate data for both the public and private health sectors, by specific category of health worker, and for greater inclusion of private-sector data at all levels of the health system.

The authors conclude by suggesting that for meaningful accountability, all measures of performance must be publicly accessible, transparent, vigorously interrogated, and result in effective remedial action.

This 21st edition of the *SAHR* remains true to its original vision, namely analysing progress in the transformation of South Africa's health system, and the extent to which health care is improved in the most vulnerable sections of our society. Common threads through all 15 chapters are the importance of accurate and quality information; strong government stewardship and leadership; and public accountability to improve population health, strengthen institutional capacity, and to enforce enabling legislation.

Importantly, we have underscored the critical importance of HRH, without which UHC will remain a pipedream. We have also demonstrated the value of different and independent perspectives on the various health sector reforms, thus enhancing the discourse on UHC. Finally, the values of equity, human rights and social justice must be central to South Africa's quest for UHC.

Laetitia C. Rispel and Ashnie Padarath
Editors

Review

1 Health Legislation and Policy

Authors:

Andy Gray[i]

Yousuf Vawda[ii]

South Africa is engaged in the complex task of advancing universal health coverage, in the form of a National Health Insurance (NHI) system. This will require the passage of new legislation and substantial changes to existing legislation. Two draft Bills have been published for comment, as well as provisional recommendations from the Competition Commission's Health Market Inquiry which highlighted delays in implementation of the remaining components of the National Health Act.

The Gauteng Mental Health Marathon Project tragedy has focused attention on the implementation, or lack thereof, of health policy and legislation, as well as measures to improve quality of care. It has served as a litmus test for the National Health Act, the Office of Health Standards Compliance (OHSC), and the Health Ombud, in that it tested the efficacy and fitness for purpose of these instruments and institutions.

After 50 years, the Medicines Control Council (MCC) ceased to exist in 2018, and has been replaced by the South African Health Products Regulatory Authority (SAHPRA). This chapter provides a critical analysis of the process of reforming the regulator, and the challenges that lie ahead, with particular emphasis on the issue of transparency and the unfinished business of regulating health-product marketing.

Medicine pricing has been identified as a key challenge to expanding universal health coverage. In this regard, there are ongoing debates about the medicine pricing model applied in South Africa, as well as the need for intellectual property policy reform.

The Gauteng Mental Health Marathon Project tragedy has focused attention on the implementation, or lack thereof, of health policy and legislation.

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Introduction

This chapter provides a summary of health-related legislative instruments at national level that have been issued since publication of the 2017 *Review*, and a critical analysis of some of the landmark developments in the health sphere. The main focus is on health-related primary legislation (in the form of Bills or Acts of Parliament), secondary legislation (Regulations published by the Minister of Health), and tertiary legislation (Board Notices issued by statutory health councils). Other legislation with an impact on health is also touched upon briefly. Changes to provincial health legislation or health-related municipal by-laws are outside the scope of this chapter. Important health-related jurisprudence is also described, as are selected national-level health policies and the processes for their development and implementation.

National health-related legislation

No new health-related primary legislation has been enacted since the 2015 amendment to the Medicines and Related Substances Act. Two Bills tabled in 2017 are still in the process of being dealt with by Parliament, while two Private Member's Bills have been ruled as undesirable and will therefore not be enacted. A further Private Member's Bill has been published for comment. Three draft Bills have been published for comment, dealing with tobacco control, the National Health Insurance Fund, and proposed amendments to medical schemes legislation. Other public health-oriented targets have included the proposal to raise the age limit for alcohol consumption from 18 to 21 years, and the tax on sugar-sweetened beverages. Although the Minister's preference for inclusion of the new restrictions in the proposed Liquor Amendment Bill has been reported, this Bill has yet to be published for comment or tabled in Parliament.[1] Only a minor change to the labelling requirement for alcoholic beverages has been issued, as a regulation in terms of the Foodstuffs, Cosmetics and Disinfectants Act (54 of 1972).[2]

National Health Laboratory Service Amendment Bill (15 of 2017)

The National Health Laboratory Service Amendment Bill (15 of 2017) was introduced in the National Assembly on 14 May 2017.[3] This Bill requires the concurrence of the National Council of Provinces (NCOP), as in terms of the Joint Tagging Mechanism it is to be handled in accordance with section 76 of the Constitution. A series of departmental briefings and public hearings have been hosted by the National Assembly Portfolio Committee on Health, and as a result, changes to the Bill were agreed to on 27 March 2018, as Bill 15A of 2017.[4] The Second Reading debate was held on 24 April 2018, and the Bill was then forwarded to the NCOP for consideration. Events for public participation will need to be held in the provinces before the NCOP can take a decision on this piece of legislation.

The Bill deals predominantly with governance of the National Health Laboratory Service (NHLS), the composition of its board, its remit within the national health system, and the manner of its funding. Given concerns about the financial viability of the NHLS, the last matter has received the greatest attention. An initial proposed section (replacing section 20 of the substantive Act), to the effect that the "[s]ervice may charge such fees for services rendered as may be prescribed by the Minister, after consultation with the National Health Council and the Minister of Finance", has been replaced in the amended Bill with a more extensive section calling for a financing mechanism that will "ensure that the Service is adequately and sustainably financed". Provision is made for an appropriation by Parliament, in addition to fees collected for services rendered.

National Public Health Institute of South Africa Bill (16 of 2017)

The National Public Health Institute of South Africa Bill (16 of 2017) was tabled on 14 May 2017.[5] This Bill has also been subjected to a series of departmental briefings and public hearings, but has not yet progressed beyond the National Assembly Portfolio Committee on Health. The Bill seeks to create a new national public entity, the National Public Health Institute of South Africa (NAPHISA), which will be funded nationally and be accountable to Parliament. NAPHISA will have five divisions: the National Institute of Communicable Diseases (NICD), the National Institute of Non-Communicable Diseases (NINCD), the National Cancer Registry (NCR), the National Institute for Violence and Injury Prevention (NIVIP), and the National Institute of Occupational Health (NIOH). Some of these are new (NINCD, NIVIP), while others already exist (NICD, NCR, NIOH) and will have to be moved from existing structures. In addition to being handled as a section 76 Bill (an ordinary Bill affecting the provinces), the Bill was referred to the National House of Traditional Leaders in September 2017 for comment, as NAPHISA may conduct research that touches on traditional practices or the areas of jurisdiction of traditional leaders.

Apart from governance measures and questions of financing, the main areas of contention with this Bill have related to the functions allocated to NAPHISA and how these can be differentiated from and co-ordinated with those of the South African Medical Research Council and the NHLS.

Medical Innovation Bill (Private Member's Bill 1 of 2014)

The Medical Innovation Bill was first tabled in Parliament as a Private Member's Bill by the late Dr M Oriani-Ambrosini MP on 18 February 2014.[6] The content of the Bill has been described previously.[7] On 22 September 2017, the National Assembly Portfolio Committee on Health adopted a motion of undesirability, thus terminating consideration of this Bill. In doing so, the Committee was convinced that the licensing provisions in terms of section 22A(9) of the Medicines and Related Substances Act (101 of 1965) and the guidelines proposed by the MCC were sufficient to create the necessary regulated access to cannabis for medicinal and research purposes. The guidelines were published in final form in November 2017.[8]

Choice on Termination of Pregnancy Amendment Bill (34 of 2017)

The Choice on Termination of Pregnancy Amendment Bill (34 of 2017) was tabled in the National Assembly on 6 December 2017 as a Private Member's Bill by Ms C Dudley MP.[9] The Bill sought to amend the Choice on Termination of Pregnancy Act (92 of 1996) by requiring firstly, that gestational age (the basis of determining access to abortion on demand) be confirmed by an ultrasound examination. The proposal required that ultrasound equipment be a pre-requisite in facilities designated as offering termination of pregnancy (TOP) services. Secondly, counselling of the woman requesting TOP would be made mandatory and would include "relevant information relating to the state of development of the fetus, including the provision of electronic images". Thirdly, the opinion of both a social worker and a medical practitioner would be needed

to assess whether a continued pregnancy would significantly affect the social or economic circumstances of the woman (in the case of pregnancies in the 13–20-week period).

The Department of Health opposed the Bill, citing the position of the World Health Organization (WHO), which characterised the proposed amendments as "not evidence-based, nor aligned with WHO recommendations".[10] On 9 May 2018, the National Assembly Portfolio Committee on Health adopted a motion of undesirability, terminating a consideration of this Bill. However, the proposer has requested that this motion be debated in the full Assembly, stating: "[b]eing able to openly discuss these painful issues helps all South Africans feel they are part of nation building and not marginalised or ignored".[11] The decision not to proceed with this Bill coincided with release of the Guttmacher-Lancet Commission report on accelerating access to sexual and reproductive health care; the report highlighted persistent global "barriers embedded in laws, policies, the economy, and in social norms and values – especially gender inequality – that prevent people from achieving sexual and reproductive health".[12]

National Health Amendment Bill (Private Member's Bill, 2018)

The challenge in dealing with Private Members' Bills was highlighted by a notice published in May 2018 in which Dr S Thembekwayo MP indicated her intention to table an amendment to the National Health Act (61 of 2003).[13] Noting that South African citizens lack adequate access to healthcare services after hours, the Bill proposes that all clinics operate 24 hours a day, seven days a week. A period of one month was provided for public comment, but the Bill has not, as yet, been formally introduced. The proposal has obvious practical limitations, even though the problem it aims to address is real.

Draft Control of Tobacco Products and Electronic Delivery Systems Bill

A draft Bill to replace the existing Tobacco Products Control Act (83 of 1993), as amended, was published for public comment on 9 May 2018.[14]

The single most important change is implicit in the name of the Bill – it proposes that electronic delivery systems (whether intended to deliver nicotine or not), such as e-cigarettes, be brought within the ambit of the Act. A new definition of "relevant product" has therefore been added, which combines "tobacco product" and "electronic delivery system". In terms of the Bill, no person may sell a relevant product to any person under the age of 18 years. Sales by remote means, including by postal services, Internet or other electronic means are also prohibited, as are sales in any health establishment, including pharmacies. Restrictions on advertising and marketing will also apply to all electronic delivery systems.

The second major change, one that the tobacco industry is likely to oppose vigorously, allows the Minister to prescribe standardised packaging and labelling of tobacco products, including packaging of a "uniform plain colour and texture". Similar provisions would also apply to electronic delivery systems. Finally, the Bill proposes that the ban on smoking be extended to include any "enclosed public place or enclosed workplace", without exception. Other places where smoking would be prohibited include "any motor vehicle when a child under the age of 18 years is present" and private dwellings used for "any commercial childcare activity, domestic employment or for schooling or tutoring".

Legislating for National Health Insurance

The pre-eminent challenge facing the South African health system is the expansion of universal health coverage (UHC), in the form of National Health Insurance (NHI). To date, policy documents outlining the approach to NHI and its phased introduction have been issued in terms of the existing National Health Act (NHA). A second "White Paper" was issued in June 2017, which gave little additional clarity on the ways in which NHI will be handled legislatively.[15] The principles of UHC and its imperative for the country were re-stated, as was the commitment to re-engineering primary healthcare (PHC) services and building the necessary quality improvement processes (including the Office of Health Standards Compliance). The commitment to a purchaser-provider split was also re-stated. However, while a range of financing options was outlined, none has been finalised, nor is there evidence of consensus between the Departments of Health and Treasury, despite the modest adjustment to medical scheme tax credits introduced in the 2018 Budget.[16]

The second phase of NHI implementation is intended to run from 2017 to 2022, and focus on "development of the NHI legislation and amendments to other legislation". A first step is the establishment of a range of institutions that would "be the foundation for a fully functional NHI Fund". In July 2017, the terms of reference and composition of the following institutions were spelled out: National Tertiary Health Services Committee; National Governing Body on Training and Development; National Health Pricing Advisory Committee; Ministerial Advisory Committee on Health Care Benefits for National Health Insurance; National Advisory Committee on Consolidation of Financing Arrangements; Ministerial Advisory Committee on Health Technology Assessment for National Health Insurance; and the National Health Commission.[17] Despite nominations having been called for in August 2017, no appointments have been made yet. The purpose of these "institutions" is relatively clear from their names, with the possible exception of the last institution; the primary objective of the National Health Commission is to "ensure optimal health and development outcomes for South Africa through implementation of health in all policies and an all-inclusive approach to the prevention and control of Non-Communicable Diseases".

In his Budget Speech on 15 May 2018, the Minister of Health announced that an NHI Bill would be presented to Cabinet for approval in the following week, and published for comment together with a linked Medical Schemes Amendment Bill.[18] The subsequent publication of these two draft Bills[19,20] was followed closely by the release of the provisional findings and recommendations report by the Competition Commission's Market Inquiry into the Private Healthcare Sector on 28 June 2018.[21] Although a process of stakeholder engagement will be needed before the final report is issued, the findings and recommendations clearly have bearing on the draft Bills published for comment and on the ongoing process of implementing the NHA.

Health Market Inquiry

The Competition Commission's Market Inquiry into the Private Healthcare Sector has been far more protracted and contested than originally envisaged. The provisional findings described the private healthcare sector as "characterised by high and rising costs", "highly concentrated funders' and facilities' markets",

"disempowered and uninformed consumers", and a "lack of accountability".[21] In particular, the report alleged that the failure to implement an effective licensing process for private hospitals and other facilities had enabled supplier-induced demand and thus driven unwarranted utilisation and costs. In particular, it noted continued failure to implement the certificate of need provisions in the NHA (sections 36, 37, 39 and 40). However, the report went beyond merely recommending implementation as provided for in the NHA, calling instead for the creation of a dedicated, independent Supply Side Regulator for Healthcare (SSRH). The proposed SSRH would consist of four units: a Health Establishment Licensing Unit, an Economic Value Assessment Unit, a Health Services Monitoring Unit, and a Health Services Pricing Unit. The phased introduction of an Outcomes Measurement and Reporting Organisation (OMRO) was also proposed. It is clear that many of these structures would require co-ordination or reconsideration in the light of plans for NHI. The report also noted the need to revisit ethical rules published by the Health Professions Council of South Africa (HPCSA) which currently hamper the development of multidisciplinary practice, reliance on global fees, and the employment of medical practitioners.

Draft National Health Insurance Bill, 2018

The keenly anticipated draft National Health Insurance Bill was published for comment on 21 June 2018.[19] The Bill focuses predominantly on the structural elements of the proposed NHI Fund and its governance board and relationship with other structures, but also includes proposed amendments to the NHA and nine other Acts.

The Bill enables the creation of an NHI Fund, as a national public entity, governed by a Board. Unlike with other such structures (including the OHSC and SAHPRA), the appointment of the Board is entrusted to an *ad hoc* Cabinet committee and not the Minister alone. Government employees would be precluded from membership of the Board. Also, in contrast to most such boards, the Board would be allowed to select its own chair and vice-chair from among its members. However, the Board would need the approval of the Minister before appointing a Chief Executive Officer (CEO). The Board would be accountable directly to Parliament.

The Bill proposes that the NHI Fund be responsible for monitoring the registration, licensing or accreditation status of healthcare providers and facilities, for determining prices, and also for establishing a National Health Information Repository and Data System. It would also undertake health economic analyses and maintain a register of all beneficiaries and their dependents, each linked to a certified and accredited primary provider. In this regard, accreditation implies approval by the OHSC, and in the case of providers, registration with a statutory health council. Certification, on the other hand, implies possession of a certificate of need.

The Bill makes provision for three Ministerial committees as well as other technical committees. A Benefits Advisory Committee is outlined, comprising the heads of all medical schools, a secondee from the WHO, representatives of each provincial department of health, the Council for Medical Schemes, and two representatives of private hospitals. No provision is made for patient representatives, and the proposed composition is skewed in favour of the medical profession and the public sector. A more technocratic Health Benefits Pricing Committee is proposed, to "recommend the prices of health service benefits to the Fund". Lastly, a Stakeholder Advisory Committee is proposed, comprising representatives from each of the six statutory health councils (including that for traditional health practitioners), the Council for Medical Schemes, Medical Research Council, organised labour, organised business, tertiary educational institutions, non-governmental organisations (NGOs) and civil society. An overlap with some of the not-as-yet-appointed "institutions" identified in the 2017 White Paper is acknowledged in the transitional arrangements, which restate the phased approach (and target timelines) outlined in the White Paper.

While the proposed District Health Management Offices would be responsible for facilitating, co-ordinating and managing the provision of non-personal services at district level (as per section 36), the provision of personal PHC services would be contracted from accredited and certified public and private providers by the Contracting Unit for Primary Health Care (as per section 37), in each geographical sub-district. Confusingly, this Unit is described as comprising "district hospitals, clinics and, or community health centres and ward-based outreach teams, private primary service providers organised in horizontal networks within a specified geographical sub-district area". The Unit therefore appears not to be a management structure, or even a contracting body, but a collective, yet will need to manage funds allocated on a risk-adjusted capitation basis and reimburse providers on that basis. While the proposed section 37(1) appears to define the role of the Unit as a sub-contractor to the Fund, sub-sections (2)(a) to (k) describe an essentially advisory and monitoring role. For example, it is unclear whether the Unit will disburse funds on behalf of the Fund or merely "monitor" such disbursement, as described in section 31(2)(d). However, in the proposed new section 31A of the NHA, the District Health Management Office is given a wide remit, facilitating, co-ordinating and managing all PHC services at district level.

In addition to proposed amendments to the NHA, the draft Bill lists proposed amendments to the Allied Health Professions Act, the Compensation for Occupational Injuries and Diseases Act, the Competition Act, the Correctional Services Act, the Health Professions Act, the Medical Schemes Act, the Occupational Diseases in Mines and Works Act, the Prevention of and Treatment for Substance Abuse Act, and the Road Accident Fund Act. Such wide-ranging amendments would demand close co-ordination and co-operation across multiple ministries.

Although clearly enabling the operation of the anticipated purchaser-provider split, and the provision of defined benefits free of charge at the point of care, the Bill does not add measurably to the clarity demanded regarding exactly how NHI will be funded, and which sources of funds will be relied upon. Section 46 lists potential sources of funds, in particular "money appropriated by Parliament".

Draft Medical Schemes Amendment Bill, 2018

In a co-ordinated release, the draft Medical Schemes Amendment Bill was also published for comment on 21 June 2018.[20] Although not overtly reliant on the outcome of the Health Market Inquiry (HMI), the Bill does traverse common territory, and also anticipates the impact of the NHI Fund. To an extent, though, the Bill can also be seen as a "spring-cleaning" exercise, addressing individual problem areas in the current functioning of the private insured market. New chapters have been proposed dealing with admission of beneficiaries and cancellation of members, and re-iterating the application of community rating.

In addition to inserting references to the NHI Fund, for example in the definition of "beneficiary", the main intention of the Bill appears to be to strengthen governance of medical schemes and medical scheme administrators, while enabling the collection of data that will be critical to NHI, such as the Central Beneficiary Register. The Register is intended to allow for the assessment of risk, which will be key to the development of capitation funding systems. In addition, a Health Care Providers Register will be created, with a unique registration number per provider, which seems to tally to some extent with the HMI proposal that the practice number system currently managed by the Board of Healthcare Funders be transferred to the SSRH's Facility Licensing Unit.

A key provision is that outlined in the proposed section 34(3), which reads: "The registrar may, after consultation with the Minister, restrict the extent of benefits offered by medical schemes, having regards to the benefit and services coverage under the Fund thereby eliminating duplicative costs for the same benefit." In this regard, the changes to chapter 6 of the Act are critical, as they enable the Council to determine, in consultation with the Minister and NHI Fund, what are referred to as "comprehensive service benefits", which must be reimbursed in full, without co-payments or deductibles. A phased transition over time is therefore envisaged, from comprehensive service benefits to complementary benefits, which do not duplicate those offered by the Fund.

As with the NHI Bill, an extensive system of appeals has been proposed, with an Appeal Board (in the case of the NHI Fund, referred to as the Appeals Tribunal).

Regulations issued in terms of the National Health Act

Extensive draft and final Regulations have been issued in terms of the NHA, and some of its structures have been put to the test and have demonstrated their resilience and independence. Others can still be regarded as works-in-progress.

Final Regulations stipulating norms and standards for health establishments were urgently needed in order to enable the functioning of the OHSC, and in time the accreditation of providers to be contracted by the NHI Fund. The final Regulations issued in February 2018 are less extensive and detailed than the preceding drafts, and may prove to be too vague to enable meaningful enforcement of quality standards.[22] For example, the draft Regulations proposed an extensive set of requirements for pharmaceutical services in every health establishment, calling for "a functional structure with clearly defined roles and responsibilities", licensed in accordance with the Pharmacy Act, with systems for logistics, access and safety measures, including measures to protect users against medication errors. The final version reduces this to compliance with the Pharmacy and Medicines Acts, the provision of a stock control system, and ensuring availability of medicines and medical devices.

Other final Regulations have amended the controls over human bodies, tissue, blood products and gametes,[23] the provision of emergency services at mass gathering events,[24] emergency medical services,[25] and forensic pathology services.[26] As regards the latter, the final version was published in March 2018 following the draft version in December 2017, an apparent haste that was striking. Likewise, an extensive set of Regulations on the surveillance and control of notifiable medical conditions was published for comment in June 2017 and finalised in December 2017.[27] This set of Regulations appears to implement the WHO's International Health Regulations (IHR), obviating the need for a separate Act of Parliament (as originally drafted in 2013). The Regulations create four categories of notifiable medical conditions, with different reporting obligations, ranging from those requiring "immediate reporting by the most rapid means available upon clinical or laboratory diagnosis followed by a written or electronic notification to the Department of Health within 24 hours of diagnosis by health care providers, private health laboratories or public health laboratories" (category 1), to those requiring "written or electronic notification to the Department of Health within 1 month of diagnosis by private and public health laboratories" (category 4). Listeriosis is included in category 1, as are the viral haemorrhagic fevers, while healthcare-associated infections or multidrug-resistant organisms of public health importance are listed in category 4.

Regulations dealing with human gamete banks are yet to be finalised.[28]

Policy guidelines – reacting to a crisis

Other instruments issued in terms of the NHA appear to be crisis-engendered. In March 2018, policy guidelines on the licensing of residential and/or day care facilities for persons with mental illness and/or severe or profound intellectual disability were issued by the Minister.[29] The intention is to regulate facilities that are not psychiatric hospitals or rehabilitation centres, but that can be described as day care facilities, group homes, or half-way houses. Draft policy guidelines had, in fact, been published by the Director-General for comment in May and June 2017, referencing the Mental Health Care Act (17 of 2002) (MHC) and the National Mental Health Policy Framework and Strategic Plan 2013-2020.[30,31]

However, the limitations of such regulatory approaches were exposed cruelly by the Gauteng Mental Health Marathon Project (GMHMP), commonly referred to as the Life Esidimeni tragedy. 144 mental healthcare users died after being transferred from long-stay residential facilities to under-regulated and unlicensed facilities after October 2015. Another 1 418 survivors suffered trauma. The tragic outcome of the GMHMP was the first major case referred to the Office of the Health Ombud, established within the OHSC in terms of the 2013 amendment to the NHA. The Ombud's report was issued in February 2017, and found "*prima facie* evidence, that certain officials and certain NGOs and some activities within the Gauteng Marathon Project violated the Constitution and contravened the NHA, and the MHC, (17 of 2002)".[32] The Ombud found that the NGOs to which patients were transferred "had neither the basic competence and experience, the leadership/managerial capacity nor 'fitness for purpose' and were often poorly resourced". On the eve of the release of the report, the Gauteng MEC for Health resigned. Subsequently, the Head of Health and Director of Mental Health have been suspended and face disciplinary action. One of the recommendations of the report was to establish an arbitration process. The final arbitration award was made by former Deputy Chief Justice Moseneke on 19 March 2018; it ordered that each claimant be paid R20 000 for funeral expenses, R180 000 for shock and psychological trauma, and R1 000 000 for constitutional damages, as compensation for what were described as "unjustifiable and reckless breaches" of the law.[33]

The entire GMHMP crisis, portrayed as an egregious case of "death by maladministration",[34] is also an object lesson of the consequences of blurred boundaries between governance (in the sense of political oversight) and management by the responsible civil servants. Senior managers appeared unable to resist the pressure they felt from political office bearers, despite being legally and professionally responsible. The MEC for Health was held accountable, but even the arbitrator could not discern her motivations: "All we can hope for is that one day, the true reason for the conception and implementation of the Marathon Project will see the light of day". This tragedy highlighted the abject failure of accountability of elected public representatives, and the lapse in the independence of structures that are accountable to political actors. However, what cannot be gainsaid is that the Office of the Health Ombud was seen to act without fear or favour.

Statutory health councils

Most of the statutory health councils have continued to issue subordinate legislation related to the regulation of scope of practice, registration and qualifications for specific professions. The lack of updated regulatory instruments from the South African Nursing Council is of concern. There is an urgent need to update the Regulations to accompany section 56(6) of the Nursing Act (33 of 2005), and thus extend prescribing privileges to include Schedule 5 and 6 medicines. No regulatory instruments were identified from the South African Dental Technicians Council or the Traditional Health Practitioners Council. Only instruments of particular interest, or those that regulate controversial aspects, are described below.

Health Professions Council of South Africa

Continued effort to regularise the situation with regard to dental support personnel has been of particular interest. The name of the responsible professional board has been changed to the Professional Board for Dental Assisting, Dental Therapy and Oral Hygiene;[35] amended qualifications for registration of dental assistants have been proposed;[36,37] and the scope of practice of oral hygienists was published in draft form and then finalised.[38] Unlike the problematic prescribing privileges accorded to clinical associates (highlighted in the 2017 *Review*[39] and yet to be corrected), the scope of practice for dental hygienists clearly links the provision of topical and local anaesthesia with the relevant section (sections 22A(4)(a)(v)(aa)) of the Medicines and Related Substances Act (101 of 1965). Before this provision can be brought into effect, however, necessary listings will need to be made in the Schedules to the Medicines Act. Co-ordination of this step still appears to be a barrier to practice.

South African Pharmacy Council

As the certificate of need implied in the NHA is not yet in operation, pharmacies remain the only health establishments that require an operating licence from the Department of Health. In December 2017, the Director-General published amended guidance on the issuing of such licences for comment.[40] The proposed guidance differentiates between community pharmacies located in rural and urban areas, and those in various size shopping centres. It expresses the norm that there should be "at least one community pharmacy in every sub-district or place", with a ratio of one pharmacy per 5 000 population (but one per 2 500 in rural sub-districts).

The Council has issued draft competency standards for pharmacists,[41] finalised extensive Good Pharmacy Education Standards,[42] and continues to update and amend the Good Pharmacy Practice standards.[43] Draft changes which would allow for the indirect supervision of post-basic pharmacist's assistants at pharmacy-linked distribution points (as opposed to PHC clinics) have yet to be finalised.[44] The Council also continues to update the list of services for which pharmacists may levy a fee and the guidelines for such fees, even though it is unclear whether or not these are uniformly implemented.[45]

Allied Health Professions Council of South Africa

The Allied Health Professions Council has instituted professional board examinations for graduates in Chinese medicine and acupuncture, naturopathy, phytotherapy and Unani-Tibb,[46] and introduced a highly regulated continuing professional development process for all allied health professions.[47] There is a well-recognised problem with the way in which the Medicines and Related Substances Act regulates prescribing by allied health practitioners. The potential conflicts between that Act and the draft scopes of practice of chiropractors and osteopaths are therefore difficult to resolve.[48]

A striking number of the Board Notices issued by the Council in the last year have dealt with practices declared "unprofessional", such as the issuing of death certificates by any allied health practitioner,[49] injection therapy by chiropractors and osteopaths,[50] and the prescribing of bio-identical hormones by homeopaths.[51]

Medicines and Related Substances Act

Implementing the South African Health Products Regulatory Authority

The President issued a proclamation notice in May 2017 bringing the Medicines and Related Substances Amendment Act (72 of 2008) into effect on 1 June 2017.[52] The linked 2015 Amendment Act (14 of 2015) therefore came into effect on the same day, allowing the Minister to appoint the Board for the South African Health Products Regulatory Authority (SAHPRA).[53] As SAHPRA only became operational once the Board met, this allowed time for the General Regulations to the Act to be extensively revised, and issued in final form in August 2017.[54] Among the many changes are: enabling provisions to allow for electronic prescribing (Regulation 33), potential online access to professional information (Regulation 11), and the requirement for barcodes on the labels of manufactured medicines (Regulation 10). With regard to the latter, the Department of Health has requested comment on its intention to prescribe the inclusion of a specific type of barcode (GTIN-14 Datamatrix) on all medicines supplied on state tender.[55]

The first meeting of the SAHPRA Board occurred on 1 and 2 February 2018. The MCC ceased to exist on 31 January 2018, ending more than 50 years of reliance on this body. The change of name is far from cosmetic, with a complete transformation initiated in the decision-making model for medicines and medical device regulation.

There is still confusion surrounding section 2(5) of the Act, which states that "The Authority acts through its Board". While this may be interpreted as requiring all decisions to be taken by the Board, that is not the intention. Decision-making power is intended to be vested in the CEO and delegated personnel, with fiduciary oversight by the Board. The CEO is also enabled to appoint advisory committees,

which are expected to replace the previous MCC expert committees. These changes do, nonetheless, bring the issue of transparency in the regulatory function to the fore. Vawda and Gray have critically examined section 34 of the Act relating to the "preservation of secrecy" and have concluded that "such a blanket provision barring access to information would not pass muster as a 'limitation that is reasonable and justifiable in an open and democratic society based on human dignity, equality and freedom'".[56] They have accordingly recommended that the provision "be amended in an appropriate manner to accommodate the fundamental right to access to information". The issue of regulatory transparency has also received attention in the European Union (EU). Pari Pharma sought to challenge the European Medicines Agency's approval of the disclosure of similarity and superiority reports on an orphan medicine. The Court found against the applicant, signalling a clear preference for transparency.

Numerous challenges confront SAHPRA, some inherited from the MCC (backlogs in the approval process, constraints on capacity), as well as an imperative to transform the regulator into a highly efficient professional organisation.

Medicine pricing and marketing

In addition to the routine annual single exit price adjustment and adjustments to the maximum dispensing fees charged by pharmacists and licensed practitioners, the Minister has issued yet another revised set of Regulations dealing with bonus and incentive schemes.[57] A previous version was never finalised, although no reason was given. A new complication has been introduced, in that section 18A of the Act has been made applicable to the sale of "any medicine, medical device or IVD" (referring *to in vitro* diagnostics). It is unclear whether this is in fact the intention, or whether the inclusion of medical devices and IVDs was a drafting error.

Section 18C now calls for the Minister to make Regulations relating to the marketing of medicines, medical devices or IVDs, including Codes of Practice for each of these industries, "after consultation with the relevant industries and other stakeholders". No such regulation has been issued since the 1997 Amendment Act came into effect in 2003. With particular regard to the advertising of medicines, the reach and powers of the Advertising Standards Authority (ASA) has been in contention for some time. Recently, the Supreme Court of Appeal heard the ASA's appeal against a High Court finding, namely that as a voluntary association the ASA's decisions are not binding on non-members and it cannot compel participation of such persons in its processes, and that the ASA may not issue any instruction, order or ruling against non-members.[58] An order of court was made by consent declaring that the ASA has no jurisdiction over non-members but may publish rulings on non-members to members in order for them to determine if they "should accept any advertisement before it is published or should withdraw any advertisement if it has been published". The order also directed the ASA to indicate this in a standard letter to non-members. This will have the effect of compelling even non-members to be mindful of and compliant with the Advertising Code or risk having their advertisements rejected or withdrawn if they have already been published, with the attendant consequences to their reputation.

With reference to the health technology assessment focus under NHI, the Director-General has invited comment on the existing guidelines for pharmaco-economic assessment of medicines.[59]

Health-related jurisprudence

A common complaint from political office bearers and senior health managers is that their budgets are being eroded by the marked increase in malpractice suits and subsequent awards by the courts. The question has been asked: when a court awards damages for wrongs, can the liable party ask to make payments to service providers as and when the expenses are incurred, instead of as a lump-sum settlement, as is routinely ordered? This matter came before the Constitutional Court in *MEC, Health and Social Development, Gauteng v DZ*,[60] which concluded that notwithstanding an instance where a court had awarded damages to be paid in instalments,[61] this precedent had not been followed, it was doubtful that the court had jurisdiction to grant such an order, and the MEC's contention must fail. However, the legislation is likely to be amended drastically to accommodate payment in instalments, as in a meeting on 23 May 2018 Cabinet approved the introduction to Parliament of the State Liability Amendment Bill, 2018. This Bill intends to amend the State Liability Act (20 of 1957) by altering the lump sum payments for wrongful medical treatment of persons by servants of the State, to an alternative settlement structure.[62] While ostensibly aimed at increasing the financial resources of state hospitals in order to provide healthcare services, this legislative attempt in no way addresses the fundamental issue of professional negligence that gives rise to the proliferation of malpractice suits.

Other policies with an impact on the health sector

For the past five years, government has been reviewing the impact of pharmaceutical patents on high prices, and consequently the difficulty of ensuring access to medicines.[39] Following on the publication of its Intellectual Property Consultative Framework in 2016,[63] the Department of Trade and Industry released another policy document in 2017, the Draft Intellectual Property Policy of the Republic of South Africa Phase I 2017.[64] In this phase of the development of the policy, the focus is on "IP and public health, coordination in international forums, and the implementation of commitments undertaken in international agreements". Phase 1 priorities have been identified on the basis of South Africa's development objectives, supplemented by research, analysis, and experience, as well as assessments of existing capacity to implement the measures outlined. While panned by the pro-IP lobby,[65] the policy has been lauded by other experts,[66,67] and despite being approved by Cabinet in May 2018,[68] no indication has yet been given of the process for amendment of the Patents Act (57 of 1978).

Conclusion

The tragedy of GMHMP can be viewed as a litmus test for the NHA, the Office of Health Standards Compliance, and the Health Ombud in that it tested the efficacy and fitness for purpose of these instruments and institutions. While it has exposed major deficiencies in both governance and management, it has also focused attention on the gap between policy and implementation, and between intentions and consequences. What is clearly needed is a sea change in the culture of service in certain sectors of the country's health services, as well as stringent adherence to, and enforcement of, constitutional obligations by all service providers. The arbitration award has set an important precedent in terms of accountability and the impact of the Constitution on the rights of citizens and their families, particularly

in the award of constitutional damages for violation of human rights. Although not binding on the courts, the last award will have strong persuasive authority. However, the extent to which weaknesses in the implementation of policy and legislation have been exposed cannot be ignored. South Africa cannot be satisfied with world-class policies and laws "on paper", and yet continue to fail to deliver a responsive, quality, affordable health service to all.

The critical issues of the GMHMP, National Health Insurance, and SAHPRA raise fundamental concerns about the health of our institutions, policies and our ability to deliver on the vision of universal health coverage that is effective, accessible, affordable and respectful of human dignity. The halting progress we have made continues to delay full realisation of the social compact promised in our Constitution.

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2 Human resources for health and universal health coverage: progress, complexities and contestations

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Human resources for health (HRH) are critical to the achievement of universal health coverage reforms. Drawing on theories of the health labour market, this chapter highlights the progress, complexities and contestations pertaining to HRH since publication of the last South African Health Review.

Positive HRH developments during the review period include: government's commitment to developing HRH norms and standards; confirmation of a relatively strong health professional regulatory framework that provides a foundation for reforms; the publication of a major study on health professions education; and embryonic initiatives to develop HRH strategic plans linked to universal health coverage.

Major gaps and weaknesses in the current HRH foundation must be addressed to ensure a high-quality health system and the success of the proposed national health insurance (NHI) reforms. These weaknesses include: insufficient stewardship of HRH planning across the entire healthcare system; lack of a national integrated HRH information system, and inadequate information on overall HRH supply to address historical inequities between urban and rural areas and the public and private health sectors; gaps, and at times failures, in HRH governance; fragmentation, weak coordination and suboptimal governance of health sciences education; and poor and ineffective operational management across all types of health facilities and provincial health departments, with rural provinces worse off than their urban counterparts.

Key recommendations include enhancing HRH technical capacity and expertise in the National Department of Health to provide strategic leadership and support for the entire health system; recruitment of public servants with the right skills, competencies, ethos and values; and the equitable allocation of resources to rural and/or underserved areas.

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Introduction

Since the launch of the 20th edition of the *South African Health Review (SAHR)* in August 2017, the Life Esidimeni catastrophe, or more accurately the Gauteng Mental Health Marathon Project (GMHMP), has dominated the health media headlines.[1] At face value, the GMHMP centres on human rights violations and the lack of compassion and care for vulnerable individuals with mental illness, in the context of a largely dysfunctional and unaccountable provincial healthcare system.[1] However, the GMHMP is also a case study of human resources for health (HRH) governance, albeit a tragic one, showing the criticality of HRH to resilient healthcare systems, and universal health coverage (UHC).[2]

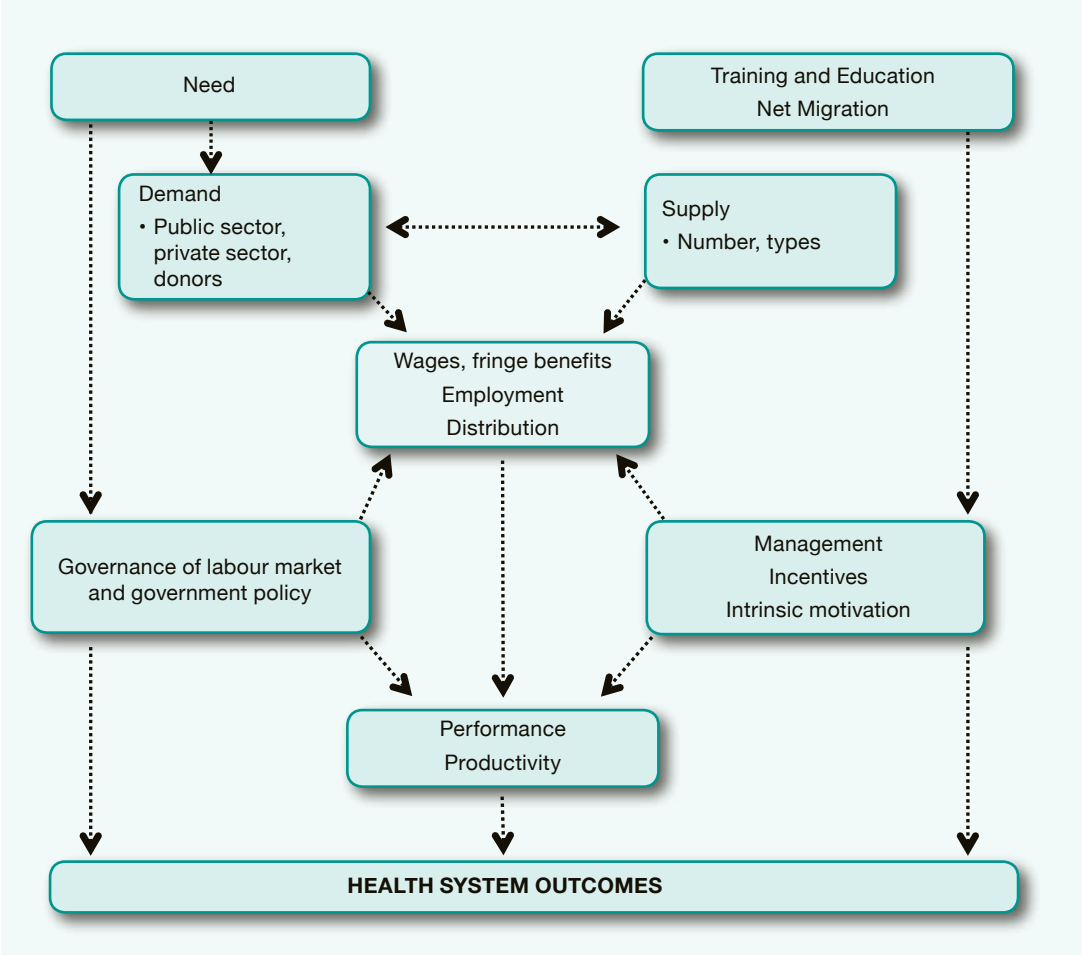
This chapter highlights the progress, complexities and contestations pertaining to HRH for UHC and high-quality health systems in South Africa. We used theories of the health labour market[3] and inputs from a HRH consultative workshop in April 2018 to review key HRH developments since publication of the 2017 *SAHR*. Sources of data include published annual reports and policy documents or statements by national and provincial health departments; reports by the Auditor-General of South Africa (AGSA); the Competition Commission Health Market Inquiry; the inspection report of the Office of Health Standards Compliance (OHSC); the GMHMP arbitration award; and relevant published studies or reports from advocacy organisations.

The chapter begins by introducing the conceptual framework used to assess HRH progress, complexities and contestations in the key domains of demand, supply, health professional education, HRH governance, and HRH management. The chapter concludes with key recommendations on HRH to ensure a high-quality health system and to move closer to the goal of UHC expressed in the National Health Insurance (NHI) Bill of South Africa.[4]

Conceptual framework for analysis

There is global recognition that HRH respond to policy and institutional changes, as well as to external forces,[5] with increasing scholarly focus on the economic factors that affect the nature and size of the global HRH crisis.[6–8] A health labour market (Figure 1) is defined as "a dynamic system comprising two distinct but closely related economic forces: the supply of health workers and the demand for such workers, whose actions are shaped by a country's institutions and regulations".[7]

Figure 1: Conceptual framework of the health labour market



Source: Adapted from Soucat et al., 2013.[3]

Progress, complexities and contestations

Need and demand for HRH

South Africa ranks among the top five countries in the Africa region in terms of density of physicians and nursing and midwifery personnel per 1 000 population.[9] However, there are several reports of acute staff shortages in the public health sector in general, and in rural and underserved areas in particular.[10–13] Hence the question as to the number and categories of health professionals needed in South Africa is a vexed one, influenced by the definition of need, the skills mix and scope of practice of different categories of health workers, resource availability, and the methodological approach used to determine need.

A positive aspect is that the National Department of Health (NDoH) has set a strategic goal of developing and implementing health workforce staffing norms and standards for health facilities, using the Workload Indicators of Staffing Need (WISN) method.[10] The WISN, developed by the World Health Organization (WHO), is based on a health worker's workload, with activity (time) standards applied for each workload component.[14] The tool assesses workload pressures on health workers in health facilities and determines the number of each category of health worker needed to cope with the facility workload.[14] WISN is applicable to government, non-governmental organisations (NGOs) and private health facilities.[14]

In 2017, the NDoH reported that the activity standards for district hospitals had been completed.[10] However, the NDoH was unable to meet its target of approving HRH norms for district and specialised hospitals due to the unavailability of data on district hospital service activities.[10] Failure to meet the target of HRH norms for district and specialised hospitals in turn affected the development of HRH norms for regional, tertiary and central hospitals.[10]

Furthermore, the WISN approach seems to be the only method adopted by the NDoH for HRH planning, but it has several limitations.[14–16] These limitations include dependence on the accuracy of annual service statistics used to assess workloads; possible over-reporting of annual service statistics; inability to differentiate when the same activity is performed by two different staff categories; and insufficient consideration of the unique circumstances and HRH needs in rural areas.[14–17] In line with proposals from some health economists, it may be more appropriate to use a combination of integrated needs-based HRH planning methods. These methods should include consideration of: demographic and epidemiological changes; impact of health policies on service delivery; quality and equity; prioritisation of underserved areas; workforce and health expenditure; level of services; and the productivity of healthcare workers.[3,18,19]

South Africa has some way to go in HRH planning across the entire healthcare system. Thus far, the NDoH has focused on the public health sector for the determination of norms and standards, and excluded the private health sector where the majority of highly skilled healthcare providers are located. Although the planned NHI system may correct suboptimal HRH stewardship across the health system, the current NHI Bill contains insufficient detail on this critical issue.[4]

Supply of HRH

The supply of HRH is essential for UHC[2] and for the successful implementation of NHI. A detailed overview of different categories of health personnel is provided elsewhere in this edition of the *SAHR*, using a combination of the government personnel salary administration (PERSAL) system and the databases of health professional councils.[20] However, HRH information systems remain underdeveloped and under-utilised. Data exclude information on environmental health officers, nurses, doctors and other categories of health workers employed by municipalities. Comprehensive information is lacking on the numbers of practising health workers in the country due to limited information in the health professional council databases.[19] Many health professionals maintain their registration even though they may have emigrated or no longer practise their profession. Updated and accurate information is also lacking on the maldistribution of healthcare personnel between urban and rural areas, between the public and private healthcare sectors, and within provinces.[20] Nonetheless, in 2015, 56.3% of all general practitioners and 73.3% of all nurses worked in the public sector, while only 35.8% of medical specialists and less than one-third of dentists worked in the public sector.[21] This maldistribution is exacerbated by the scarcity of posts for dentists and rehabilitation therapists in the public health sector.

The main issues of contestation regarding HRH supply are summarised in Table 1.

Table 1: Contestations of HRH supply in South Africa, 2017/18

Lack of a national integrated HRH system that ensures standardised data collection and analysis.
Inadequate information on overall HRH supply: size, composition and/or deployment.
Lack of data harmonisation across health professional councils.
Disjuncture between the increased production of medical graduates and the ability of public sector health facilities to absorb interns.
Difficulties in placement of community service health professionals, exacerbated by a reluctance of new graduates to go to rural areas, funding constraints, and freezing of posts.
Policy uncertainty on mid-level and community health workers, including their scope of practice, position in the healthcare system and relationships with other health professionals.
Maldistribution of health workers between public and private health sectors, and between urban and rural areas.

Sources: Day et al., 2018;[20] Rural Health Advocacy Project, 2018;[13] Academy of Science of South Africa, 2018;[19] Competition Commission of South Africa, 2018.[21]

Training and education

The supply and quality of health workers are determined largely by the pre-service education of health professionals.[3] A significant positive development during the period under review was the release of the consensus study by the Academy of Science of South Africa (ASSAf) on health professional education.[19] The ASSAf study provides evidence-based information and recommendations on the transformation of health professional education in South Africa to ensure improved population health.[19] The key findings and recommendations of the ASSAf study are shown in Table 2.[19]

Table 2: Key findings and recommendations of the Academy of Science of South Africa consensus study on health professions education, 2018

Major findings
• South Africa is renowned for healthcare professional education and training excellence, but this is constrained by fragmentation, weak coordination and poor governance.
• Around R12 billion is spent annually in South Africa on health sciences education, through multiple fragmented funding streams and departments.
• There is inefficient use of resources, with shortfalls in the quantity, quality and relevance of healthcare professional education and training for the health needs of the country.
• Barriers to health professional student selection and success include: variation in quality of schooling; inequities in career guidance and access to information; inequities in availability of staff, finance, and facilities at universities to conduct selection processes and academic monitoring, assistance and follow-up; lack of resources and time to develop and perform psychometric tests on select students.
• Current experience of internship may undermine the vision and intention of undergraduate health professional education.
• Although service demands have outweighed learning in the community service programme, most community service professionals report positive professional growth and development.
Main recommendations
Student selection should be reconceptualised using a broader set of criteria than those currently in use.
Selection and training should be oriented towards addressing inequity and meeting the needs of the most underserved, through supporting a primary health care focus and increasing the supply of healthcare professionals to rural areas.
Public sector academic institutions need to be strengthened to scale up the production of healthcare professionals.
Professional bodies should ensure that their information systems reflect sufficient details on practice location to allow adequate health workforce planning.
The clinical training platform should be expanded to include both public and private healthcare facilities.
Universities should take responsibility for education and professional development from the undergraduate years through to internship and community service.
Inter-professional education and collaborative practice should be developed and implemented in health professional education.
Governance of health sciences funding should be enhanced by strengthening the capacity and accelerating the momentum of the Joint Health Science Education Committee.
Human resource planning, resource allocation and budgeting need to be improved.

Source: ASSAf, 2018.[19]

HRH governance

The WHO defines governance as the "existence of strategic policy frameworks, combined with effective oversight, coalition building, regulation, attention to systems design, and accountability".[22] In concert with this definition, Kaplan et al. have defined eight HRH governance principles: strategic vision, accountability, information, transparency, efficiency, equity/fairness, responsiveness, and citizen voice and participation.[23]

Education and training and scope of health professional practice are well regulated in South Africa, which is positive. During the period under review, the South African Nursing Council (SANC) appointed a new registrar, and improved communication with members through an electronic newsletter that commenced in March 2018. However, the planned phasing out of legacy nursing qualifications has been postponed yet again, which will have grave consequences for the future production of nurses. This is because the Minister of Higher Education and Training issued a notice that no training can be provided by nursing colleges beyond 2019 unless they are registered as higher education institutions. Further, there is no published annual report for the 2016/17 financial year to provide an overview of the SANC's progress and achievements against its legislative mandate. The postponement of critical nursing education reforms, the lack of a detailed annual report, and delays in the appointment of the new Nursing Council reflect gaps in governance and lack of prioritisation of nurses and nursing. This is of concern given the numerical dominance of nurses and their importance to the healthcare system.[24]

The Health Professions Council of South Africa (HPCSA) has published a 2016/17 annual report,[25] but remains without a permanent registrar. A 2015 Ministerial Task Team on the HPCSA found numerous systemic and complex problems, including mismanagement and poor governance, erosion of confidence in the HPCSA, and administrative irregularities.[26] Three years later, the Health Market Inquiry found that despite the important role of the HPCSA, gaps remain in governance of health professionals under its jurisdiction, leading to unintended negative consequences such as lack of innovation and poor cost containment.[21] Furthermore, the Inquiry found that the HPCSA lacks the capacity to enforce ethical rules and to deal speedily with complaints, thereby falling short of a core criterion of a regulatory body.[21]

South Africa's five-year strategic plans on HRH and nursing education, training and practice[28] expired during 2017.[27] Although there are moves afoot to review performance on both strategic plans, development of new strategic plans has been hampered by lack of technical capacity, and instability in senior management responsible for HRH. Two new HRH chief directors have been appointed in the NDoH in the space of one year. As pointed out earlier, South Africa lacks a national integrated HRH information system and the NDoH should be the custodian of this. This situation is exacerbated by gaps in the information provided by the health professions councils.[19]

During the review period, extensive and disruptive industrial action on the part of health workers in Gauteng, Limpopo and North West provinces collided with dysfunctional and weak public healthcare systems.[29–33] The reported reasons for the industrial action ranged from failure to pay performance bonuses to allegations of corrupt provincial administrations.[29–33] The industrial action in the three provinces served to highlight a complex and overlapping set of problems, including inadequate or poor implementation of dispute resolution mechanisms provided for in the Labour Relations Act, poor management of health-worker grievances, failure to finalise the minimum service level agreement in the central bargaining council, and inadequate performance management. These problems impact ultimately on the right of people to access healthcare services, and lead to avoidable deaths and further weakening of a fragile healthcare system.

Both the GMHMP catastrophe and industrial action by health workers highlighted additional fault lines in HRH governance (Table 3). In the case of the GMHMP, some health professionals honoured their professional and ethical codes of conduct. At the same time, the GMHMP demonstrated that institutional and professional mechanisms failed to prevent the tragedy, and that this was exacerbated by lack of accountability on the part of public health officials at all levels of the health system.[1,34]

Table 3: HRH governance fault lines in the Gauteng Mental Health Marathon Project, South Africa, 2017

Fault lines
Inadequate planning, with insufficient preparation and rushed implementation.
Failure of accountability at all levels of the healthcare system, including inadequate explanations as to why the GMHMP was initiated and what happened.
No mechanisms for independent oversight, monitoring, review and audit.
Some health professionals violated the Constitution and other laws, as well as their professional code of ethics, thus showing disregard for the rights of the patients and their families.
Both SANC and the HPCSA failed in their mandate to protect the public: there was lack of proactive investigation into the transgression of ethical codes once the facts on the professionals concerned were in the public domain.

Sources: Moseneke, 2018;[1] Office of the Health Ombud, 2017.[34]

HRH management

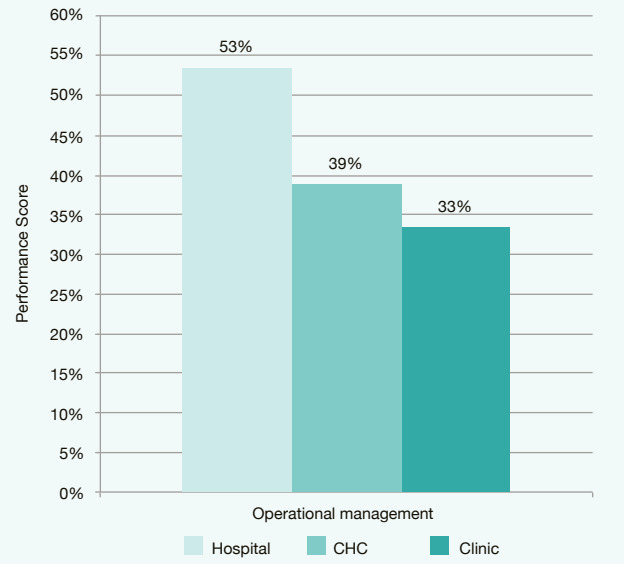
HRH management refers to institutional and behavioural ways of making decisions on a range of issues, such as staff recruitment, selection and retention, employee discipline, and employment termination.[3] An effective HRH manager "motivates health workers to perform by aligning their goals with those of the organisation and narrowing the gap between an employee's ability and performance".[3]

The 2016/17 inspection report by the Office of Health Standards Compliance (OHSC), the independent quality-of-care regulator, highlights suboptimal performance in the 'operational management' domain in all nine provinces (Figure 2).[35] This domain measures compliance with national core standards, notably the ability of a health facility to provide safe and effective patient care through effective management of human resources, finances, assets and consumables, and records and information on the provision of scheduled services.[35]

Although Gauteng, KwaZulu-Natal and the Western Cape obtained higher scores than the more rural provinces, their average scores were lower than 70%, demonstrating poor operational management of facilities inspected.[35]

Figure 3 shows the average national operational management scores for hospitals, community health centres (CHCs) and clinics inspected during the review period.[35]

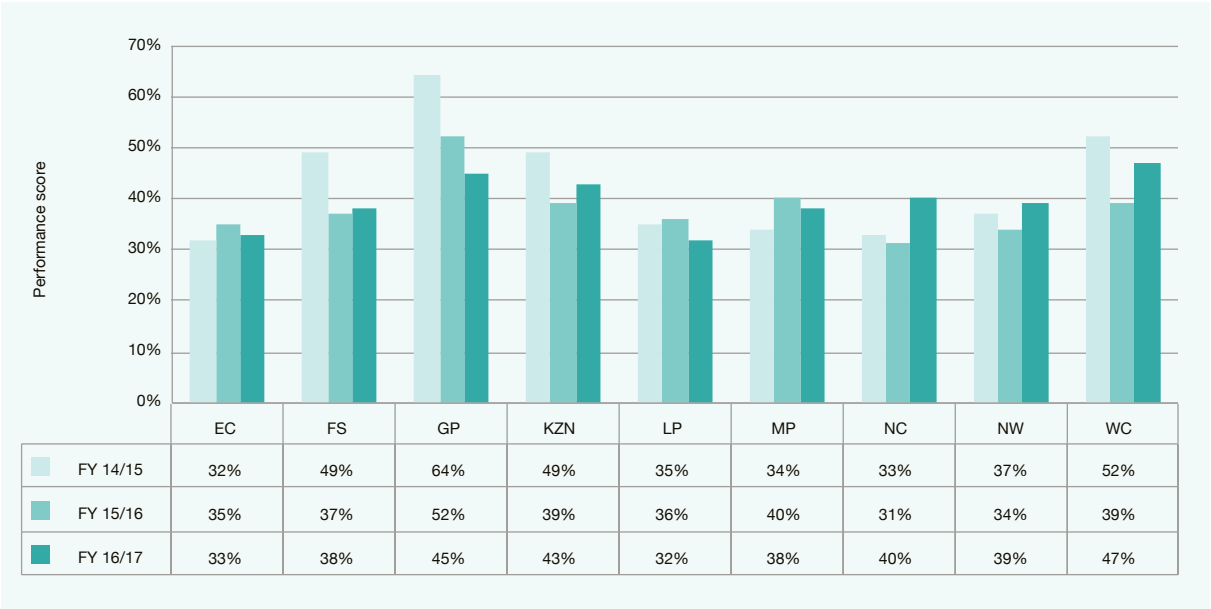
Figure 3: Average national performance scores for operational management by facility type, South Africa, 2016/17



Source: OHSC, 2018.[35]

Overall, the average performance scores for hospitals were marginally higher than those for CHCs and clinics, but were very low at 41%.[35] This means that one in every two hospitals inspected during 2016/17 met the national core standards for operational management.[35]

Figure 2: Average provincial performance scores for operational management, South Africa, 2014/15–2016/17



	EC	FS	GP	KZN	LP	MP	NC	NW	WC
FY 14/15	32%	49%	64%	49%	35%	34%	33%	37%	52%
FY 15/16	35%	37%	52%	39%	36%	40%	31%	34%	39%
FY 16/17	33%	38%	45%	43%	32%	38%	40%	39%	47%

Source: OHSC, 2018.[35]

Table 4: Comparison between graduate output and public-sector increase in number of health profession graduates appointed in the South African public health sector, 2002–2010

Professional group	Graduate output (n)	Public sector increase (n)	Retention gap (n)	Retention gap (%)
Medicine	11 700	4 403	7 297	62.4
Dentistry	2 140	248	1 892	88.4
Pharmacy	3 645	1 960	1 685	46.2
Physiotherapy	2 934	497	2 437	83.1
Occupational therapy	1 827	410	1 417	77.6
Speech-language pathology and audiology	1 413	265	1 148	81.2
Dietetics	657	502	155	23.6

Source: ASSAf, 2018.[19]

The poor operational management scores across facility types and the nine provincial health departments are of concern, as evidence suggests that effective operational management is correlated positively with health worker retention and performance.[3]

The ASSAf consensus study on health professional education compared the number of graduates for selected professions, over a given period, with the increase in number of new appointments in the public sector.[19] The approach has limitations as it does not track individual graduates but compares graduate output with total new appointments in the public sector in a given year, irrespective of when such graduates qualified.[19] In addition, there are a limited number of public sector posts for rehabilitation therapists, and these graduates have little option but to move to the private sector following their community service. Nevertheless, the comparisons between graduate output and public sector increase suggest poor retention or absorption of newly graduating health professionals in the public health sector (Table 4).[19]

Conclusion and recommendations

There have been several positive HRH developments during the review period: government's commitment to developing HRH norms and standards; existence of health professions regulators that provide a foundation for essential HRH reforms; publication of the ASSAf consensus study on health professional education, which contains detailed recommendations; and embryonic initiatives to develop HRH strategic plans linked to UHC.

Five major gaps and/or weaknesses in the current HRH foundation must be addressed to ensure high-quality health systems and the success of NHI reforms. These gaps/weaknesses are:

- Failures in governance at all levels of the healthcare system and healthcare facilities, as well as on the part of health professions regulators.
- Insufficient stewardship of HRH planning across the entire healthcare system.
- Lack of a national integrated HRH information system, including inadequate information on overall HRH supply to address historical inequities between urban and rural areas and the public and private health sectors.
- Fragmentation, weak coordination and suboptimal governance of health sciences education, contributing to the inefficient use of resources and shortfalls in the quantity, quality and relevance of healthcare professional education and training.
- Poor operational management at health facility level, across type of facility and provincial health department, with rural provinces worse off than their urban counterparts.

Ensuring adequate HRH is a critical requirement in achieving global UHC goals.[2,8] The success of the proposed NHI in South Africa will be dependent on addressing the identified HRH weaknesses and on strategic investment in the people who enable healthy communities and high-performance health systems. Deeper health labour market analyses are required to understand the economic forces affecting the supply and demand of the health workforce.

We therefore recommend the following HRH strategies:

Enhance HRH technical capacity and expertise in the NDoH

Improving the capacity of national HRH staff to develop, lead and implement HRH policies and strategies is critical on the road to achieving UHC. Capacity is required at both the individual and institutional level, involving both additional staff and advanced analytic skills.[36] We therefore recommend the following:

- A mapping exercise should be conducted to assess the capacity needs of the national HRH staff on all eight governance elements of strategic vision, accountability, information, transparency, efficiency, equity/fairness, responsiveness, and citizen voice and participation. In addition to training, ongoing coaching and mentoring should be done to facilitate ownership, strengthen skills transfer, and build institutional memory overtime. Relevant indicators should be developed to monitor and evaluate the success of this initiative. For sustainability purposes, efforts should be made to ensure leadership stability.

Recruit public servants with the right skills, competencies, ethos and values

Recruitment and selection of people with the right skills and competencies are critical to the success of the NHI reforms. In many LMICs including South Africa, recruitment and selection processes are often influenced by political interference, nepotism and corruption rather than merit or having the correct values. [37,38] The following recommendations should be considered:

- More professional and objective selection systems and processes need to be developed and applied.[37]
- More innovative strategies are required to select health workers with values that include a commitment to public service, health equity, working in under-served areas, honesty and integrity.

- More staff with public health competencies should be employed, including competencies in health promotion and protection, disease prevention, epidemiology, monitoring and evaluation, and strategic management.

Improve performance management system

Better outcomes can be achieved by improving the performance of the health workers we already have. Specific recommendations are:

- A review should be done of the performance management system and its implementation to improve the link between staff performance, organisational performance and health outcomes.
- In other settings, the implementation of performance-related remuneration systems has been recommended to promote the achievement of UHC. Rewards for team-based performance and the achievement of clear performance outcomes could be considered in South Africa.
- Management capabilities in the public sector should be enhanced to address employees' discontentment with their poor working conditions and wages in order to reduce the impact of employees' strikes on the delivery of health services. This will encourage professionalism, respect and improved relationships between management and employees.

Increase allocation of HRH in rural and/or underserved areas

Achieving universal access to quality health care for all citizens implies that historical inequities in HRH allocation and distribution should be addressed to improve coverage. Despite the government's commitment to health equity, little progress has been made in changing the way in which financial resources are allocated to ensure distribution according to the relative need for health services.[39,40] We therefore recommend the following:

- Increase capacity of health service managers from poorer, rural provinces to understand different spending options to enable the optimal use and management of resources allocated. This can be done by ensuring that appropriate structures and processes are in place and that relevant training and ongoing support are provided.
- Strategies for attracting more dedicated health professionals to work in rural and underserved areas are required. These may include a combination of financial and non-financial interventions such as creating positive practice environments, improving opportunities for professional advancement, and supportive supervision.[41]

Immediate Priorities

The immediate short-term priorities for HRH in South Africa are to:

- Develop an updated HRH strategic plan, with a clear monitoring and evaluation framework.
- Engage with the ASSAf study recommendations and incorporate urgent recommendations into the updated HRH strategic plan.
- Explore the development of an integrated HRH information system that optimises existing systems and that harmonises data from professional councils.
- Develop norms and standards for the entire healthcare system, in consultation with all relevant stakeholders, and aligned with the proposed NHI reforms.
- Provide stewardship of both the public and private health sectors through appropriate and accountable governance structures.
- Ensure regulatory enforcement and oversight of health professions councils, especially SANC and the HPCSA.
- Address the uncertainty and gaps in policy with regard to mid-level health workers and community health workers (see chapter 7),[42] and integrate solutions into the updated HRH plan.
- Monitor implementation of legislation and key policies in provincial health departments.

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3 Human resources for health planning and National Health Insurance: the urgency and the opportunity

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The implementation of National Health Insurance (NHI) amplifies the urgent need for coordinated, comprehensive health workforce planning in South Africa. Planning for and estimating the cost of adequate human resources for health (HRH) is of paramount importance to a well-functioning health system. Planning is also a central requirement for a strategic purchaser of health services tasked with matching healthcare needs with the supply of services.

The NHI is likely to alter health staffing requirements in South Africa as it strives to improve quality of and equitable access to health care. Increased health-seeking behaviour anticipated under NHI implies increased need for all cadres of healthcare workers, particularly specialists and general practitioners (GPs), who are underrepresented in the public sector. The creation of the NHI Fund also provides the opportunity for much-needed HRH planning on a more systematic and regular basis.

At present there is no ongoing process for HRH planning and no single, high-quality, integrated data source in South Africa to enable such planning. A review of the available data, together with the limitations of these data, is presented. There are no publicly available, audited and regularly updated statistics on the number and mix of health workers available and required for South Africa's population.

This chapter considers both global best practice in health workforce planning and the South African context of critical shortages in order to recommend a way forward. The creation of a timely, accurate and integrated repository of human resources data is an essential first step. We recommend the creation of a multi-stakeholder structure tasked with the development of integrated plans that consider the health system as a whole, based on models that account for both supply-side dynamics and the need for services, and that explicitly model the interactions between cadres of healthcare workers.

National Health Insurance is likely to alter health staffing requirements in South Africa as it strives to improve quality of and equitable access to health care. Increased health-seeking behaviour anticipated under NHI implies increased need for all cadres of healthcare workers.

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Introduction

There is inadequate public-domain health workforce planning in South Africa,[1] the impact of which is reflected in critical shortages and the maldistribution of resources. The last publicly available health workforce projections for South Africa's public sector needs were generated in 2011.[2] Modelling the need for and cost of adequate Human Resources for Health (HRH) is of paramount importance in South Africa because HRH make up almost two-thirds of total public health expenditure.[3]

National Health Insurance (NHI) amplifies the need for coordinated, comprehensive health workforce planning in South Africa, given the intention of a more integrated health system, and to improve equity, quality of care and access to services.[4] Increased health-seeking behaviour anticipated under NHI implies the need for expanded availability of all health workforce personnel, including specialists and general practitioners (referred to collectively as physicians), who are underrepresented in the public sector.[a]

The implementation of NHI also creates the opportunity to reconsider the structural mechanism for HRH planning, particularly because this is a central requirement for a strategic purchaser of health services tasked with matching healthcare needs with the supply of services. Rigorous planning for HRH is necessary to achieve optimal balance in the functional and geographical distribution of health staff,[5] and to ensure appropriate strategies to deal with shortages. Mechanisms to do so may include training, reorganising staff, efficiency improvements and/or purchasing of services from the private sector. Any intervention should be evidence-based, emphasising the need for meaningful planning tools. The intended structural changes to the health system, and the demands these changes will pose, make it imperative to learn from previous work and to build nuanced and rigorous tools and processes for system-wide HRH planning.

This chapter considers the implications of NHI for HRH planning in South Africa, including structures and processes, the different model typologies, model designs and data requirements. Within this framework, a brief reflection is offered on the different public-domain health workforce planning models and approaches used in South Africa over the last 15 years, and the currently available data sources.

Methodology

This chapter is based on a review of literature on workforce projection models and planning processes, a review of previous initiatives in South Africa in the public domain and a review of available data sources.

In 2013, Ono et al.[6] reviewed 26 health workforce projection models across 18 Organisation for Economic Co-operation and Development (OECD) member countries. Three countries, namely the Netherlands,[7,8] Australia,[9,10] and the United Kingdom,[11] emerged as exceptional in the way they approached the process of planning and data collection, and the models they used. The experiences of these countries, as well as Japanese[6,12,13] and Thai[14] experiences, are relied on given the dearth of literature from low- and middle-income countries especially in Africa.[b]

Although this chapter focuses on health workforce planning in general, physicians are used to for illustrative purposes.

The review of previous work done in South Africa included the 2008/09 project by the Colleges of Medicine of South Africa (CMSA),[15] work done by Econex in 2009[16] and 2010,[17] the 2011 health workforce planning model by the NDoH as part of a larger process to develop a National Human Resources Strategy for South Africa[2] and work done to cost South Africa's public PHC system based on the World Health Organization model (Workload Indicators of Staffing Need (WISN)) for determining the correct mix and number of staff, as per the demand for services.

HRH planning and NHI

The implementation of NHI both accentuates the urgent need and creates the opportunity for a more centrally, coordinated approach to health workforce planning in South Africa.

The urgent need

The absence of effective HRH planning in the current system is illustrated by the dire staff shortages in the public sector, geographic maldistribution, and challenges in the interface between the training platform and the public service. We briefly provide examples of each of these.

The collapse of oncology services in KwaZulu-Natal[18] and North West[19] in 2017 and 2018 respectively, are examples of severe shortages that have threatened the public sector's service delivery capacity. These point both to systemic challenges and to the long-term effects of an absence of effective HRH planning. These shortages have also severely compromised the training platform, affecting not just current but also future supply.

The geographic maldistribution of HRH can be clearly seen using the example of anaesthetist services, which are required for the provision of adequate surgery services. Three provinces have single digit numbers of public-sector anaesthetists: Mpumalanga, Limpopo and the Free State. This creates an inequity in access to surgical care, and pressure on surrounding provinces.

In 2018, a large number of junior doctors were not placed in the public sector to complete their internships and community service because these posts were not funded by the provinces.[20,21] While aggravated by severe cuts in provincial health budgets, this disconnect between the training platform and the available budget for HRH illustrates the current lack of co-ordination and planning.

NHI accentuates all these issues. The imperative of access to quality care brings into focus current (and future) shortages. The goal of improved equity will require interventions to remedy current geographic maldistribution. The planned restructuring of the health sector requires planning tools which can be used to assess the impact

a The term 'physician' is used in this chapter in this broad sense, reflecting the international literature, rather than the narrower meaning of internal medicine specialist that is common in South Africa.

b Literature from African countries generally emphasises the extreme need for more human resources, and programmes that have been implemented to expand human resources, rather than giving detailed descriptions of planning processes. The available English literature on workforce projection models from other middle-income or upper-middle-income countries is limited, as much of the experience in Latin America is described in Spanish or Portuguese only.

of alternative policy options on the country's HRH requirements, including interventions that relate to the training platform.

There are still many unknowns regarding how NHI will be implemented. Areas of uncertainty include the nature and scope of the minimum benefit package, the extent to which existing private financing mechanisms will be permitted to continue, and the extent to which the NHI Fund will purchase services from private providers. All of these decisions require effective HRH planning tools to assess the achievability and sustainability of NHI policy.

The opportunity

The creation of the NHI Fund introduces a purchaser-provider split into the South African health system, with the fund acting as a single purchaser. The role of a purchaser in a health system is to match the supply of and demand for healthcare in a manner that is equitable, deciding what care to purchase, from whom and on what basis. HRH planning is a critical tool to enable strategic purchasing.

In addition, the move towards a more integrated health system under NHI will require consideration of HRH resources in both the public and private sectors. This is relevant because the South African private sector shows dramatically higher physician-to-population ratios[16] than the public sector, given the highly resourced nature of the private-sector market together with non-financial factors that often drive doctors away from the public sector.[22] Integrated planning tools will help to illustrate ways in which the resources across the two sectors can be leveraged to the benefit of all South Africans.

There has not been a comprehensive health workforce planning initiative that considers supply, demand and unmet need in the entire health system. Previous private sector work did not fully take into account the complexities of public sector delivery,[17] while public sector-driven planning models focused mainly on planning for public sector need and context (e.g. the 2011 HRH model[2]). Separate consideration of the two systems ignores overlaps (public sector doctors can apply to work in the private sector while being employed full-time in the public sector, under Remunerative Work Outside Public Service or RWOPS), movements between the two sectors, and the policy imperative to consider re-organisation of the system as a whole. Any restructuring of the health system has HRH implications. HRH models and projections can be used to assess the impact of restructuring on the future gaps between the need for and supply of resources. An example of health system restructuring is the launch of the District Clinical Specialist Team (DCST) model, which aims to get teams of specialists to provide mentoring in primary health care (PHC) and less-specialised hospitals, while also providing clinical services for highly complicated cases.[23] This approach changes the planning needs for specialists, as it focuses more on a task-shifting and mentorship approach that could reduce reliance on specialists across the country.

NHI is the largest-scale redesign of the South African health system that has ever been considered. The opportunity to consider HRH planning as part of that redesign is clear and considers ways to institutionalise and regularise planning, the possible approaches to HRH modelling and approaches to improve the availability of timeous and accurate data. Each of these aspects is considered in turn.

Institutionalising HRH planning

HRH planning in South Africa has historically been an *ad hoc* process. It is also not clear from recent policy and market processes that there is a clear view on how to approach HRH planning in South Africa in future. The Health Market Inquiry (HMI) has recommended the establishment of a supply-side regulator,[24] where the function of HRH planning would be well-placed (although this is not mentioned). The draft Medical Scheme Amendment Bill makes provision for the Council for Medical Schemes to house the data needed for HRH planning, although it is not clear that they, as a regulator of private healthcare funders, are best placed in the health system to do so. The draft NHI Bill is largely silent on HRH planning.

This section considers the need for ongoing processes, the need for the creation of structures to undertake HRH planning and whether separate processes are required for different cadres of the workforce.

The need for ongoing processes

Health workforce planning needs to be actively and continuously managed in order to prevent supply-demand gaps from emerging,[1] as has occurred in South Africa. This was recognised in the NDoH HRH strategy which pertained to the period 2012/13–2016/17, but with the intention to take a 2030 view, as per the National Development Plan, with five-yearly updates to the strategy. There has been no update since the previous plan expired. The absence of an ongoing process in South Africa is reflected in the recent call from the South African Committee of Medical Deans (SACOMD) for the establishment of a joint workforce planning process to ensure integration between the training platform and the availability of posts.[1]

A review of international best practice indicates that ongoing processes are ubiquitous, although there are variations in the entities tasked to do the planning.

Who does the planning?

Planning can be conducted by a series of expert panels set up by government (Japan), by a multi-stakeholder government-industry committee (Netherlands), by a more permanent, dedicated national planning agency or by the government itself. Both the United Kingdom and Australia have transitioned from having dedicated agencies to locating the planning function within government.

The Japanese government has set up various commissions and expert panels to conduct health workforce planning for different categories of healthcare workers. The panels have generally been housed in the Department of Health.[6] Estimates produced by the Japanese government commission were also tested by academics using their own estimation models.[12,13] This is an advantage of work being placed in the public domain and should ultimately lead to more robust models and results. In the United Kingdom, the Centre for Workforce Intelligence (CfWI), a dedicated HRH planning institution, was responsible for all health workforce planning and analysis from 2010 to 2015. The centre was closed in March 2016, with staff transferred to the Department of Health and Health Education England (located in the NHS).[25] The move appears to be a political decision, and there is little information yet on the effectiveness of this in-sourced approach.

Australia had a dedicated national health workforce planning agency, Health Workforce Australia, from 2008 to 2014.[26,10] It was established as a statutory body. In 2014, the functions of this body were transferred to the Department of Health.

It appears that the establishment of a separate body is a useful first step to ensure focussed effort on establishing process, data collection and model building. Once established, it may make sense to move this functionality back to the Department of Health.

The approach taken in the Netherlands seems most suitable to South Africa. Their Advisory Committee is composed of three groups of stakeholders: medical professionals, medical training institutes, and health funders. The outputs are then discussed by relevant specialised platforms (sub-committees) of the Advisory Committee.[8] The Committee is set up to advise the Dutch Government on how to plan and budget for HRH. This approach aligns with the recommendation in the South African NDoH Human Resources Strategy for the Health Sector 2012/13–2016/17 that a separate agency be established to take responsibility for South Africa's health workforce planning and strategy.[2] This recommendation has not yet been implemented. This approach also aligns with the recent call from SACOMD.

Which health professionals are covered?

Another dimension to consider is which healthcare professionals are covered, and whether there are separate processes for different disciplines or an integrated approach. The United Kingdom and Australia have favoured an integrated approach, planning for a wide range of health (and social care) professions under a single entity, while the Japanese have separate processes for the different cadres.

We favour an integrated approach given the need for multidisciplinary teams in the health system and changes in scope of practice through task shifting or the emergence of new cadres.[27] There is a complex relationship between fluctuation in the number of different categories in the health workforce, and the question of whether the overall supply meets the health needs of the population being served. Generally, separate planning processes do not allow for an accurate interplay between cadres.

In the South African context, the Econex work considered nurse,[28] general practitioner and specialist numbers separately,[17,29] while the CMSA work considered only specialists.[15] The national health workforce planning model was more comprehensive, covering 100 medical professions, including physicians, nurses, dental practitioners, allied health professions (such as occupational therapists and physiotherapists) and community health workers.[2] This was an appropriate approach given the multi-disciplinary team-based approach foreseen in the NHI Green[27] and White Papers.[4] These policy papers make it clear that the public PHC sector will remain a nurse-driven service, with doctors and specialists using hospitals as their base, but still doing outreach services.

Designing an HRH model

Effective HRH planning requires modelling work to project the supply of health professionals, and to consider its adequacy. In this section we consider model typologies, the components of supply-side modelling, and the components of either demand or need modelling, and the use of scenarios in HRH modelling and the creation of staffing norms from HRH models.

Health workforce planning model typologies

It is useful to compare the HRH modelling that has previously been done in South Africa to the types of models that can be identified in the international literature. At least four health workforce planning model types can be identified, of increasing complexity.[6,30,31]

- *Supply-side focused models,* with simple demographic assumptions to control for demand-side factors (population size, and in certain cases, simple utilisation assumptions);
- Supply-side and *demand-side* (estimated gap) models, with demand-side assumptions moving beyond simple demographics, and more detailed utilisation assumptions;
- Supply-side and *need-based* (estimated gap that considers need) models that move from utilisation-based demand to more nuanced considerations of demographic and morbidity trends;
- An extension of the third model type (supply-side and demand-side, sensitive to need) that also includes *specific service targets* or specific health outcome targets. This approach allows for a more integrated consideration of "numbers, mix, distribution, productivity and outcome".[31]

All of the previous work done in South Africa falls into the first category of models. The aim of the 2008/09 project by the CMSA was to research the number of specialists and subspecialists within South Africa and to calculate whether these numbers are sufficient[27] by comparing South Africa's supply of specialists per 1 000 population with international benchmarks[15] (not taking cognisance of factors driving need or demand in South Africa).

Work done by Econex in 2009[16] and 2010[17] was similarly supply-side focused. By the authors' own admission, it was not "a complicated needs or demand-based model".[17] The aim of the model and overall analysis was to contribute data on nurse, doctor and specialist numbers to the NHI discussion.

The 2011 health workforce planning model by the NDoH was part of a larger process to develop a National Human Resources Strategy for South Africa.[2] As with the other two models, it stopped short of considering changes in healthcare service needs over time.

Given the shortages of HRH resources in the South African context, it is likely that demand is not a good reflection of the underlying health needs of the population. There is therefore the risk that if planning is based on gaps between supply and demand, existing inequities in the system will be perpetuated. An estimated gap approach that considers needs is therefore better suited to the South African context.

Supply-side components

The main components on the supply side of a model should include data on the current workforce stock; full-time equivalent(s) per category of health worker; controls for international migration; exits through death and retirement; and data on the number of health workers in training. These pillars are common features in the planning of most countries surveyed.[6] Doing the modelling by

age and sex of the workforce is key to allow for consideration of feminisation and ageing.

Although South Africa has a young population, similar to that of many other middle-income countries, its health workforce population mimics the dynamics of high-income countries and is likely to be affected by the same factors present in those countries. This includes increased feminisation of the workforce[12,32] (and the implications of this on specialty choice and working hours), and the declining number of health workers available as a consequence of both an ageing workforce and changing retirement patterns.[33] At the same time, the South African market for health workers is subject to some of the influences observed in other low- and middle-income countries, for example, pull factors that make physicians leave for high-income countries with better working conditions.[6]

Demand and need components

Demographic developments are typically taken into account by using data on population projections and patient registration (e.g. Netherlands).[8] Sociocultural developments based on expert estimations and empirical data (if available) are also frequently used.

The Australian approach projects population size and links current and future utilisation to demographics (age and sex cohorts). Service utilisation (or changes in utilisation) are derived from changes in population composition.[10] In addition, current unmet demand for care in the baseline period is also considered.[10]

In the United Kingdom, changes in need are based on consensus expert estimations.[34] All three countries used a panel of experts to provide inputs on epidemiological and other factors driving need.[8,10]

Interestingly, the Thai approach to physician modelling (1972–2004) was typically informed by demand-side projections targeting specific service targets, rather than being supply-led.[14] Regardless, however, of initial emphasis, ultimately both supply and demand have to be considered.

Planning for change through scenarios

Apart from the baseline projection, best practice international models typically include three to four scenarios.[8,10,34] Scenarios can be used to illustrate the impact of future uncertainty and are well suited to areas such as epidemiological developments, sociocultural developments, innovation and technological developments, changes in demand and changes in productivity.[8,10,34] They can also be used to illustrate the impact of policy interventions such as health reforms, changes in the use of foreign doctors, task shifting, and changes in work hours. Complex scenarios allow the interactions between different forces to be illustrated. In this way, planning tools can be used to aid decision-making by enabling comparison between interventions.

Most of the models reviewed included scenarios dealing with specific factors impacting on physician productivity, including technological changes. In recent years, some models have also started to account for task-shifting in the form of horizontal and/or vertical substitution; for example, substitution between doctors and other health staff such as nurses or trained assistants (clinical associates in the South African context).[1] Given South Africa's shortage of medical professionals, these substitutions become relevant when planning for NHI. This may mean that some cadres will need their scope of work expanded so that they can be suitably accredited, and so that the NHI Fund is able to purchase services from these providers individually or from within multidisciplinary practices or groups.

Using HRH models to create staffing norms

HRH model projections linking supply and either demand or need should be translated into staffing norms in order to link planning and implementation. Clear staffing norms could help to ensure equity in HRH distribution.[4] They may also be useful to plan for incremental coverage, moving from expressed demand (minimum level) to need (more comprehensive coverage). However, norms may oversimplify the complexities of health delivery, and retention of some flexibility in the system is desirable.

One of the activities suggested in the NDoH's HRH strategy was to develop detailed staffing norms for tertiary, regional and district hospitals "to ensure a balanced health system".[2] Although there was a large project to develop these norms following release of the draft HRH strategy, it is not clear that the norms were ever implemented.

Another example of staffing norms is the World Health Organization model: WISN. Work has been done to cost South Africa's public PHC system using WISN to determine the mix and number of staff. Levels of compliance with WISN are very low (7% of clinics in March 2016).[35] A study done by the Medical Research Council (MRC) in North West province, found the WISN model to be significantly more expensive than norms suggested by the MRC.[36] This example illustrates the importance of linking staffing norms to broader HRH planning processes and modelling.

Sources of data

The lack of a single, integrated source of HRH data is an impediment to HRH planning in South Africa. We contrast data availability in South Africa with international practice.

Potential data sources for South African HRH planning

Currently, South Africa's public and private health sectors do not regularly provide publicly available data on their HRH counts and demographics. There is no single repository of health workforce data that includes all the necessary fields of interest, neither within each sector nor for the country as a whole. Rather, data are housed in a variety of institutions, from regulatory bodies such as the Health Professions Council of South Africa (HPCSA) to bodies such as the Board of Health Care Funders (BHF), which is tasked with issuing practice numbers to enable healthcare providers to claim from health funders. Given the siloed nature of the public and private health systems in South Africa, any proper health workforce planning model will require data from several different organisations, government datasets and regulatory bodies. This makes the process cumbersome and difficult to replicate regularly.

Regulatory bodies such as the HPCSA and the Nursing Council should have the full list of registered health professionals, by type. These datasets, however, do not provide an up-to-date view of whether the professional is located in the public or private sector (or both). There are also concerns about the accuracy of these datasets in terms of emigration, death and retirement.[7] Professional registration

data should act as the foundation for the total HRH count. Further data are required to improve accuracy and separate out the public sector from the private sector, those who are registered but not practising, and those who are out of the country either temporarily or permanently.

Payroll information from public provincial departments of health, via the PERSAL (government payroll information) system, can be used to identify registered health workers employed in the public health system. On their own, the PERSAL data do not contain sufficient information on health worker type (for example, the data do not differentiate between medical specialties).

In the private sector, the main data source could be the BHF database. Importantly, the BHF database also distinguishes between group and individual practices, allowing for a more granular understanding of the number of health professionals in the private sector. This database could be triangulated with medical scheme claims data from the largest medical schemes to ascertain which of the professionals in the BHF database are still practising and whether full-time or part-time.

To create a South African baseline dataset for the system as a whole, these individual datasets will have to be collated and linked (in a manner cognisant of data sensitivities). While the *South African Health Review* does report on some HRH data year on year, the data sources are likely the same as described above and therefore come with the same cumbersome data collection and collation issues and quality concerns.

The recent draft Medical Schemes Amendment Bill (2018) proposed that a central repository be introduced of all health-related data for the country.[38] This would significantly improve the ability to do robust planning.

Data sources used internationally

Two main data sources are typically required:

- Supply data: Best practice models tend to draw heavily on healthcare professional surveys or censuses of specific categories of healthcare workers. These censuses provide nuanced information on work hours, movements in and out of the workforce, and how societal gender norms interact with the aforementioned. Inputs from expert panels, particularly on demand-side and epidemiological drivers, are also frequently used,[7,34] as are data from training institutions, such as data on medical school intake, medical school graduates and fellows in medical schools (for specialisation).[7,34] In countries like Australia, where a high proportion of physicians are immigrants, data from the government department tasked with managing immigration may also be required.
- Demand and need data: The data required to model demand and need can be obtained from national population projections and data on current utilisation (e.g. hospital episode statistics).[6,10,34] Expert estimates on need and demand can supplement these administrative and other data.

Conclusions and recommendations

Although there have been at least three HRH modelling exercises in the public domain in South Africa, there is no evidence that the findings and recommendations flowing from these models have been implemented. The models and some of their assumptions are likely to have become outdated as epidemiological, scope of practice, market, and public provision dynamics have changed. In addition, all previous work has been supply-side focused with limited consideration of the future adequacy of the supply.

The absence of effective planning is evident in the dire shortage of physicians, the collapse of certain specialist services and a disjoint between the training platform and the public service.

The proposed NHI in South Africa, coupled with the lessons from international best practice outlined in this chapter, lead to the following recommendations:

- A regular HRH planning process that includes both the public and private health sectors needs to be institutionalised. We recommend the establishment of a separate health workforce planning agency. The establishment of a body tasked with ongoing planning would create a structure within which data can be housed securely.
- The experience of other countries suggests that an inclusive approach that combines key stakeholders and experts, is the gold standard for HRH planning. This also necessitates the inclusion of higher training institutions to ensure greater coherence between the training and the service-delivery platforms.
- All data and outputs from this process need to be publicly available and open to scrutiny, and recommendations flowing from this process need to be integrated into the management of the health system.
- Our recommended approach to HRH modelling is an estimated gap model that pays careful attention to the need, and not just the demand, for health services. Modelling should reflect all cadres of health workers given the policy imperative for multi-disciplinary service delivery. The use of scenarios is recommended to enable the exploration of the impact of policy choices and interventions to address shortages.
- South Africa has a long way to go in terms of data readiness for robust HRH planning. Given the complexities outlined above, there is a need to move away from the siloed nature of HRH data in the South African health sector. A centralised database should include professionals in both the public and private health sectors and should reflect all cadres of health workers.
- A simple initial change that could aid HRH planning substantially is to capture more data on health workers in the PERSAL system (for example, RWOPS status and academic qualification).

This review of best-practice HRH planning experiences shows a need for more research on HRH planning processes in countries comparable to South Africa, e.g. other African or other middle-income countries. Available information on how to go about HRH planning is dominated by insights from the experiences of high-

income countries. However, international best practice is well within the reach of the South African health system.

South Africa's NHI reforms with all its requisite policy change and system reorganisation, provides a unique opportunity for effective HRH planning which will be central to the NHI Fund being able to carry out its strategic purchasing functions.

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Review

4 Strengthening the district health system through family physicians

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In 2007, family medicine was recognised as a new speciality in South Africa and all eight medical schools began training specialist family physicians. The introduction of this new specialty can be regarded as a generic intervention in the district health system intended to strengthen clinical processes and health system performance. Family physicians have been deployed in a variety of ways, which reflects both their breadth of training and the confusion in national and provincial policy regarding their roles in the health system.

This chapter discusses the conceptualisation of the different roles of family physicians; the development of family medicine training programmes; and the deployment of family physicians as part of district management teams, within district clinical specialist teams, within sub-districts, at community health centres, and in district hospitals as both clinical managers and clinicians.

The chapter highlights the findings of studies that have evaluated the initial impact of family physicians on the district health system, and proposes recommendations to enhance the effective contribution of the specialty.

Family physicians have been deployed in a variety of ways, which reflects both their breadth of training and the confusion in national and provincial policy regarding their roles in the health system.

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Introduction

From 1994, the South African government has been committed to the provision of primary health care (PHC) for all through a district health system (DHS).[1] Despite this commitment, government has struggled to provide quality primary and district level health care. In the last 10 years a number of reforms have been introduced to strengthen the DHS. Most notable among these have been the introduction of ward-based outreach teams (WBOTs), the development of district clinical specialist teams (DCSTs), strengthening of school health services, and the improvement of primary care facilities in relation to Ideal Clinic criteria. Another reform that has received less attention is the introduction of the family physician as a specialist in family medicine. Family medicine was recognised as a new speciality in 2007 and family physicians from the new postgraduate training programmes became available for deployment from 2011.[2]

This chapter describes the challenges and successes in introducing family physicians as a generic intervention to strengthen the DHS, and summarises the initial research findings on the impact of these physicians. The chapter also identifies policy implications and the implementation of policy for family physicians. The different terms used to refer to doctors working in the DHS are defined in Table 1.

Table 1: Terminology used to refer to doctors in the South African district health system, 2018

Term	Definition
Medical generalist	Any practitioner (doctor, nurse practitioner or clinical associate) who diagnoses and manages a wide variety of patients in the DHS.
Medical officer	A doctor employed as a medical generalist in the DHS and not registered as a specialist in family medicine.
General practitioner	A doctor working as a medical generalist in the private sector of the DHS and not registered as a specialist in family medicine.
Family physician	A doctor working as a medical generalist in the DHS and registered as a specialist in family medicine.

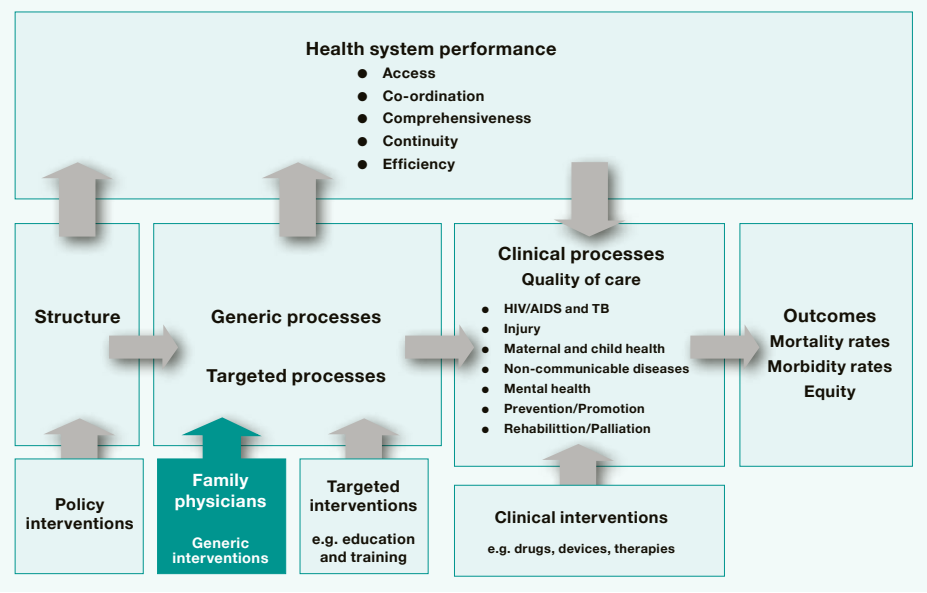
Source: Mash et al., 2015.[2]

The district health system

In South Africa the DHS is the organisational unit through which PHC is delivered. It has been described by the WHO as "a more or less self-contained segment of the National Health System. It comprises first and foremost a well-defined population, living within a clearly delineated administrative and geographical area, whether urban or rural. It includes all institutions and individuals providing health care in the district, whether governmental, social security, non-governmental, private, or traditional."[3]

This study applied a modified Donabedian causal chain model to conceptualise the introduction of family physicians into the DHS (Figure 1).[4,5] The model consists of three categories, namely structure, process and outcomes, which can be used to plan assessment of the DHS. Structure refers to the context of healthcare delivery and relates to issues defined in national policy such as governance, economics and the workforce. Process issues are split into three categories: generic (organisational processes that cut across multiple programmes, e.g. family physicians); targeted (aimed at a specific programme or condition); and clinical (services at the level of the patient for specific conditions). Generic and targeted processes can affect health system performance in terms of accessibility, continuity, coordination, comprehensiveness of care and efficiency as well as clinical processes.[6] Clinical processes can be defined as the quality of care for conditions across the burden of disease. The outcomes of this system can be measured in terms of changes in mortality, morbidity and equity.

Figure 1: Conceptual framework for the district health system in South Africa, 2018



Source: Lilford et al., 2010:[5] von Pressentin et al., 2018.[4]

Family physicians in the DHS

Family physicians can be seen as a generic intervention in the DHS because they potentially impact all clinical processes as well as health system performance. They are trained in the same model as other specialists, with four years of supervised postgraduate clinical training as part of a Master of Medicine degree that culminates in a national Fellowship examination conducted by the College of Family Physicians.

The national learning outcomes for family physicians are aligned with the six key roles envisaged for them within the DHS (Table 2).

Table 2: Six key roles of family physicians in the South African district health system

Role	Description
Clinician	Family physicians are medical generalists (Table 1) who can offer competent care appropriate to the district hospital or primary care.
Consultant	Family physicians are the most highly trained clinicians in the healthcare team, whether this is at primary care or district hospital level. As such they are expected to see more complicated patients referred by clinical nurse practitioners, more junior doctors and clinical associates.
Capacity-builder	Family physicians work in a context where the other members of the healthcare team may have limited training or experience. For example, qualified nurses may train for a further year to become clinical nurse practitioners. Thereafter they can work as medical generalists and take responsibility for 80% of all primary care consultations.[7] They often need support to build their capability and confidence. In district hospitals, doctors are often interns or community service medical officers who have little experience and need supervision and guidance from more senior clinicians.
Clinical governance	Family physicians take the lead in improving the quality of clinical care in their facility or sub-district. Clinical governance activities include guideline implementation, quality improvement cycles, clinical teaching, risk management (e.g. morbidity and mortality meetings), and reflection on routine health information (e.g. medication and laboratory use).[8]
Community-oriented primary care (COPC)	Family physicians are trained in the principles of COPC and to consider the population at risk and not just the patient in their facility. They can be champions of COPC. The introduction of WBOTs provides an opportunity to support the implementation of these principles in practice.
Clinical trainer	Family physicians may have a formal training role in the workplace for undergraduate students (e.g. medical students, clinical associates), interns, or postgraduate students (e.g. registrars).

Source: Mash et al., 2015.[2]

Training

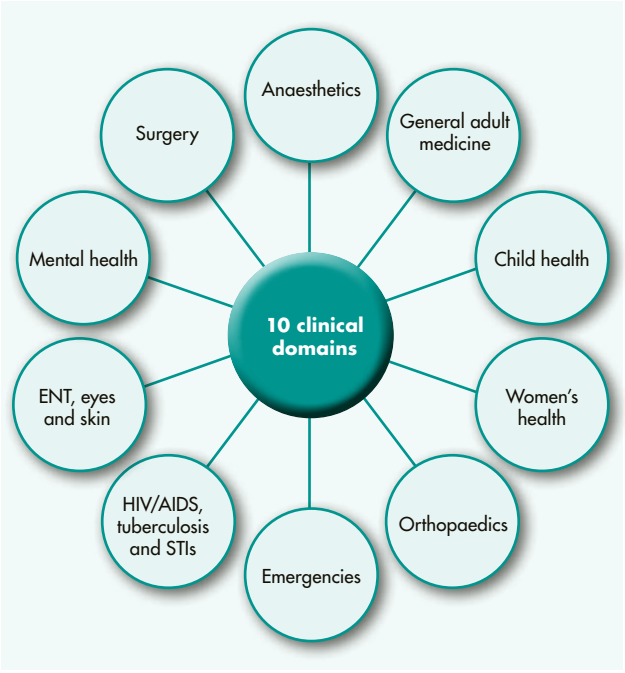
Family physicians are trained to work throughout the DHS in district hospitals, PHC facilities and communities, and are prepared to become the senior clinicians in rural district hospitals, multidisciplinary community health centres, and sub-districts with a variety of clinics. Their training is defined by five national unit standards (Box 1),[9] 10 clinical domains (Figure 2)[2] and a list of 242 clinical skills that range from surgical, obstetric and anaesthetic skills appropriate to the district hospital, to skills in community-oriented primary care such as making a community diagnosis.[10]

Box 1: National unit standards for South African family physicians

- Effectively manage himself or herself, his or her team and his or her practice in any sector with visionary leadership and self-awareness in order to ensure the provision of high-quality, evidence-based care.
- Evaluate and manage patients with both undifferentiated and more specific problems cost-effectively according to the bio-psychosocial approach.
- Facilitate the health and quality of life of the community.
- Facilitate the learning of others regarding the discipline of family medicine, primary health care, and other health-related matters.
- Conduct all aspects of health care in an ethical and professional manner.

Source: Couper et al., 2012.[9]

Figure 2: Clinical domains included in the training of South African family physicians



Source: Mash et al., 2015.[2]

Throughput

In 2011, the national Human Resources for Health policy identified a gap of 888 family physicians in the public sector.[11] By 2017, only 158 new family physicians had graduated from the nine training programmes in the country.[12] The output of new family physicians was limited by a lack of interest in and awareness of the new discipline, a lack of registrar posts, a lack of family physicians as clinical trainers in the DHS, difficulty completing the research component of the degree, and a low pass rate in the national clinical examination.[2,12] Lack of recognition for family physicians in the private sector, both in terms of scope of practice and remuneration, may have also reduced interest in the training programme.[12] Furthermore lack of family physician posts within the DHS may be creating the perception of limited career opportunities. National initiatives have focused on improving the quality of clinical training[13] as well as the validity and reliability of the national examination.

Despite these limitations, the number of family physicians in the DHS has increased, which has allowed training to shift from regional and tertiary hospitals to the appropriate context. The ability to supervise research has improved at some of the universities as academic family physicians obtain doctoral degrees. It is hoped that increased exposure of undergraduates and interns to the distributed platform, COPC and family medicine will increase interest in the discipline. The South African Academy of Family Physicians has been negotiating with the private sector and raising the profile of the discipline.[14]

The number of family physicians on the national register has increased from 545 in 2013 to 1 064 in 2017.[15] This is largely due to the exemption (grandfathering) of family physicians with a variety of qualifications and from vocational training programmes prior to 2007. These family physicians may not fulfil all of the learning outcomes outlined above and particular care must be taken when employing them in district hospitals to ensure that they have the necessary competencies.

The South African government appears to have worked on a goal of 0.2 family physicians per 10 000 population in their HR policy,[11] while the World Bank's experts have suggested an absolute minimum of three family physicians per 10 000.[2] The current supply of family physicians in 2015 was reported as 0.1 per 10 000 compared with rates of 0.2 per 10 000 in Brazil and 1.2 per 10 000 in China.[16] High-income countries report rates of 4–12 per 10 000.[16] In South Africa, the distribution of family physicians between the public and private sectors is not equitable and the rate within the public sector is reported as 0.03 per 10 000 population.[17]

Assimilation into the DHS

Government policy has been mixed with regard to family physicians. On the one hand, the National Development Plan[18] recognised family physicians as custodians of clinical governance in the health district, and papers on National Health Insurance recognised them as key role players in district hospitals.[19]

On the other hand, policymakers appear to have been confused by the notion of medical generalists (Box 2) who are trained and registered as specialists in family medicine. For example, human resource policy saw them as a sub-speciality of internal medicine and calculated that the country needed more ophthalmologists than family physicians.[11] In some provinces, family physicians were employed in regional and tertiary hospitals because the DHS was not meant to employ specialists. In some policy documents, family medicine was conceptualised as a department within the district hospital rather than as being responsible for the entire hospital.[19]

Box 2: Definition of medical generalism

"Medical generalism is an approach to the delivery of healthcare that routinely applies a broad and holistic perspective to the patient's problems.

Its principles will be needed wherever and whenever people receive care and advice about their health and wellbeing.... The ability to practise as a generalist depends on one's training, and on the routine use of skills that helps people to understand and live with their illnesses and disabilities, as well as helping them to get the best out of the healthcare options that are available and appropriate for their needs."

"It involves:

(a) seeing the person as a whole and in the context of his or her family and wider social environment;

(b) using this perspective as part of the clinical method and therapeutic approach to all clinical encounters;

(c) being able to deal with undifferentiated illness and the widest range of patients and conditions;

(d) in the context of general practice, taking continuity of responsibility for people's care across many disease episodes and over time; …

(e) co-ordinating his or her care as needed across organisations within and between health and social care."

Source: Howe et al., 2013.[20]

The introduction of DCSTs was both an opportunity and a further contradiction for family physicians. On the positive side, there was funding for each district in the country to have a post for a family physician; on the negative side, the teams were focused solely on maternal and child health and positioned as external specialists coming to assist the district. It was not intended that family physicians come to the district from regional hospitals, but rather that they be part of the fabric of health services within the district. They were also trained to be generalists and not focused on only one of the important clinical processes.

Employment of family physicians

National policy is clearer on the contribution of family physicians to district hospitals than on their contribution to PHC. The role of family physicians in strengthening PHC facilities and WBOTs has not been as clearly conceptualised.

Perhaps as a result of this confusion at national level, provinces have been unsure about employing family physicians. Family physicians are also expensive and provinces have had to consider the opportunities against the costs of investment. However, the situation has been different in the Western Cape where the skills gap in rural district hospitals[21] was recognised in 1998, and family physicians were employed to meet this gap from 2005 onwards.[22] Currently most district hospitals in the province have family physicians, as do a growing number of the community health centres in towns and metropolitan areas. In other provinces, such as the Eastern Cape, family physicians were located in central hospitals until quite recently, and the skills gap in rural district hospitals still exists.[23] In the city of Tshwane in Gauteng, the Department of Family Medicine at the University of Pretoria championed the establishment of COPC as an approach to universal health coverage.[24] Here, family physicians have a clearer role in supporting the WBOTs and other PHC services. In KwaZulu-Natal, the initial focus was on creating family physician posts in DCSTs and district hospitals, with some family physicians working in clinical manager posts at community

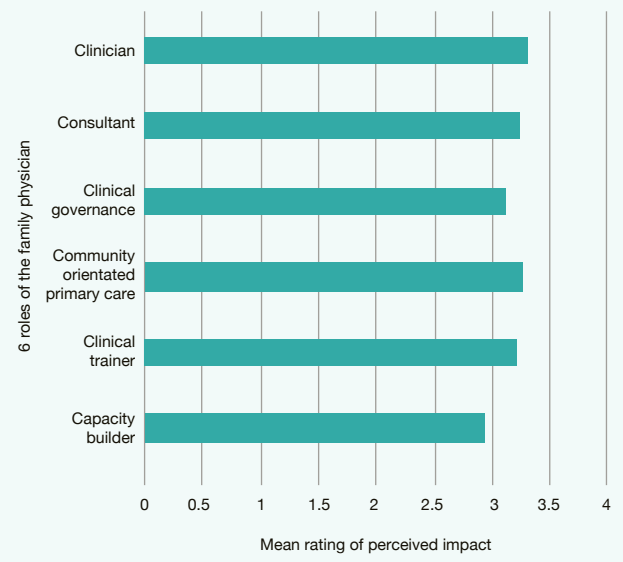
health centres.[25] Consequently, the different employment strategies in different provinces has led to a heterogeneous picture and a lack of uniformity in approach.

Effect of family physicians on health system performance

A family physician impact assessment tool was validated in the Western Cape[26] and subsequently used in a national survey of family physicians.[27] The tool was structured around the six roles of family physicians described in Table 2, and the perceived impact of 52 family physicians was rated by 542 of their managers, colleagues and subordinates in seven provinces. Limpopo and the Eastern Cape were excluded as they did not form part of the service-learning footprint of the universities that participated in the study. Family physicians came from district hospitals and community health centres as well as from the new and older training programmes. The impact of the family physician was rated on a scale from 0 to 4 for each of the six roles, with the scores interpreted as follows: < 1.5: no impact in this area; ≥ 1.5 but < 2.5: little impact in this area; ≥ 2.5 but < 3: moderate impact in this area; and ≥ 3: high impact in this area.

Figure 3 summarises the findings and shows that respondents felt that family physicians had a high impact in their roles as clinicians, consultants, leaders of clinical governance, champions of COPC and clinical training, and a moderate impact as capacity builders.

Figure 3: Perceived impact of family physicians across seven South African provinces, 2018



Source: Von Pressentin et al., 2018.[27]

Respondents were also asked to compare the impact of family physicians with the impact of other medical officers; family physicians were reported as being more impactful across all six roles. No significant difference was noted between family physicians in district hospitals and community health centres, from urban and rural areas, and from older and newer training programmes.

District managers reported that employment of family physicians led to improved patient access to more comprehensive care at lower levels of the health system.[28] As clinicians, they were seen to bring a more advanced skill set to manage complicated patients, resulting in fewer referrals to regional or tertiary hospitals. As consultants and capacity builders, family physicians were seen to share their skills and competence, which also resulted in fewer and more appropriate referrals. Within facilities, they were credited with improving patient flow and triage, particularly in emergency centres. In some provinces, family physicians are reported to have shaped the development of COPC and shared their expertise with the WBOTs in the community.[24]

An observational study was not able to verify the perceptions of district managers, although scores for the availability of signal functions related to child care were found to be better in district hospitals with family physicians than in those without.[4] Patients in primary care felt that there was less coordination and continuity of care in facilities with family physicians, although family physicians were often located in facilities with higher workloads.[4]

Supportive organisational environments

The impact of family physicians on health system performance depends on a supportive organisational environment. A number of factors have been identified in this regard.

First is the extent to which family physicians are used as 'gap fillers' to push the queue.[28,29] If there are insufficient medical officers then family physicians are often required to prioritise frontline clinical care and neglect their other roles. The number of practitioners, mix of senior and junior doctors, and turnover may all impact on the family physician's roles. Sometimes they are asked to fill a gap left by another specialist at the referral hospital or to work as a clinical manager. It should be noted that family physicians are trained as clinicians and not managers, although they are expected to offer leadership in all their roles.[8] Although they may take responsibility for clinical governance they are trained to influence corporate governance (e.g. supply chain, finances, human resources) rather than be responsible for it.[8] In the current South African context leadership is a critical capacity for the family physician as newly qualified specialists enter a rapidly changing or evolving health system, with huge expectations placed on them to make a difference.

A second key factor is their relationship with local managers and the prevailing management style.[4] Local managers need to understand the training and roles of family physicians and work in collaboration with them.[28] A management style that is too controlling, restrictive or misdirected may stifle the family physician's ability to have an impact.[28]

Lastly, the district policy environment is also important in terms of role clarification and support from the district management team and the availability of financial resources and support services to enable functions such as clinical governance.[28]

District managers also reported some ambivalence regarding the impact of family physicians on the health system versus the educational system. Their role as clinical trainer was perceived as taking time away from service delivery, and as benefiting the university more than the health services. At the same time, managers recognised that students contributed positively to patient care, often attracted other infrastructure and resources, and also performed practical research.[28]

Effect of family physicians on clinical processes

District managers reported that family physicians have had a positive impact on clinical processes for chronic diseases, particularly HIV, TB, mental health and non-communicable diseases, as well as maternal, child and emergency care.[28] Their impact appears to be mediated by direct clinical care, capacity building and clinical governance activities. Managers reported that care offered by nurses, doctors, registrars and community health workers was improved by input from family physicians. Managers also reported that family physicians engaged with implementation of guidelines, protocols or standard operating procedures as well as quality improvement cycles, review of adverse events and learning from routine data.

Effect of family physicians on health outcomes

District managers reported that while it was too early to detect an effect on district health outcomes, this could become apparent over time and with the wide-scale deployment of family physicians.[28] This viewpoint was confirmed by an ecological study that did not find any correlation between family physician supply and district health indicators across the country.[17] However, an observational study comparing facilities with and without exposure to a family physician, found that in-hospital rates for child, neonatal and perinatal mortality were better in facilities with a family physician, and that the number of modifiable risk factors associated with these deaths was significantly improved.[4] The observational study matched facilities for province, rural or urban location as well as bed size and adjusted for confounders such as outreach from general specialities at the referral hospital and bed utilisation rate. However, it was not possible to measure all potential confounding factors.

Conclusions

Family physicians were first introduced into the DHS as a generic intervention in 2011. Evidence suggests that in the short term they have already had a positive impact on health system performance and key clinical processes. Policy on the role of family physicians in the health system has been largely positive, although sometimes contradictory and confusing. The supply of family physicians has been limited by a range of factors affecting the recruitment of registrars, clinical training, assessment, and career progression. There is little evidence of impact on health outcomes as yet, as it is still too early to measure. A longer timeframe and larger numbers of family physicians are needed.

Recommendations

- In order to strengthen PHC, teams with higher-level expertise and greater breadth of engagement at community level are required. Family physicians should provide PHC teams with the additional expertise they need to provide effective COPC.
- National government should ensure a congruent understanding of the role of family physicians in HR, PHC, DHS and NHI policy documents.
- Provincial government should employ family physicians at scale in the DHS, in district hospitals, community health centres and sub-districts. Provinces should plan to create more family physician posts within the DHS as well as more registrar posts to enable a greater supply of family physicians. The numbers need to double to be on a par with Brazil, and increase by a factor of 30 to meet the World Bank target (three family physicians per 10 000 population).[2]
- District managers and their management teams should understand and support the different roles of the family physician, avoid using them as 'gap fillers', and create a supportive environment within which they can maximise their impact.
- Researchers should continue to monitor and evaluate the impact of family physicians on the DHS in order to inform policymakers, district managers and educational programmes.

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20 Years of community service in South Africa: what have we learnt?

5

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The Health Professions Amendment Act No. 56 was signed into law by President Nelson Mandela in 1998, beginning a system of mandatory community service in the public health sector for all health professionals in South Africa.

The first cohort of doctors began their year-long service in July 1998, followed by a much larger cohort in January 1999. All other categories of health professionals followed in successive years, with the largest cohort of professional nurses joining in 2005.

This chapter draws on numerous published and unpublished studies of community service, including annual exit surveys initiated by the Department of Health. The initial development of the programme is described as well as observed trends in the experiences of community service officers, and the effect of community service on the health services since its inception in 1998. The policy is analysed in terms of its stated objectives, the process of policy development, initial implementation, and the operational challenges that have arisen due to fiscal constraints and the difficulty that provinces face in funding sufficient posts for community service officers.

Implementation of the community service policy has varied considerably, especially because of the absence of national guidelines for provincial departments.

Compulsory CS is an effective strategy for recruiting health professionals to rural and underserved areas, but it is ineffective in retaining them in the absence of complementary longer-term human resource interventions.

Compulsory community service is an effective strategy for recruiting health professionals to rural and underserved areas, but it is ineffective in retaining them in the absence of complementary longer-term human resource interventions.

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Introduction

The recruitment and retention of health professionals in rural and underserved areas is a global challenge that no country has managed to solve satisfactorily. In 2010, the World Health Organization (WHO) developed a comprehensive set of guidelines based on the best available evidence for the recruitment and retention of healthcare professionals in rural and remote areas.[1] The guidelines focus on four core categories, namely educational interventions, regulatory interventions, financial incentives, and professional and personal support (Table 1). One of the regulatory interventions within this offering is compulsory service, which places this strategy within a broader set of options for increasing the supply of health professionals in areas that are difficult to staff.[2,3]

Table 1: World Health Organization guidelines to improve attraction, recruitment and retention of health workers in remote and rural areas

Intervention	Examples
Educational interventions	• Recruiting students from rural backgrounds • Locating health professional schools outside of major cities • Facilitating clinical rotations in rural areas during studies • Development of curricula that reflect rural health issues • Continuing professional development for rural health workers
Regulatory interventions	• Enhanced scope of practice • Different types of health workers (task-shifting) • Compulsory service • Subsidised education for return of service
Financial incentives	• Appropriate financial incentives
Professional and personal support	• Better living conditions • Safe and supportive work environment • Outreach support • Career development programmes • Public recognition measures

Source: World Health Organization, 2010.[1]

This chapter summarises the global experience of mandatory community service. The chapter focuses primarily on the experience of community service of medical doctors in South Africa, for two reasons: this was the first group to commence community service two decades ago; and there is a considerable literature on their experiences. The initial development of the programme is described as well as observed trends in the experiences of community service officers, and the effect of community service on the health services since its inception in 1998. The chapter draws on numerous published and unpublished studies of community service in South Africa, including annual exit surveys initiated by the Department of Health. The policy is analysed in terms of its stated objectives, the process of policy development, initial implementation, and the operational challenges that have arisen more recently due to fiscal constraints and the difficulty of provinces in funding sufficient posts for community service officers. The concluding section highlights the key recommendations relevant to policy makers, health service managers, professional associations and other stakeholders.

Community service in other countries

Compulsory service for health professionals has been instituted in various countries since the early 1900s, with literature from the Soviet Union in 1920, Mexico in 1936,[4] Norway in 1954, Cuba in 1960[5] and Ecuador in 1970.[6] To date, more than 70 countries have established some form of obligatory service in underserved areas, either as a condition of service for government employment contracts, or with incentives such as education (e.g. as a prerequisite for postgraduate training) or licensing for independent practice (including private practice), as in South Africa.[7] Australia imposes obligatory periods of rural service as a precondition to full registration for immigrant doctors who have qualified elsewhere,[8] and in the Indian state of Andra Pradesh, a mandatory one-year period of rural service for all medical and dental graduates was instituted in 2011.[9] Students in India agitated against this government order, arguing that the inexperience of young graduates would put patients' lives at risk, a position borne out by the experience in South Africa.

In 1970, Ecuador instituted a year of compulsory medical service known as 'medicatura rural'. A survey of this programme found that the doctors experienced an enormous discontinuity between their biomedical training in urban hospitals and the public health needs of the rural communities.[6] Although medical staffing improved dramatically in rural areas, there was little impact on the health of these communities, as the young graduates lacked the necessary public health and epidemiological expertise to make a difference.

In Thailand, a three-year period of service is obligatory for all graduates of government-funded medical schools, all of which can be served in a rural area.[10] Although this initially appeared to solve the rural staffing crisis, a 'buy-out' option has seen many leaving for private practice without fulfilling their service obligations. From 1994, a special recruitment track in Thailand targeted applicants from rural backgrounds for medical training. This has resulted in over 90% of graduates remaining in the province to which they were first assigned,[11] an experience replicated by the Umthombo Youth Development Foundation in KwaZulu-Natal (KZN) (see chapter six).[12] Hence multiple strategies are more effective than compulsory service alone.

Community service in South Africa

Following democratic elections in 1994, the government adopted a primary health care (PHC) approach to provide access to health care to all South Africans,[13] and introduced major health sector reforms[14] including several human resources for health (HRH) reforms.

Policy process

Community service (CS) was first introduced in July 1998 and was implemented within the context of a confluence of recommendations on human resource training and retention. Firstly, there was the recommendation from the Ministerial Committee on Human Resource Development that medical graduates undergo a compulsory period of postgraduate vocational training (PGVT) with appropriate supervision, which was adopted and became effective in January 1998.[15] The National Department of Health (NDoH) simultaneously proposed two-year compulsory CS for all medical graduates after internship, to meet the health needs of rural communities. At the same time, the Medical and Dental Education Committee (a technical group) of the Health Professions Council of South Africa

(HPCSA), recommended a five-year undergraduate degree for doctors followed by a two-year structured internship programme to ensure competencies and skills in all domains. Intense lobbying by the Junior Doctors Association maintained that young doctors were prepared to serve in areas of need as part of their social obligation but that it would be unrealistic to call this training when the level of supervision was unlikely to be adequate, particularly in rural hospitals. PGVT was eventually replaced with one year of compulsory CS post-internship in 1998, via amendments to the Health Professions Amendment Act.[16]

The objectives of CS have been to:

- Ensure improved provision of health services, especially to rural and underserved areas; and
- Provide young professionals with an opportunity to enhance their skills, and to acquire knowledge, behaviour patterns and critical thinking to assist them in their professional development and future careers.[17]

While the two objectives were not explicitly weighted in terms of importance, the evidence suggests that the second objective has been subsumed by the first because in reality the programme has consisted of 'service not training'. CS officers have reportedly been allocated according to healthcare needs as determined by the NDoH rather than according to availability of supervision for junior staff.

A significant shortcoming of the CS policy is that it was initiated through a political process[18] and in the absence of a broader human resources for health (HRH) strategy for the health sector.

Despite three of the eight strategic priorities of the HRH strategy[19] being directly relevant and complementary to CS (professional human resource management; quality professional care; and access to health professionals in rural and remote areas), by the time that the HRH Strategy 2012/13–2016/17 was published, the CS programme had already been institutionalised. Thus the complementary strategies of the broader HRH policy framework needed to optimise CS were not implemented during the initial decade.

Despite some limited evidence provided by initial and ongoing surveys, implementation of the CS policy has varied considerably, especially because of the absence of national guidelines for provincial departments. Specific procedures and a written policy were eventually developed only by the KZN Department of Health in 2010.[20] This lack of attention to detailed guidelines has been the source of much confusion and unhappiness with the CS system, together with an alleged lack of transparency in the allocation process.

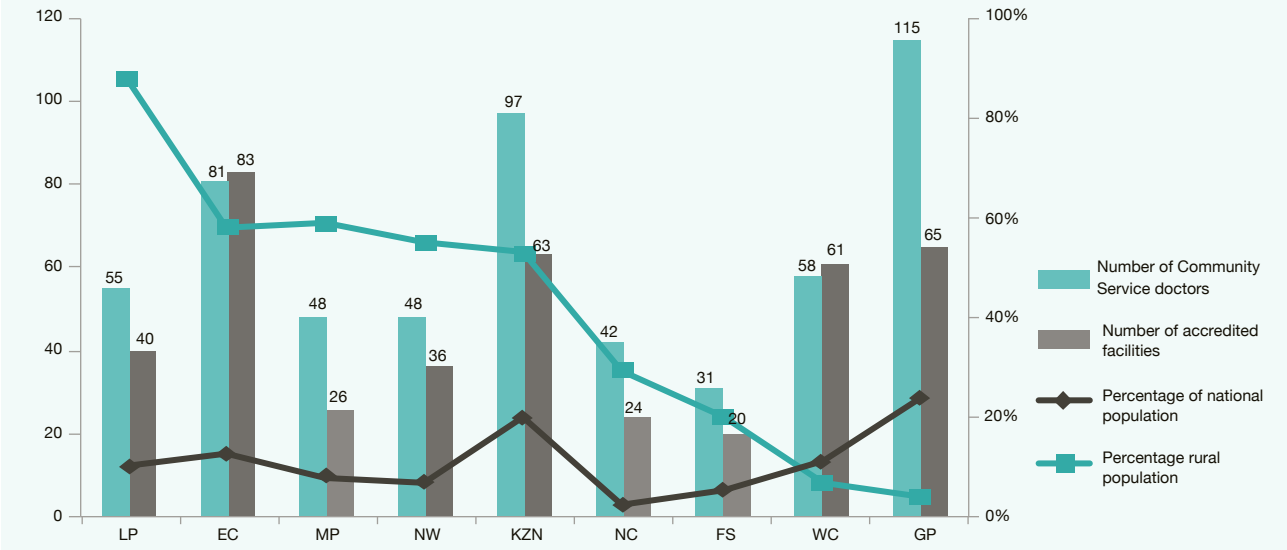
Allocation of community service

The allocation process allows CS applicants to nominate their choice of sites from a prescribed list of approved health facilities drawn up by the provincial Departments of Health, the South African National Defence Force, and the Department of Correctional Services. These posts are identified according to the availability of funding, rather than actual relative need in terms of objective indicators such as vacancy rates for each category of staff in each province or district. Applicants are requested to select five options of their choice from the list, and these preferences are then submitted directly to the NDoH, which allocates applicants to different sites according to certain criteria. Provincial bursary-holders who have a service obligation to their provinces of origin, are given first priority for placement. Other social factors such as family responsibility are then taken into account on an individual basis.

Around 50% of CS officers in each professional group were allocated to rural hospitals. This could be regarded as successful in terms of the objective of improved provision of health services, since about half of the South African population was located in rural areas in 1998.[21]

Figure 1 plots the number of CS doctors allocated and the number of accredited facilities in each province against the percentage of the national population and the percentage of each provincial population that is rural (with the provincial percentage shown in decreasing order), using data from Stats SA censuses 2001 and 2011.[22] The aim of this comparison is to show allocations in terms of

Figure 1: Percentage of provincial and national population that is rural, compared with the number of CS doctors and number of facilities accredited for CS by province (2001–2013)



Sources: Stats SA Census 2001 & 2011[22] and annual CS survey.[23]

relative need in rural areas. Limpopo receives a disproportionately low number of CS doctors for its rural needs, while the Western Cape and Gauteng receive disproportionately high numbers of CS doctors.

Another approach, adopted by the Rural Health Advocacy Project, yielded similar results.[24] The project compared the distribution of CS allocations with the South African Index of Multiple Deprivation, applied to health districts in the Eastern Cape, North West, and KZN. These results suggest that there is a gross maldistribution of CS allocations in favour of urban and less-deprived districts as well as an accompanying regression in access to health services in rural areas.

A number of surveys have compared the ranking of the choice of site chosen by CS officers on application, with outcomes at the end of the year such as satisfaction with CS and professional development, and found no relationship between the two.[9,25]

Finally in 2017, the Minister of Health stated unambiguously that from 2018, rural communities would be prioritised in CS placements.[26] Community Service and Internship Placement Guidelines were published for 2017–2018.[27] This coincided with the launch of an online application and placement system (ICSP), which was compromised by teething problems in the first year of implementation.

Implementation

The pioneer group of 26 CS doctors were mostly allocated to urban hospitals in July 1998, followed by a cohort of 1 088 in January 1999.[28] The first group of 173 dental graduates began their CS year in July 2000, and were allocated to sites in all nine provinces as well as the South African Military Health Service. In 2001, 406 newly qualified pharmacists started and in 2003 a further six professional groups began CS: physiotherapists, occupational and speech therapists, clinical psychologists, dieticians, radiographers and environmental health officers. In 2005, professional nurses as the largest single health category commenced community service, bringing the total number of CS officers each year to around 7 500.

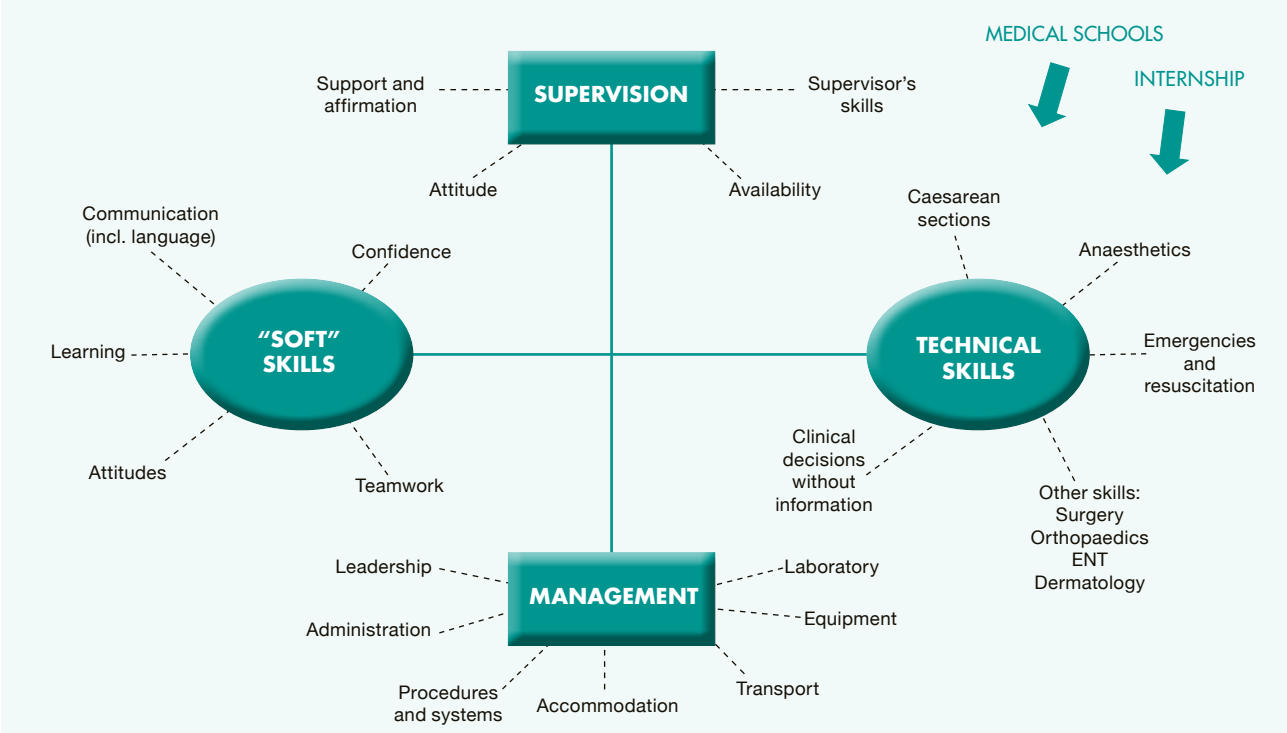
Take-up rate

The take-up rate for CS, calculated as a percentage of those eligible for CS who actually arrive to take up their placements, is one indicator of the general acceptability of CS in the eligible population of new graduates.[23] The results show that around 90% of registered medical interns report for CS, with the shortfall being accounted for by emigrations, foreign interns, social reasons such as starting a family, or decisions to leave the profession. This is of some concern, as the 10% who do not turn up for CS amount to about 130 new graduates, the output of one medical school, who may be lost to the South African public health system in the longer term.

Evaluation of CS for doctors

An internal report by a specific task team for the NDoH on the skills and competencies of interns and CS doctors in 2001 revealed serious challenges (Figure 2).[29] The report noted that the most important technical skills were lacking among junior doctors, namely emergency procedure skills (particularly Caesarean section skills), anaesthetic skills, and resuscitation skills. Additionally, certain skills had not been sufficiently developed, such as the flexibility and competencies to make clinical decisions without supervision or complete diagnostic information in resource-constrained settings where essential equipment was not available.

Figure 2: Major themes identified by the NDoH task team on the skills and competencies of interns and CS doctors in South Africa, 2001



Source: Mathebula et al., 2001.[29]

In addition to technical competencies, the task team found that less tangible issues such as attitude, teamwork, confidence and communication, were equally important in the delivery of quality medical care and were significantly enhanced or hampered by the degree of supervision available and the management capacity of the institution.

These findings prompted a revival of the two-year medical internship proposal, which was eventually implemented in 2005.[30] Thus internship, as part of the professional training period, was adjusted specifically to meet the health service needs encountered during the CS year.

Despite efforts to address gaps in the skills of new graduates, critical gaps still persist among CS doctors. For example, in 2007 data from the National Confidential Enquiries into Maternal Deaths showed that junior doctors with one year of internship were not adequately prepared for unsupervised practice, and that a number of maternal deaths occurred in district hospitals with junior staff who did not have the requisite anaesthetic and obstetric skills.[31] In a 2013 follow-up study, Nkabinde et al. found that most CS doctors felt well-prepared clinically, but critical gaps in knowledge and skills were still identified in paediatrics, orthopaedics, anaesthetics and obstetrics.[32]

Experience of community service professionals

The experience of CS has been monitored in several cross-sectional surveys as well as via qualitative studies within all professional groups. The first year of CS implementation for doctors,[28] dentists,[33] therapists,[34] dieticians,[35] and psychologists[36] was scrutinised particularly closely. The findings suggest that despite the less-than-satisfactory allocation, orientation and support processes, the majority of respondents reported that they developed professionally through the year and contributed positively to the community they had served.

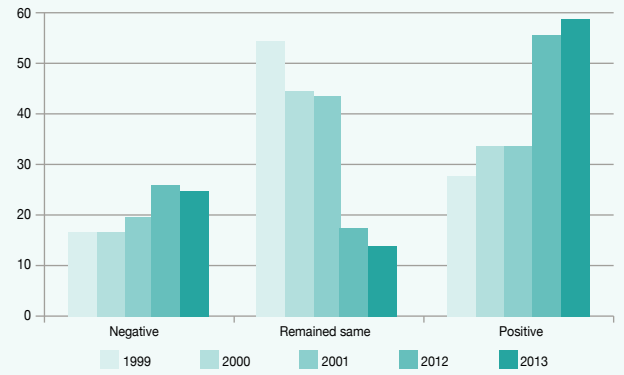
Supervision

A detailed study of the 2009 cohort of CS doctors, which developed a 'Supervision Satisfaction Score' (SSS), found a high level of participant satisfaction with CS.[37] The study noted that participants reporting professional development during the CS year were twice as likely to report an intention to remain in rural, underserved communities. Orientation and induction processes at the various sites were variable, and on the whole, far from optimal. On average across the country, CS doctors (the group for whom the most longitudinal data are available) rated their satisfaction with job orientation at around 65%, clinical supervision by seniors at around 60%, and support from managers at around 50%.[38]

A KZN study[39] of professional nurses, reported that they felt positive about CS policy and their work experience, but struggled with the workload and role expectations in terms of responsibility and autonomy. This is not unexpected among young professionals entering the workplace fulltime for the first time.

An interesting finding from surveys of dieticians,[35] doctors[28] and therapists[34] was that CS is viewed more positively at the end of the year than at the beginning. Longitudinal data from CS doctors show that this trend has increased significantly over the past 15 years, as shown in Figure 3.

Figure 3: Response of South African CS doctors to the statement: "My attitude towards community service has become more negative/positive because of my experience this year", 1999–2013.[23]



Discussion

The CS experience has become something of a 'rite of passage' in the process of professional identity formation.[40] Clearly, a significant process resulting in greater acceptability of CS occurs during the 12 months of placement, which could be explained by a number of different hypotheses. Either CS has just become part of the anticipated norm over time, or the exposure of young professionals to the real needs of patients in the public health service stimulates a sense of social solidarity, despite the difficulties of the system. The CS process may be understood in terms of the acquisition of confidence and competence through professional development, leading to a clearer professional identity and the development of resilience under challenging circumstances. But it may equally be understood as a social intervention, bringing health professionals from largely middle class backgrounds into direct contact with the social, economic and historic inequities in South Africa.

Longer-term implications of community service

Following initial assessment of the first cohorts of various professions, a number of insightful studies have followed up with analyses of CS,[41–44] including the implications for undergraduate education[45,46] and internship.[47] In summary, the experience of CS exposes the misalignment of many tertiary education curricula with the challenges and priorities of the South African public health services.[48] Hence educationalists need to address the realities that their graduates will inevitably face.[49]

A number of other studies have focused on the retention of professional staff in rural areas after the completion of CS.[50–52] The proportion of CS officers who say that they are prepared to work in the public service in rural or underserved areas after CS varies between 10% and 35% depending on the study setting, the province, and the professional category. For doctors, this figure was consistently around 20% of survey respondents, representing one-fifth of the professional workforce who remain positive and committed to rural service on a voluntary basis. This has implications for continuity of care. As noted by one hospital manager: 'It is better to have one doctor for 5 years than 5 doctors for one year each'.[a]

a Personal communication: V. Fredlund, 2013.

Community service is a reliable recruitment strategy for short-term staff, but retention of committed professionals requires an array of interventions. Rather than rotating all graduates through rural facilities for a year only, a different strategy to form a more stable rural workforce would be to incentivise the 20% who are willing to stay on longer, and release the rest. In isolation of other HR strategies, CS might to some extent actually defeat its own ends if newly qualified professionals assume that they have 'done their duty' and compensated society for the cost of their studies after only one year in public service.[28] The potential of this annual workforce supply of motivated young professionals could be optimised through bonded scholarships,[24] incentivised postgraduate training, and promotion opportunities to build teams in difficult-to-staff health facilities. This is an area of long-term human resource management that is generally lacking in the public health service, but a comprehensive strategy could make all the difference to rural health services in the longer term.

Backlash

Inevitably there has been some degree of backlash against the compulsory nature of CS, epitomised in a 2012 article in the *South African Medical Journal* entitled "Slaves of the State".[53] Describing CS as "forced labour", the author, from the legal profession, characterised it as exploitation and discrimination, and called for it to be challenged under the Constitution. Indeed, an application was brought by Dr Miguel Desroches in 2014 to be heard directly by the Constitutional Court.[54] Posted to a rural site in the EC for his CS year, he challenged the system legally, but his application was dismissed by the judges who said it was "not in the interests of justice to hear it at this stage". The ethics of the compulsory nature of CS, limiting the freedom of individual health professionals to practise where they choose, is often framed against the need for social and restorative justice in South Africa, and further legal challenges can be anticipated in future.

Funding

The availability of funded CS posts poses the greatest challenge to the current system as provinces struggle to find sufficient funding to employ all new health profession graduates in CS posts. In a review of the 2017 CS officer allocations in North West and Eastern Cape projects, a report by the Rural Health Advocacy Project found that posts in urban facilities were filled whereas rural posts remained unfilled, indicating that the funding crisis disadvantaged the very areas that CS was intended to assist with staffing.[24]

Some media releases have highlighted complaints against the NDoH for failing to place applicants, but applicants have refused to take up available posts in rural areas. However, in the case of environmental health practitioners, and more recently dentists and pharmacists, the absolute number of posts available in the public health system has been insufficient to accommodate all applicants. Although relatively small in number, some health professionals have been unable to fulfil their CS requirements to register for independent practice, and have left their profession to take up other occupations to earn a living. If no funded posts are available in the public sector, then a policy change needs to be considered, including an amendment of the relevant legislation, to allow an alternative to CS as currently constituted to suffice for independent practice. In the case of pharmacists for example, this means accrediting private pharmacies for CS or removing the obligation for CS altogether.[55]

Other professions have expressed an interest in introducing CS. The Department of Higher Education has considered a system of CS for all university graduates, similar to the National Youth Service Corps in Nigeria, which was established by decree in 1973.[56] Despite lengthy consultations and investigation, this has not been developed further. The legal profession, led by the Law Society of South Africa,[57] has also considered a certain period of compulsory CS before full qualification as an attorney, with support from law students who regard it as an issue of social justice. However, CS is often confused with pro bono work and no clear decision has been made; the Law Society adopted the view that pro bono services would be best rendered by its members on a voluntary rather than a compulsory basis. Veterinarians have been more successful, through the initiative of the Department of Agriculture, Forestry and Fisheries, which instituted a compulsory year of CS for all newly qualified graduates in 2015, with the first group beginning in January 2016.[58] Non-profit veterinary organisations as well as government services have benefited enormously from the injection of human resources as a result of this intervention.

Conclusion

Compulsory CS is an effective strategy for recruiting professional staff to rural and underserved health facilities, but it is ineffective in retaining them in the absence of complementary longer-term human resource interventions. It has positive effects in terms of professional development and social investment, but there are also some unintended consequences and a backlash to the compulsory nature of the programme. In addition, provinces are finding it difficult to fund all the necessary posts.

Recommendations

The following recommendations were made at a National Summit on Community Service held in 2015,[23] and on the basis of this review.

- A comprehensive long-term strategy ensuring access to health professionals in rural and underserved areas in South Africa needs to be driven by the NDoH. Current development of the National Strategic Plan for Human Resources for Health 2019/20–2024/25 provides a strategic entry point for framing many of these policy decisions.
- Community service posts need to be allocated and funded on the basis of relative need and equity, based on objectively verifiable indicators such as the deprivation index or vacancy rates by district.
- The orientation, supervision, support and professional development of CS officers needs to be better structured and funded, with incentives such as postgraduate training opportunities for the minority who are prepared to stay on in rural or underserved facilities after CS.
- The roles of the universities should be formalised in terms of recruiting and selecting students from rural areas, exposing them to rural facilities during undergraduate training, and providing postgraduate opportunities for professional development during the CS year.

- Management and support of CS officers should be standardised across provinces, including the provision of adequate staff accommodation in rural areas. The private and non-profit sectors could play a helpful role in this area.
- A system should be instituted to monitor CS and subsequent career progression via continuous online human resource tracking, through the relevant statutory health councils.
- Attention must be given to the maintenance and development of CS as one of a range of HRH strategies crucial to the establishment of the National Health Insurance system.
- Ongoing monitoring and evaluation of HRH, including specific research projects on operational and strategic aspects of compulsory CS, will be crucial to inform future policy changes.
- Further policy development on CS may be needed, including relevant legislative changes, in order to adjust the programme to the changing context.

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Case study

A rural scholarship model addressing the shortage of healthcare workers in rural areas

6

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Shortage of healthcare workers (HCWs) in rural areas is an international problem. In South Africa the Umthombo Youth Development Foundation (UYDF) scholarship scheme is an intervention to attract and retain HCWs in rural areas.

Umthombo began 19 years ago. The scholarship scheme is based on the premise that graduates of rural origin are more likely to choose to work in rural areas, and that funding the studies of such students is a viable option in increasing the number of health workers in rural areas.

To date, a total of 337 students spanning 16 different disciplines have graduated as a result of the Foundation's support. The scheme has recorded a 92% university pass rate over the past five years.

This chapter describes the key features of the scholarship programme, reflects on the challenges and lessons learnt, and discusses the broader application of the UYDF model in producing HCWs committed to public and rural service. The UYDF experience demonstrates that rural students from quintile 1 and 2 non-fee-paying schools can succeed at university if provided with the necessary financial, academic and social mentoring support; that graduates will return to work in their local hospitals if it is a condition of support; and that training of HCWs who remain and work in South Africa is an economic investment.

Extension of the model may increase the number of HCWs in rural areas, which is promising given that staffing rural areas is likely to be a major challenge in the successful rollout of the National Health Insurance system.

The Umthombo Youth Development Foundation scholarship scheme is an intervention to attract and retain health care workers in rural areas.

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Introduction

The shortage of health care workers (HCWs) in rural areas is an international problem and well documented in the literature.[1–6] In South Africa, there is an overall shortage of HCWs in the public sector, with 106 518 public-sector vacancies in 2010 for 14 clinical health professions.[1] Medical practitioners accounted for 10 860 of the total vacancies, while professional nurses accounted for 44 780 of the total.[1]

Although 43.6% of the South African population live in rural areas, they are served by only 12% of doctors and 19% of nurses.[1] Of the 1 200 medical students graduating in the country annually, only about 35 end up working in rural areas in the longer term.[1]

One initiative to address the shortage of doctors in rural and underserved areas of South Africa is through recruitment of HCWs (mainly from overseas), and placing them in areas of greatest need. For example, from November 2014 to March 2018, Africa Health Placements deployed 4 384 doctors in South Africa, with 1 391 placed in KwaZulu-Natal (KZN).[a] These figures highlight the need for doctors in underserved areas, and the shortage of doctors in South Africa.

Research in Australia, Canada and the USA has shown that recruiting medical and health science students originating from rural areas is one of the most effective strategies in addressing staff shortages in rural and remote facilities.[7–13] This has been corroborated by local studies which found that the "rural origin" of HCWs is associated with rural practice (in most cases this was the most significant factor), and that incentives such as bursaries and scholarships, with an enforceable rural service agreement, encourage rural practice.[6] A 2003 study that investigated the career choices of medical graduates of rural origin in South Africa and what proportion of rural-origin graduates were practising in rural areas, concluded that students of rural origin were significantly more likely to work in rural areas than their urban counterparts.[7] Despite the limitations of the study (namely small sample size and predominantly male subjects), the results suggest that 45.9% of rural-origin graduates were in rural practice, compared to 13.3% of urban-origin graduates.[7] Hence rural origin is strongly associated with rural practice.[2–6]

This chapter describes critical aspects that have enabled the Umthombo Youth Development Foundation (UYDF) to recruit, support and produce rural-origin HCWs successfully and consistently since 1999. The chapter illustrates how these aspects have been combined into a workable model, and describes how one aspect supports another. Broader use of the UYDF model to increase the number of HCWs committed to public service is discussed, with specific implications for the provision of universal health coverage through National Health Insurance (NHI).

The Umthombo Youth Development Foundation

Overview

Established by Dr Ross in 1999, the original intention of the scheme was to provide HCWs for hospitals in the Umkhanyakude health district of KZN. The scheme focused on identifying local youth with the potential and interest to study a health science degree, and who on graduation would be willing to work at a rural hospital in the district for the same number of years that they were supported.[14] In 2008, the scheme transitioned from a small voluntary organisation managed by trustees to a professional organisation with full-time staff. By 2018, 15 district rural hospitals in three KZN districts (Umkhanyakude, Zululand, and King Cetshwayo), and two rural Eastern Cape district hospitals, were participating in the scheme.

Critical aspects

Some of the conditions attached to the scholarship were that students had to apply to universities themselves; undertake compulsory voluntary work at the hospital before selection in order to confirm their choice of health science discipline; do compulsory work at the hospital during vacations; and choose study fields based on the provincial Department of Health (DoH) human resource priorities.

The scholarship provides comprehensive financial support, which includes tuition and residence fees as well as meals and textbooks. Initially, students were required to report on their progress during their vacations when they returned to the hospital for compulsory holiday work. Students were also required to visit their previous school to raise awareness of the scheme and to serve as role models for other aspiring learners. Mentoring support took place via monthly telephone calls and annual visits to the universities.

The scheme was designed to centre on the local district hospital, which was involved in various aspects of the programme such as selection of students, provision of mentoring and support during the holiday work periods, and employment of graduates.

Management and operation of the scheme have evolved over the years to keep pace with the scheme's growth, and the following have been put in place since 2009.

Identifying sufficient youth with potential

A number of initiatives exist in order to identify sufficient rural youth with potential. These include:

- Marketing and introducing the scheme to learners in the area: Local schools are visited and presentations are given at career expos to raise awareness of the scholarship programme and its success. The possibility of health sciences as a career opportunity is discussed, as well as the subjects and grades required to study health science courses, and university application procedures and closing dates. Learners are also made aware of funding opportunities through the KZN DoH Provincial Bursary Scheme, the National Student Financial Aid Scheme (NSFAS), and other bursary providers.
- Open days: Each participating hospital has at least one open day (ideally two) a year, where top learners from local schools who are doing Mathematics and Science and who have an interest in studying a health science degree, visit the hospital to learn more about the health science discipline they are interested in. Learners are taken on a tour through the various hospital departments and meet professionals and graduates of the scheme who share what their health science discipline entails, how they succeeded at university, and what the learners can expect at university. Various related presentations

a Personal Communication: M Mashingaidze, Data Analyst, Africa Health Placements, 23 March 2018.

such as the university application process, and how to apply for a UYDF scholarship, a provincial bursary or a NSFAS loan/bursary, are also provided on the day.

- Voluntary work: Learners who have applied for admission to university for a health science degree and who are interested in applying for a UYDF scholarship, are required to do at least one week of voluntary work in the relevant department at their local hospital as part of the application process.
- Local selection committee: Applicants are interviewed and selected by a local committee consisting of hospital representatives, the local school principal or district office representative, and a community representative. The local selection process also builds in accountability between the student and the community, as in most cases members of the interview panel know the parents or relatives of the applicant. Interviews focus on the students' understanding of their chosen health science discipline and their commitment to serve their community after graduating.

Box 1: Selection criteria

Applicants must:

- come from the area;
- have applied or have been accepted to study a health science degree at a South African public university in a discipline required by the hospital. The local hospital, as well as the KZN DoH District and Head Office, determine the priority health science disciplines to be addressed through student selection;
- have completed at least one week of voluntary work at the local hospital;
- be in financial need and able to provide proof thereof;
- be chosen by the local selection committee; and
- agree to sign a year-for-year work-back contract.

Source: MacGregor, 2017.[15]

Comprehensive financial support

Comprehensive financial support covering tuition, accommodation, books, food, minor equipment and incidental expenses is provided for each student. This allows students to focus exclusively on their studies without having to worry about financial issues, and ensures that students have all the books and equipment needed to study and practise effectively, thus improving their chances of success.

Mentoring support

Non-academic factors, such as lack of money, lack of family support, and studying in English, are some of the factors affecting academic performance of black students from disadvantaged homes and schools.[16] As rural students in South Africa are poorly prepared academically and socially for university,[17] a mentoring and support programme is in place to ensure that they are able to address the academic and social issues they face as soon as possible, thus increasing their chances of success.[15]

In 2008, a full-time student mentor was employed to ensure that this essential support was provided consistently to all students. In 2010, this was augmented by the establishment of a network of volunteer mentors (called local mentors) throughout the country. Local mentors are not necessarily HCWs as their role is not to provide additional tuition, but to hold students accountable for obtaining the support they need through specific university departments or student support services. Local mentors are situated close to the campuses of the 16 different tertiary institutions across South Africa. All first and second year students, as well as struggling senior students, are allocated a mentor with whom they have monthly meetings. Challenges and possible solutions are discussed, with the student being held accountable for implementation of the solution plan. Local mentors report to the student mentor who visits each student once a year.

Holiday work

As part of the mentoring support programme, all students are required to do a minimum of four weeks of holiday work at their local hospital each year. This allows students to complement their theory with practice as they work under the supervision of hospital staff, which in turn has a positive impact on their university performance. In addition, they build relationships with the hospital staff and recognise the need to return and address staff shortages once qualified. Student holiday work gives the hospital the opportunity to groom students to become the employees the hospital desires.

Student life skills/Imbizo

A student gathering (imbizo) is held at the end of each year where issues such as effective self-management, personal development and other relevant matters (HIV and AIDS, financial management, relationships, etc.) are discussed. The imbizo is intended to provide the space to discuss important non-academic matters and groom students to become empathetic, compassionate, and competent HCWs willing to serve their communities.

Graduation, employment, and work-back

Some health disciplines require UYDF graduates to undertake a compulsory internship training at regional or tertiary hospitals not situated in rural areas. These graduates are subsequently employed in rural district hospitals, ideally the hospital that they were selected from, or a hospital within their district, in order to honour their work-back contract. Graduates are required to work one year for every year of support received from the scheme. Employment of graduates is the responsibility of the participating hospital and the provincial DoH. Until 2009, employment of graduates was based on an informal agreement with the KZN DoH. This process was strengthened in 2010 when a Co-operation Agreement was signed between the UYDF and the KZN DoH Department.

Support of graduates in the workplace

An initiative is in place to assist new graduates with integrating quickly into their work environment. This involves senior UYDF graduates assisting new graduates to adapt from university life to the hospital work environment.

Health care workers in rural areas often feel isolated and their professional development restricted due to lack of personal and professional development opportunities.[18] In order to retain qualified staff in rural hospitals, the UYDF provides financial support for graduates and other professional hospital staff to acquire additional clinical or procedural training through attending short courses or distance-based learning programmes. Support is also provided

for graduates to obtain the necessary management and financial skills should they be interested in assuming a management role in the hospital. These interventions are in line with the World Health Organization guidelines, which cite medical education, regulatory interventions, financial incentives, and personal and professional support for rural practitioners as important factors in retention.[18]

Financial resources to run the scheme

The financial resources required to run the scheme are raised from South African companies (corporate social investment), South African trusts and foundations, and international foundations interested in the development of the public health system and/or youth development. In 2011, UYDF entered into a partnership with the NSFAS, wherein some of the UYDF students' tuition and residence fees are paid by NSFAS. Currently, the full cost of supporting a student, including mentoring support, is R115 000 (US$7 600) per student per year.

Each component described above adds strength and value to the overall scheme, thus all the components are deemed to be critical in a successful rural scholarship scheme (Figure 1).

Application of the UYDF model

Implementation of the UYDF model requires a good relationship between the local hospital and UYDF. The Foundation's involvement with a particular district hospital is conditional upon the entire hospital management understanding the initiative and agreeing that the hospital will be an active partner. The Foundation provides hospital management with bi-annual updates.

In reality, it is sometimes difficult to keep local hospitals engaged as they have many other priorities and are often working in resource-limited environments. The UYDF undertakes the school marketing because local hospitals do not have the time or resources to perform the function adequately. For holiday work to be productive, hospital staff must be supportive of the initiative to ensure that students are mentored and exposed to their full scope of practice.

Mentoring support forms the backbone of UYDF's success, leading to a consistently high (above 90%) annual pass rate, and graduates with a passion to serve their communities. The use of local mentors has ensured that students on all campuses countrywide are able to have face-to-face meetings with their mentors. The provision of mentoring support is also cost effective, at approximately R10 000 per student per year. If implemented nationally, this simple yet highly effective system of support could have a huge impact on the national university pass rate.

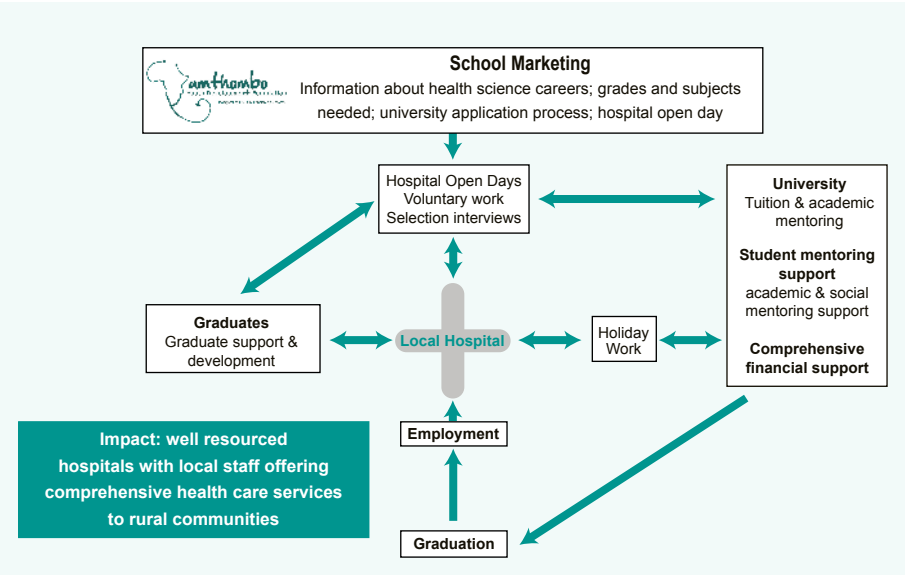
When seeking employment in the KZN DoH, the details of potential graduates are submitted to the Department in April of the preceding year. Although KZN provincial bursary holders are given preference over UYDF graduates in terms of available posts, UYDF graduates are appointed in the same way as provincial bursary graduates, should funded posts be available.

UYDF graduates and other HCWs can access financial support for professional development courses enabling them to remain current in their discipline. Since these HCWs are employed, the UYDF only makes a contribution to the total cost.

Achievements of the UYDF model

The five-year (2013–2017) average annual university pass rate achieved by UYDF students has been 92%, with the majority of students completing their degree within the minimum time, or minimum time plus one year. Of the 32 students who were due to complete their studies in 2017, only one student required an additional year of study, and a further two medical students who were to complete in December 2017 required an additional six weeks. This is in contrast to trajectories reported by other South African studies. For example, one 2016 study found that 45% of all undergraduates and 70%

Figure 1: UYDF model for staffing rural district hospitals



Source: Ross et al., 2015.[19]

of students on financial aid, never graduate.[20] The Department of Higher Education and Training, which provides throughput rates for full-time students studying four-year health science degrees, reported that after four years 53% of students complete and 21% drop out; after five years 69% complete and 21% drop out; and after six years 75% complete and 25% drop out.[21]

To date, 337 graduates in 16 different health disciplines have been produced, of which 113 are doctors. All graduates have taken up employment in rural hospitals to honour their work-back obligation, and as at December 2017, 145 had completed their entire obligation. Ten graduates (3%) bought themselves out before completing their work-back obligation (8 doctors, 1 psychologist, and 1 physiotherapist), while 9 graduates (2.7%) defaulted by either not working or paying back. This represents a total of 5.7% of graduates who either bought themselves out or who are defaulting; again a stark contrast with international findings. A review of the Queensland Health Rural Scholarship Scheme, which focused on allied health care professions, reported that 13.7% of the participants had broken their service bonds either before graduation or before completion of their service period.[22]

Of the 145 graduates who have no further work-back obligations, 63% (n = 91) are still working at a rural hospital, with an additional 6% (n = 8) working for rural-based non-governmental organisations (NGOs). Nineteen percent (n = 27) are working in the urban public health sector, while 10% (n = 15) are working in the private sector. The remaining 3% (n = 4) are specialising (statistics as at 31 December 2017).[15] The high percentage of UYDF graduates still working in rural areas after their work-back obligations are complete confirms that investment in the training of rural youth has a positive effect on staffing rural hospitals in the long term.

Discussion

Despite the odds against rural students completing their tertiary education (due to poor quality of primary and secondary education, especially in mathematics and science), the UYDF scholarship scheme has demonstrated that this is indeed possible given adequate support, with 337 students graduating over the last 19 years. These students all came from rural areas and rural quintile 1 and 2 non-fee paying schools. This suggests a significant level of success when compared with national norms.[17,20,21]

A similar scheme, the Wits Initiative for Rural Health Education (WIRHE),[23,24] located within the Centre for Rural Health at the University of the Witwatersrand, operated in North West and Mpumalanga provinces from 2003 to 2014. The major difference between the two schemes is that the UYDF model is district hospital-based, while the WIRHE scheme was district focused. By the end of 2011, the WIRHE programme had produced 23 graduates across seven different disciplines.[25] However, due to financial constraints the North West DoH did not employ WIRHE graduates produced after 2011, thus the outcomes of the initiative were not achieved.[b]

The KZN DoH has a provincial bursary scheme, in addition to the Cuban training programme and nurse training programme, to improve human resources for health (HRH) in the province. The 2014/15 KZN DoH Annual Report indicated that the new "Decentralised Training in a PHC Model" was at an advanced stage and was expected to have a significant impact on throughput as well as addressing inequity between urban and rural areas and the increased intake of health science students. The report further highlighted that the University of KwaZulu-Natal was planning to double the intake of health science students (including medical, nursing and all allied workers) over the next five years in line with identified HRH needs in the province.[26] According to the report, a total of 854 bursaries were awarded to health science students in the 2014/15 period and a further 30 students were sent to India to study pharmacy (20 students) and medical imaging technology/ultrasonography (10 students). Ninety-five students were sent to Cuba, which increased the number of South African students studying in Cuba to 789.[26]

While the KZN DoH made a huge investment (R243 million) in HRH training in the 2014/15 period, this has not been sustained.[26] Only 57 bursaries were awarded to health science students in the province in 2015/16, and in 2016/17 this decreased to 16 bursaries[27] due to financial constraints. This has also impacted negatively on the employment of bursary holders (including UYDF bursary holders) in areas of greatest need. Many of the vacant posts have now become non-funded posts, at both hospital and district level, despite there still being a need for more staff in rural and underserved areas. The implications of such a drastic reduction in student intake are likely to be felt for years to come.

Broader application of the UYDF model

The UYDF model lends itself to training healthcare professionals for a particular purpose; in the case of UYDF, for rural service. Extensive interaction with students from selection to graduation allows UYDF to inculcate its vision, namely to address the shortage of HCWs in rural hospitals and to improve healthcare delivery to rural communities. Through application of the UYDF model, students understand that they are being supported for a greater purpose, rather than for their personal benefit alone. This is in contrast to the KZN provincial bursary programme where students are selected without interviews, and are financially supported throughout their university studies with very little contact with the Department. The result is that there is often an incongruence between the objectives of these graduates and those of the Department, as nowhere in their training have the students been sensitised to the purpose and objectives of the Department.

Policy implications

In order to be implemented successfully, NHI will require a sustainable supply of competent and committed HCWs willing to live and work in underserved areas – very typical of UYDF graduates. If the UYDF model is utilised, this will allow the National Department of Health to produce HCWs who understand their role and function within the NHI, and who are therefore fit for purpose.

b Personal Communication: Ian Couper, Director, Centre for Rural Health, University of Witwatersrand, 20 August 2015.

Impact on National Health Policy

South Africa's national health policy is centred on the improvement of health for all through removal of barriers to healthcare access and through reduction of health inequalities. These priorities are addressed in the activities of the UYDF, as the Foundation contributes directly to the development of skilled personnel who work to improve population health.[28]

Perhaps the most important contribution of the UYDF to national health priorities is the development of a critical mass of healthcare professionals willing to work in rural areas, which is the focus of the HRH strategy.[1] These health professionals are being placed in rural areas and are critical to the realisation of universal health coverage and the implementation of NHI.[28]

Return on investment

The UYDF objective of addressing staff shortages in rural areas through investment in rural youth results in a dual benefit: the community benefits from the UYDF graduates' work, and the individual benefits from the opportunity to become a qualified HCW. A 2016 study by a health economist on return on investment, using economic data from UYDF, indicated that it cost R186 million to produce 254 graduates (2015 graduate numbers).[28] The study also indicated that these graduates would have lifetime earnings of R4 billion (using 2015 figures), and that they will pay approximately R1.2 billion in income tax. This clearly shows that the investment in training HCWs gives an excellent return. This is even more significant given that the focus is on investing in youth, as youth unemployment rates in South Africa and the world are unacceptably high.

Conclusions and recommendations

The UYDF experience proves that:

- rural students from quintile 1 and 2 non-fee-paying schools can succeed at university if provided with the necessary financial, academic and social mentoring support;
- that graduates will return to work in their local hospitals if it is a condition of support;
- and that training of HCWs who remain and work in South Africa is an economic investment.

The following critical and complementary components of the model must be considered for inclusion in any similar scheme:

- A shared vision of commitment to rural health should be created;
- Schemes should be embedded in a rural context; and
- Multi-faceted support should be provided.

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7

Ward-based primary health care outreach teams in South Africa: developments, challenges and future directions

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In 2011, South Africa adopted the Ward-based Primary Health Care Outreach Team (WBPHCOT) Strategy. The WBPHCOTs are made up of generalist community health workers (CHWs) supported by nurse team leaders, and linked to local primary health care (PHC) facilities (via referral, support and oversight). These outreach teams build on a pre-existing NGO-based community care and support system that emerged in response to HIV and AIDS in South Africa. By early 2017, 42% of the estimated required total of 7 800 teams were reporting activity data through the District Health Information System.

The WBPHCOTs are envisaged as a key element of PHC in the future National Health Insurance (NHI) system, and a WBPHCOT Policy Framework was launched in December 2017. An accredited curriculum for a comprehensive CHW cadre has been approved nationally and is being implemented through a decentralised training infrastructure. Although an investment case for the WBPHCOT policy has been finalised, additional resources have yet to be allocated for rollout of the strategy.

This chapter draws on policy documents, research conducted by the authors, and grey and published literature to recap the history of CHW programmes in South Africa and the emergence of the WBPHCOT strategy and policy. Key dimensions of WBPHCOT policy and implementation are reviewed, including scope of work, selection, supervision, training, financing and monitoring and evaluation. The chapter concludes with a set of recommendations addressing a number of significant constraints on performance and future development of WBPHCOTs in light of their intended role in NHI.

The Ward-based Primary Health Care Outreach Teams are envisaged as a key element of primary health care in the future National Health Insurance system.

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Introduction

South Africa has a long history of small-scale experimentation with community health worker (CHW) programmes, starting with the Pholela community oriented primary health care (PHC) initiative in the 1940s[1] and gaining momentum after the 1978 Alma Ata Declaration on PHC.[2] Although the democratic government elected in 1994 did not formally adopt CHWs as a cadre,[3] rapidly changing care needs generated by an overwhelming HIV and AIDS epidemic led to the emergence of a large community-based health sector in the 1990s.[4] Care in this sector was, in the main, provided by lay health workers through non-governmental organisation (NGO) and community-based organisation (CBO) intermediaries. It fulfilled a range of care and support functions, from palliative home-based care to HIV counselling and testing, follow-up of tuberculosis (TB) patients, and support of orphaned and vulnerable children.

With time, the sector's functions expanded as new programmes were introduced, such as the prevention of mother-to-child-transmission of HIV and universal access to antiretroviral therapy (ART), requiring adherence counselling and support.[5] As dependence on these community-based services grew, state subsidies and contracting of NGOs expanded and lay health workers increasingly became part-time workers who were paid a stipend. By 2010, there were more than 70 000 such workers, deployed through nearly 3 000 NGOs.[6] NGO-based workers were often single-purpose cadres with a wide variety of titles and training, reporting through vertical HIV and AIDS budget lines and minimally integrated into the formal PHC system.

The precarious status and working conditions of lay health workers, low remuneration, and poorly managed NGO contracts resulted in growing calls from civil society for a formalised CHW programme and incorporation into state employment. Over the years, a number of policy initiatives sought to regularise the community-based sector and the status of CHWs. This culminated in 2010 in the appointment of a Primary Health Care Re-engineering Task Team[7] and the formulation of the Ward-based Primary Health Care Outreach Team (WBPHCOT) Strategy.

The PHC re-engineering strategy proposed a renewed focus on district and PHC systems, and the reorganisation and integration of the existing community-based services into outreach teams organised according to wards (the lowest political unit). These teams would consist of generalist CHWs, led and supported by nurses, and working in close collaboration with environmental health officers and health promoters. The teams would be responsible for a defined number of households and form close links with the local health facility. The role of these teams would include, but extend beyond, HIV and TB to include maternal and child health and chronic non-communicable disease care, and add a stronger preventive focus to the existing care and support orientation.

The National Department of Health (NDoH) defined an overall model and roles for the WBPHCOTs, issued a set of implementation guidelines, developed a reporting system through the national District Health Information System (DHIS), and established an accredited national CHW curriculum through the Quality Council of Trades and Occupations (QCTO). However, the detailed design, funding and implementation of the WBPHCOT strategy was left to provinces, which proceeded to adopt and adapt the strategy in varying ways and at different paces from 2011 onwards.[8] PHC re-engineering features centrally in the overarching reform agenda of National

Table 1: Goals and objectives of the WBPHCOT Policy Framework and Strategy (2017)

No.	Goal	Objectives
1	Improve the working conditions of WBPHCOTs	Standardise WBPHCOT management structures at provincial and district level
		Standardise roles and responsibilities of actors in the provision of community-level services
		Complete the CHW investment case to obtain the required budget over the medium-term expenditure framework (MTEF) for a well-resourced and well-functioning CHW programme
		Complete and maintain the national CHW information database and use the information to confirm existing CHWs in teams required to serve specific communities
2	Improve human resource recruitment, selection, placement, development and management pertaining to the WBPHCOT programme	Define an adequate ratio of WBPHCOTs to population and households, allowing for differential geographic distribution and considering problems with access in rural areas
		Ensure that WBPHCOTs are fully staffed and equitably distributed throughout South Africa
		Ensure appropriate implementation and management of recruitment, selection, appointment, placement, remuneration, skills development, dispute resolution and occupational health and safety processes for all members of WBPHCOTs
		Ensure adequate supervision and support for CHWs as well as for WBPHCOT team leaders
3	Standardise the WBPHCOTs scope of work and ensure standardised application in all nine provinces of South Africa	Ensure standardised implementation of the approved scope of work
		Confirm training content and method to ensure that WBPHCOTs are capacitated to provide the required services
		As part of the Ideal Clinic programme, ensure that WBPHCOTs have adequate physical space in clinics to prepare for their day in the field and to meet their data-recording and reporting responsibilities
4	Improve and maintain the monitoring and evaluation system for the WBPHCOT Programme	Review and standardise current indicators and data-collection tools across all provinces
		Establish the required structures at national, provincial, district and PHC facility level for data collection and reporting
		Ensure submission of monthly activity data from PHC facilities into the DHIS, quarterly progress reports, and five-yearly outcome and impact reports from the NDoH and provinces

Source: NDoH 2017.[12]

Health Insurance (NHI),[9] and NHI pilot districts have received some support in developing the outreach teams in their districts. On the whole, however, implementation has been highly uneven across the country. By March 2017, there were 3 275 WBPHCOTs submitting information through the national DHIS,[10] 42% of the estimated total of 7 800 teams required.[11] Anecdotal evidence suggests that many teams are incompletely staffed.

In December 2017, the NDoH released a WBPHCOT Policy Framework and Strategy, with the overarching goal being "the efficient management and leadership of WBPHCOTs to support the delivery of primary healthcare services in South Africa".[12] The policy outlines four goals, linked to objectives (Table 1), each of which are currently part of more detailed planning processes convened by the NDoH.

An investment case for the WBPHCOT policy has been tabled in the National Health Council, the highest national health sector decision-making body.[11]

Scope of work of WBPHCOTs

The WBPHCOT Policy Framework and Strategy envisages that WBPHCOTs will have a comprehensive scope of work and consist of generalist CHWs (6–10 CHWs per team), with the support of a nurse outreach team leader (OTL) and a data capturer. In executing these roles, WBPHCOTs are conceptualised as an extension and part of existing PHC facilities, with facility managers providing the oversight, support and supervision of teams.

The scope of work of CHWs mandates them to:

- Conduct community, household and individual-level health assessments.
- Identify potential and actual health risks and assist the household or individual to seek appropriate care.
- Screen and refer individuals for further assessment and testing.
- Identify pregnant women and conduct home visits during pregnancy and the postnatal period to promote healthy and safe births and identify danger signs.
- Provide support for healthy maternal-child behaviours, including exclusive breastfeeding.
- Provide screening and health-promotion programmes in schools and early childhood development centres, working in partnership with school health teams and other HCWs.
- Counsel on and provide support for family planning choices.
- Provide follow-up and assistance to persons with chronic health problems, including distribution of medicines, help with adherence to treatment, and defaulter tracing.
- Promote and work with other sectors and undertake collaborative community-based interventions such as early childhood development interventions and geriatric care.

Recent assessments in three districts (across three provinces) indicated that WBPHCOTs had a comprehensive scope of activities, programme areas and target groups. Emphases varied by district and urban/rural localities within districts and the demographic profile of each site.[13,14] In broad terms, the activities of WBPHCOTs are household focused, with preventive maternal-child health interventions and follow-up of chronic lifelong conditions in adults (including delivery of medication in some areas) forming the two key components. Specific CHW practices extend to advice on oral rehydration solution for diarrhoea; administration of pregnancy tests, vitamin A and anti-helminthics; sputum collection for TB testing; and in some instances, home HIV testing. There is advocacy to include the diagnosis and treatment of childhood pneumonia, neonatal sepsis and acute malnutrition as part of the CHW scope of work.[15]

The policy envisages that each team will cover approximately 6 000 individuals or 1 500 households per annum. This translates to 150–250 households per CHW. However, it is acknowledged that the number of households covered by each CHW in the WBPHCOT has to accommodate differences based on distance and travel time between households, demographic structure and burden of disease. Recent empirical assessments in urban and rural areas have proposed the following norms:[13]

- urban/peri-urban: 250 households per CHW;
- rural: 169 households per CHW;
- deep-rural: 96 households per CHW.

In several parts of the country, delivery sites extend beyond the household and include mobile outreach points, designated health posts, and support groups in community venues.[16,17] In a number of provinces, WBPHCOTs have engaged other sectors such as Social Development, the Social Security Agency of South Africa and the Department of Home Affairs around access to social grants. They have also participated in inter-sectoral 'war rooms' at community level, and have worked closely with local political structures.[18–20]

Notwithstanding these latter activities, the training and scope of practice of CHWs have not focused on the social determinants of health or the development of skills required for community mobilisation. There is considerable potential for WBPHCOTs to further promote local action on the social determinants of health – whether on food environments, pedestrian safety, or access to services from other sectors (such as policing).[19] The CHW training curriculum includes modules on community mapping and mobilisation. However, in order to achieve this, the value of such roles must be recognised, and CHWs must be actively supported through appropriate training and support from cadres such as environmental health practitioners.

The WBPHCOTs do not have any special role in the formal governance structures of community participation and accountability such as Facility Health Committees.

Selection of CHWs

Health care workers in WBPHCOTs have mostly been recruited from the pool of existing lay health workers in communities, who are then trained and entered into new organisational and contractual relationships with local health systems. The wide range of background (educational, experiential and training) and competencies among HCWs has resulted in a cadre of workers with varied skill levels, literacy levels and capacities.

The WBPHCOT policy states that CHWs are to be selected by a committee that includes health facility committee representatives, OTLs, operations managers, and where applicable, an NGO. Priority is given to current community-based workers and those living in the community being served. The policy further stipulates a minimum educational requirement of a school-leaving certificate

(grade 12). There is concern that this requirement will exclude many existing CHWs,[16] although the policy allows for recognition of prior learning for the trained cadres already in the system. Both men and women can be selected, but in practice, the vast majority are women.

A significant proportion of the original lay health workers remain outside WBPHCOT developments, and in places may out-number integrated CHWs. The perceived lesser status and at times lower remuneration of home-based carers not incorporated in the teams is a source of significant local tension, especially where these cadres do not meet the new educational requirements.[16]

Training of CHWs

One of the early steps taken in the implementation of the WBPHCOT strategy was to set up short-course training in phases, followed by the development of a national qualification through the QCTO, the regulatory body for work-based learning and apprenticeships.

The training is currently divided into three phases, consisting of 10-day short courses followed by practicums. Phase one (initiated in 2012) covers orientation on the structure and functioning of the health system and the WBPHCOT, plus orientation on HIV and AIDS, TB, and maternal, child and women's health and nutrition (MCWH&N). The second phase (initiated in 2014) expands to cover the topics of non-communicable diseases (NCDs) and social support. The third phase (initiated in 2015) is the one-year National Qualification Framework (NQF) Level 3 Health Promoter qualification. A system of career progression in community-based services is still to be established, although in some areas of the country, CHWs with school-leaving certificates are preferentially selected for further professional training.

In a number of provinces, decentralised training systems have been established at district and even sub-district level, through in-house regional training centres.[20] However, a national appraisal in 2015 found that "the organization and timing of available training is inadequate, particularly the need for CHWs to complete Phase 1 before they begin to go out into the community; the slow pace of progression through the phases; the absence, shortages or delays in materials, un-conducive learning spaces, and a lack of budgeting and generally poor planning".[16]

While central to successful performance, systems of induction and in-service and continuing education remain ad hoc and poorly connected to the basic training.

Support and supervision of WBPHCOTs

The quality of support and supervision is central to the functioning of WBPHCOTs. The policy envisages that each team will be supported by an enrolled nurse (EN) as OTL. Initially, professional nurses (PNs) were recruited as OTLs, and in many provinces OTLs are still a mix of ENs and PNs. While placing highly trained PNs into teams is hugely beneficial to the team's functioning,[20] this strategy has run into difficulty in the face of severe shortages.[16]

Insufficient supervision has been a persistent challenge for WBPHCOTs due to under-resourced, overstretched or absent team leaders. In theory, supervision is to occur in weekly meetings that provide support, feedback and coaching and through accompanied home visits conducted quarterly by the OTL. Outreach team leaders are meant to devote 70% of their time outside the facility, providing supervision support and evaluation for CHWs in the field and liaising with other service providers. In reality, where OTLs are seconded from health clinics, competing demands and lack of transport or resources limit their capacity to provide community-based supervision. Furthermore, this arrangement inevitably pulls CHWs into facility-based tasks. In some areas of the country, this has been compounded by initiatives to do away with lay counsellors, who support facility-based HIV testing, counselling and ART treatment preparation.

Links between WBPHCOTs and the formal health system

In terms of the policy, each WBPHCOT is linked to a PHC facility that provides support, receives referrals and ensures involvement in campaigns run from the facility. The OTL reports to the facility manager, and WBPHCOT data are submitted to the DHIS through the facility. Health facilities are also supposed to provide the WBPHCOT with space, supplies and equipment.

While this arrangement makes organisational sense, evaluations have concluded that PHC facility-based players often have fundamentally different needs and orientations to outreach teams, and see themselves in competition for scarce resources: "attaching WBPHCOTs to clinics adds additional management and service responsibilities onto already strained, overstretched, under-resourced and underperforming clinics and CHWs."[21] As a result, relationships between outreach teams and facility staff are often described as strained and unsupportive.[20] This is compounded by dual reporting lines in many parts of the country, where CHWs remain linked to and receive stipends through NGO intermediaries, while being accountable to PHC facility managers.

Approaches that enable greater autonomy of community-based services have been experimented with and proposed as alternatives.[21] These include separate physical location in health posts within communities, and specifically designated support teams at district and sub-district levels.

While the policy spells out roles for different spheres of government, overall programme governance at district, provincial and national levels remains poorly developed.[8] There is little active coordination and oversight from the national sphere, or mechanisms for stakeholder participation and voice that would enable the learning and feedback crucial to successful implementation.

Remuneration and financing of WBPHCOTs

In South Africa, CHWs originally emerged from a volunteer mobilisation of community-based care and support. As their role became formalised, with expectations of fixed and increasing hours of work, a system of stipend payments was established through NGO intermediaries. Remuneration levels were far below levels in formal public sector employment, and in many instances below the minimum wage. Remuneration levels and working hours continue to be highly variable across the country. CHWs can be expected to work anywhere between 20 and 40 hours a week, and earn in the range of R1 800–R3 500 per month. Payments continue to be provided through NGOs, or companies contracted as 'paymasters', or through special contracts falling outside the routine employment systems.

The WBPHCOT Policy Framework is silent on the issue of remuneration and working conditions of CHWs. Decent work for CHWs remains a major unaddressed issue and stumbling block to the implementation of the WBPHCOT strategy. Recent years have seen increasing instances of collective action by CHWs and attempts at establishing representative bodies, such as the National Union of Care Workers of South Africa in 2016.[22]

Most of the financing of WBPHCOTs is through conditional grant allocations for HIV and AIDS and TB, which reflects the original focus of the teams. Other funding sources include the Expanded Public Works Programme and grants allocated directly by provincial and local governments. Certain districts, notably the NHI pilot sites, have received support through ring-fenced grants for WBPHCOT implementation.

A study of expenditure on WBPHCOTs in two districts estimated that it amounted to only 4% of per capita PHC expenditure in the districts. If the CHWs were paid the national minimum wage (as proposed in the investment case[11]) this would increase expenditure on WBPHCOTs to less than 5% of PHC expenditure.[13] Although community-based services have been significantly under-resourced, total expenditure is not insignificant – estimated at R2 billion in 2017. An additional R4.6 billion would be required if the strategy was to be scaled up to include all wards, and with all CHWs paid the minimum monthly wage. This represents 3.5% of total public health expenditure.[11]

Monitoring and evaluation of WBPHCOT strategy

At the inception of the WBPHCOT strategy a routine monitoring system was designed as part of the existing DHIS. Core activity indicators were defined and a system of individual household records, paper-based tick lists, and forms for collated upward reporting were developed. This system provides monthly reporting on the number of households that receive CHW activities, disaggregated by type of activity, head counts and referrals. Data are entered at facility level together with other data elements from facility-based activities. A back-referral system was devised using paper referral forms, to be brought to a clinic and signed by attending clinicians when a referral is completed. Apart from back-referrals, the paper-based monitoring system is relatively well adhered to, and effort is put into ensuring that information fed into the system is quality controlled. However, the information gathering, verification, collation and capture processes are time consuming and prone to error, loss and delay. The information is not easy to access or use and storage space for the paper-based system is a problem.[16]

An initial phase of household registration collects information on members of each household. While these data are presently not entered into the DHIS and collated, this system could play a major role in future health patient registration systems for NHI. An mHealth system for WBPHCOT has been designed and successfully piloted in parts of the country, and could significantly enable future monitoring and evaluation systems.[21, 23]

The performance of the PHC system has improved over the last decade, as measured through routine indicators such as antenatal and immunisation coverage and TB cure rates. However, the role played by WBPHCOTs in these improvements is uncertain. Localised studies have shown that outreach teams can impact on health outcomes, especially for MCWH&N.[24–26] Studies have also demonstrated the impact of enhanced team supervision and continuous quality improvement on CHW visits during pregnancy and the postnatal period, and on exclusive breastfeeding rates.[27] Studies have also documented the impact of disease-specific community cadres on HIV testing and disclosure, and ART uptake and adherence in adults and children.[28,29]

Many of these studies have been conducted under controlled experimental conditions and do not necessarily represent impacts in the routine institutional environment. An analysis drawing on routine data from North West Province, an early adopter of the WBPHCOT strategy, found that facilities with outreach teams had significantly greater improvements in family planning and measles coverage, and significantly reduced incidence of severe diarrhoea.[30] In Gauteng, hypertensive patients receiving home delivery of medication and follow-up by WBPHCOTs had higher levels of blood pressure control than those attending only clinics.[31]

An extensive modelling exercise was done as part of the investment case for WBPHCOT. This drew on evidence from South Africa and elsewhere regarding effective CHW interventions for MCWH&N, HIV/TB and NCDs, and estimated that a properly resourced, scaled-up WBPHCOT programme could save 200 000 lives and more than five million productive disability-adjusted life years over 10 years. The multiplier effects of saved lives and employment creation would inject billions of Rands of additional revenue into the economy.[11]

Conclusions and recommendations

Since its inception, the WBPHCOT strategy has been favourably received by health system actors and it is being implemented in many parts of the country. The strategy is now finally anchored in formal policy and there is increasing consensus on the core elements of the model and scopes of work. As an integral part of the proposed NHI PHC platform, WBPHCOTs could play a unique role in supporting the implementation of new NHI systems (such as health patient registration systems), widening access to health care, and addressing the social determinants of health.

However, implementation has been slow and uneven, and coverage is still relatively low. Lack of clear national leadership and political and budgetary commitment, poor governance mechanisms and employment status, low remuneration of CHWs, too few OTLs, and poorly developed support systems (including links to health facilities and the role of facilities) are important constraints in the scale up and performance of WBPHCOTs. Bold national leadership and willingness to commit resources in the face of fiscal austerity will be required to overcome these constraints. Until then, the WBPHCOT programme will be caught in a catch-22: unless it is properly resourced impacts will be hard to achieve, while advocating for more resources will require that the programme prove its value to sceptical decision-makers.

Key issues to be addressed in the future are as follows:

- Addressing the employment status, remuneration and working conditions, including career paths, of CHWs.
- Defining relationships between WBPHCOTs and governance structures at community level, including the relationship with health committees.
- Promoting the role of CHWs in social mobilisation/animation of their communities.

- Developing the relationship between CHWs and environmental health practitioners in undertaking/catalysing local environmental activities.
- Defining optimal ratios of CHWs to households.
- Defining realistic scopes of work for WBPHCOTs and avoiding excessive expectations of CHWs.
- Developing a comprehensive, supportive supervision framework for WBPHCOTs that includes regular in-service training and development.
- Creating specialised community-based teams and functions to support WBPHCOTs, such as community-based palliative care, rehabilitation, mental health care, etc.
- Developing methodologies to assess impact, including using the routine information system and funding operational and evaluative research on the WBPHCOTs.
- Defining the role of WBPHCOTs in the future NHI.
- Instituting systems of programme governance that enable feedback and learning (between implementers across the system, horizontally and vertically), and that feed into the policy process nationally.
- Developing frameworks, guidance and induction for sub-district and district level managers in priority setting, planning, monitoring and supporting WBPHCOTs.

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Factors influencing the motivation of community health workers in Vhembe district, Limpopo

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Introduction

Community health workers (CHWs) form part of South Africa's ward-based-outreach team and constitute an integral part of primary health care (PHC) delivery. A study was done in Vhembe district, Limpopo, to determine factors influencing CHW motivation. Participants were 14 females aged 39–52 years, with educational levels ranging from no formal education to Grade 12, and varying work experience ranging from 5 to 12 years. Home-based workers were excluded from the study because they fall under the auspices of the Department of Social Development (DSD). All the necessary ethical and research standards were adhered to.

Key findings

The CHWs interviewed reported being involved in the following activities: supporting people living with HIV and AIDS; assisting with management of tuberculosis; giving health-promotion talks; conducting home visits for chronic patients; tracing medication defaulters and encouraging adherence to medication; referring clients to the clinics where CHWs are stationed; and assisting the parents of the malnourished children.

Community health workers expressed an interest in delivering more clinical services in order to address patients' needs in their communities. However, they reported that lack of clarity from the health system regarding their scope of practice was the biggest deterrent to their motivation. In addition, they felt that nurses perceived them as a threat. They cited examples as evidence of this, namely nurses refusing to allow them to screen for blood pressure, even though CHWs are trained to fulfil this function, and nurses objecting to CHWs wearing white uniforms. In expressing this frustration, one participant said the following:

> *We are trained to assist the nurses but they do not accept us, it's like they have jealousy. I say this because we are trained on how to take BP, prepare bed for the sick and we have chosen white uniform. We are not allowed to do all these things because they think we are trying to be like them. (Participant F)*

Community health workers also cited irregular remuneration and work hours and lack of office space as deterrents to their performance.

> *We sometimes spend two or three month without being paid. We do not get paid every month. We work eight hours a day Monday to Friday but since we are accessible to the community members, we even work after hours depending on the seriousness of the illness. During rainy seasons it's a problem because we lack umbrellas and raincoats. We meet under a tree, we do not have a place and when it rains we have to ask [to use] someone's house. (Participant B)*

Participants expressed distress at the lack of basic equipment and consumables, which resulted in increased risk of the spread of infection and less than optimal care and management of patients.

> *We should receive enough money, be given resources like Pampers [adult diapers] because other patients are unable to help themselves. We do not have resources and it's been a year now. We sometimes request patients to buy gloves and pampers. Pampers for the older people are expensive and as a result the family must use clothes to replace pampers. When we lack gloves, we make use of plastics to cover our hands and assist our patients. (Participant E)*

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Patients live in poor socio-economic conditions, often with no money or food, and there is a cultural expectation that CHWs should 'bring something' when they do house visits, although the CHWs themselves experience financial difficulties.

> *The problem is when we visit them in families whereby they say we visit empty handed. The problems in the community are poverty, sickness and traditionally a sick cannot be visited without something. (Participant C)*

> *When doing door to door, we get patients and sometimes I even take money from my own pocket and give a patient to go to the clinic and consult. We are able to visit patients at homes and detect issues that require urgent attention. We even take treatment for the frail. (Participant E)*

The toll of working under stressful conditions due to limited resources, poor supervision and the expectations of the community, has left CHWs feeling mentally and physically exhausted.

> *Some situations of patients are stressful, some patients stay alone, I am forced to clean, cook for the patient and that is a lot of work. To clean and cook is not my work. We work long hours from 8 o'clock until 4:30. (Participant C)*

> *This work is very difficult, other patients, e.g. the elderly, when found bed bound, is a patient who is terminally ill. We clean such a person and care for them. (Participant D)*

Certain elements featured prominently in the interviews, namely the possibility of permanent employment as CHWs, the responsibility they feel towards their patients, and the respect afforded to them by the communities in which they work.

> *We have hope that one day they will make us permanent and we are working because there is nothing we can do. We continue to provide the community, patients and the families with our services because we cannot leave our patients. (Participant J)*

> *Some people who are sick are the only bread winners and if we can stop they might die. (Participant H)*

> *The community accepts us, the community structures talk about our services at funerals and this makes the community to respect us and appreciate our availability in the village. (Participant D)*

Lessons learned

- All members of the healthcare team need to be educated on their specific scope of practice and need to be made aware of working in a spirit of mutual co-operation rather than competition.
- Scopes of practice must be clearly defined, with roles and responsibilities clearly articulated.
- Community health workers need to be given the necessary supplies and resources required for their work.
- Consideration should be given to providing psychological support for CHWs who work under extremely stressful conditions.
- The recognition and respect given to CHWs by their communities is an important motivating factor in their work; this respect and recognition should also be forthcoming from the healthcare system.

Conclusion

This study found that CHWs take an active role in the delivery of community-based PHC interventions linked to their local health facilities, and that their motivation is affected by a mix of monetary and non-monetary incentives. It is critical to recognise CHWs as an essential cadre for improving healthcare delivery at community level. Community health workers should be offered adequate remuneration for their work, as well as advanced training and a clear career development pathway to improve the quality of their services and their motivation.

Review

8 Transgender women outreach workers and their role in South Africa's HIV response

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Transgender women (TGW) are women whose gender identity differs from the sex assigned to them at birth. South Africa's legal framework protects the rights of TGW and their right to health care. Improving our nation's health requires that health services be accessible and appropriate for all. However, TGW are often reluctant to access health care due to the lack of services that affirm their gender and meet their needs in a holistic manner. Many who do access these services experience stigma and discrimination. Innovation and efficient and effective utilisation of human resources are critical for health-system strengthening, and peer-driven delivery approaches are considered best practice to access, foster and provide responsive, quality health services to marginalised groups, including TGW.

This chapter provides a synopsis of the global and local context for TGW from an HIV perspective. The role of TGW outreach workers in South Africa's HIV response is described. Three case studies are presented to provide insight into how TGW outreach workers support their clients to cope with the key issues they face, namely stigma and discrimination; the consequences of non-conforming gender expression; scarce employment opportunities; the inadequacies of bio-medically focused HIV services and limited resource allocation for TGW programming. The case studies highlight how outreach can comprise mentorship between older and younger TGW and support community building among the women. Important challenges facing outreach services for TGW in South Africa include the uncertain funding landscape; limited interventions for socio-economic empowerment and harm reduction around substance use; and lack of access to hormone therapy and gender-affirming surgery. Recommendations are made for increased support of outreach services and initiatives that take a multi-sectoral and comprehensive approach to TGW.

Peer-driven delivery approaches are considered best practice to access, foster and provide responsive, quality health services to marginalised groups, including transgender women.

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Introduction

'Transgender' is an umbrella term that refers to people whose gender identity differs from their assigned sex.[1] Transgender women (TGW) (male to female) were assigned male sex at birth but identify socially as women. They include people along the continuum of hormone therapy and gender-affirming surgery.[a,1]

The National Department of Health (NDoH) High Transmission Area (HTA) Guidelines (2014) define outreach workers, or peer educators, as people with similar socio-demographic characteristics, experiences or beliefs as the intended service beneficiaries.[2] They may also have first-hand understanding of the issues and HIV risk factors in the community that could influence health outcomes.[3] In HIV programmes, this involves selecting, training and supporting outreach workers to become experts in HIV and related topics tailored to their peers. Outreach workers should be supported to use a life skills approach to stimulate dialogue around HIV and related topics and thus improve knowledge. They also need to share skills that support behaviour changes to reduce the risk of HIV infection and/or the consequences thereof. Where possible, they provide HIV prevention commodities and HIV testing services (HTS), and they refer (and ideally accompany) clients to services and support retention in treatment.[2] Transgender outreach is a new, small and unique element in South Africa's health system and HIV response.

While the context of transgender health leaves much to be desired, this chapter focuses on HIV programming since HIV has received the most focused funding to date, albeit insufficient.[4] Furthermore, HIV is a major part of the health burden for TGW.[5,6] The literature demonstrates that TGW have a higher likelihood of living with HIV than cisgender women and yet they are unlikely to be retained in care without appropriate action.[6] The evidence shows that harsh socio-economic determinants facing TGW contribute to high-risk behaviours for HIV acquisition and transmission.[7–9] Therefore, one cannot focus on the broader context of TGW health without addressing HIV. This chapter outlines the global and South African context of HIV for TGW. The aim of the three illustrative case studies is to identify key issues affecting TGW and increase understanding of the role, process and influence that TGW outreach workers have within South Africa's HIV response.

Global context

There are few transgender population size estimates, partly due to the varying definitions used.[4,10] In 2016, Winter and colleagues used estimates from four countries where population-level proportions were available and extrapolated a worldwide estimate of 25 million transgender persons.[11,b] A systematic review done in 2012 estimated that one in five TGW are living with HIV.[12] However, data on TGW in Africa are limited.[4]

There are numerous underlying drivers of HIV among TGW. The UNAIDS Gap Report describes these factors and how they may manifest through gender identity and/or expression.[13] Social rejection by family, friends and society, together with harassment, stigma and violence may lead to anxiety, depression and suicidal thoughts, affecting self-perception and self-worth and limiting engagement in society. These factors may act as deterrents to access, uptake and retention in HIV and other services. Lack of engagement with the healthcare system potentially exacerbates the HIV epidemic among TGW and broader society.[13]

South African epidemiology, context and policy

Participants in a South African stakeholder consensus workshop estimated there to be between 17 000 and 22 000 TGW in South Africa.[14] However, there are insufficient data to measure South Africa's progress towards achieving the UNAIDS 90-90-90 HIV treatment targets for TGW.[15] While the findings of the few available studies are not generalisable, they suggest cause for concern. For example, more than half (57%) of gender non-conforming participants (n = 36) recruited through a survey of 316 men who have sex with men (MSM) in Cape Town screened HIV-positive, which was significantly more than their male-identifying counterparts (31%).[16] The study found that one in four TGW had never tested for HIV, despite only 28% reporting consistent condom use.[16] A qualitative study examining the access of TGW to sexual health services in six provinces revealed that alcohol and other drug use, considered a pathway to HIV risk-taking behaviours, was prevalent among several participants.[17] This is consistent with another study that included TGW sex workers in four cities, where 66% reported being drunk during their last paid sexual encounter.[18]

In South Africa, TGW face pervasive stigma and discrimination.[19] Gendered cultural practices[20] and social vulnerability put them at risk for violence. For example, in a national five-year monitoring project 8% of participants reporting prejudice-motivated attacks were TGW.[21]

In South Africa, the Alteration of Sex Description and Sex Status Act (49 of 2003) makes provision for transgender people to align their bodies with their gender identity without surgery.[22] Legislation and policy also support appropriate health responses for TGW; this includes the Constitution,[23] the South African National Strategic Plan on HIV, TB and STIs (2017–2022),[24] and the South African National Lesbian, Gay, Bisexual, Transgender and Intersex (LGBTI) HIV Plan (2017–2022).[25] However, there are currently no national transgender healthcare guidelines.

Programmes and funding

Due to limited domestic information, local TGW programming relies on global research[2] and will be informed by the ongoing *Botshelo Ba Trans study*[c] and future research.

The overall context of transgender health in South Africa is inadequate. The establishment of Gender DynamiX in 2005, the first transgender-focused organisation, saw unprecedented mobilisation around trans health. Advocacy efforts have yielded notable results, including the Global Fund recognition of TGW as a distinct funding category, and the debut of a biennial Trans Health Advocacy and Research Conference in 2011. However, more work is required for TGW to realise their sexual and reproductive health and rights.

a This definition does not capture the complexity of being confined to a 'male body' while identifying with a feminine gender social position. Transgendered bodies can be at any stage of medical transition and are not defined in terms of a male-female binary.[2]

b Transgender people includes transgender women, transgender men and people who are gender non-conforming.

c This bio-behavioural survey will provide information on HIV risk factors, progress toward UNAIDS 90-90-90 goals and population size estimates for TGW in Cape Town, Johannesburg and East London.

Sexual reaffirming surgeries are currently offered through two public hospitals,[d] with an average waiting time of over 20 years.[26] Medically prescribed hormone therapy[e] takes place at the primary health care level subject to a psychologist's recommendation. As a result of barriers to access, many TGW self-medicate with oestrogen-containing contraceptives.[17,27]

Right to Care (a Global Fund principal recipient) supports most of the transgender-led HIV outreach service providers (Global Fund sub-recipients). Between April 2017 and March 2018, 783 TGW were reached and 595 were tested for HIV. Eight per cent of the women (47/595) tested positive for HIV; of these, 85% were referred for HIV services, but only 4% were linked successfully. Outreach service providers included Anova Health Institute, Enhancing Care Foundation, Free State Rainbow Seeds, the LGBTI Community Centre, Lifeline Northern Cape, and the Social, Health and Empowerment Feminist Collective of TGW of Africa (S.H.E.), operating services in selected areas in all provinces except Limpopo and the North West.[f]

Transgender outreach workers are also employed by organisations that provide HIV prevention and related services to sex workers in metropolitan areas (e.g. the Sex Workers Education and Advocacy Taskforce (SWEAT), TB HIV Care, and Wits Reproductive Health and HIV Institute). However, there are few formalised, safe spaces to which outreach workers can refer TGW sex workers. Examples in Cape Town include the 'SistaazHood',[28] and until 2017, the 'Glitz and Glamour' support club for TGW sex workers living with HIV.[g]

Anova Health Institute offers gender-affirming services at its key populations clinics in Cape Town and Johannesburg and has trained more than 3 500 healthcare workers on trans issues. Transgender and Intersex Africa, Gender DynamiX and Access Chapter 2 focus on rights, psychosocial services and gender-affirmation advocacy for TGW, but not outreach services.[29] Themba Bonke and Trans Power Care Centre (described later) are TGW-led organisations that provide HIV outreach.

It is encouraging that the South African country concept note and funding request submitted to the Global Fund for the funding cycle 2019–2022 includes transgender programming.[h] Additionally, the United States Agency for International Development (USAID) will be funding a transgender programme through the United States President's Emergency Plan for AIDS Relief (PEPFAR) for the programme cycle 2018–2023.[i] Both of these programmes are likely to include peer-led interventions.

Methods

Due to limited published literature, a descriptive case study approach was employed. Grey literature was used and case studies were analysed to gain insight into and reflect on lessons learned from the field in this new area of service delivery. The case studies were used to provide detailed examples and to highlight the contextual and other factors influencing peer outreach work among TGW. Representatives from six non-governmental organisations (NGOs) working with TGW in different contexts were approached by the authors of the study in their capacity as researchers and programme implementers working with TGW in South Africa. Participants were contacted in person or telephonically, and given an outline of the aim of the chapter, the risks of participation, and how information would be used. Consenting TGW outreach workers completed a template outlining their context, TGW work force and service provision. Participants were not remunerated and gave permission for their names, roles and responsibilities to be used. Data were entered into a password-protected excel spreadsheet and analysed using directed content analysis.[30] Direct quotes were used where appropriate, and comments from the organisations and consenting TGW were integrated.

Findings

Four of the six organisations approached provided feedback, namely Anova Health Institute, S.H.E., Trans Power Care Centre and Themba Bonke. They employ an average of four (range 1–8) TGW outreach workers who provide HIV services.

The following case studies demonstrate how credibility and shared experience establish trust and increase access to and use of HIV services in the TGW community. The first case study reveals the cultural pressures, stigma and discrimination faced by TGW, especially in rural South Africa. The second case study involves a peer outreach worker in the Western Cape who describes her experience working with TGW in a peri-urban setting. It highlights the pervasiveness of victimisation and violence affecting TGW and the unique role that TGW outreach workers can play in supporting TGW survivors of violence. The third case study highlights how leadership in the TGW community can be used to counter experiences of stigma and discrimination.

d Groote Schuur Hospital (Cape Town) and Steve Biko Academic Hospital (Pretoria) provide about four gender-affirming surgeries annually.

e Oestrogen for hormone therapy is used off label as it is listed on the Essential Medicine's List primarily for the management of menopause.

f Personal communication: B. Mokube, M&E Manager: Global Fund, Right to Care, 29 May 2018.

g Personal communication: J. Hugo, Senior Clinical Advisor, Health4Men, Anova Health Institute, 27 January 2017.

h Personal communication: G. Oberth, Lead Consultant, South African Global Fund concept note development team, 18 August 2018.

i Transgender programming is included in the "Advancing the South African HIV Response for Key Populations" request for applications (RFA 72067418RFA00003) issued in December 2017.

Case study 1: Outreach to TGW in rural Eastern Cape

Kwelera is a rural area outside East London (Eastern Cape). It has poor infrastructure and most people live in huts, without adequate lighting, ventilation and electricity. Kwelera is part of the Xhosa Kingdom where a strict gender binary is assigned according to birth sex and maintained through cultural rituals. Ulwaluko (cultural circumcision) is a cultural ritual for people assigned male at birth, regardless of sexual orientation and/or gender identity. Transgender women are often coerced into this ritual, which is linked to the attainment of a masculine identity – countering a TGW's feminine identity.

Mama Afrika was 17 years old when her family starting pressurising her to undergo cultural circumcision. She explained: "Most TGW that I work with have migrated to East London because of the harsh conditions in these areas. In the rural areas, they cannot be themselves. Most don't have jobs or education opportunities". According to Mama Africa, many socially rejected TGW end up living on the street and frequently become involved in the sex industry.

Considering that HIV risk among TGW is embedded in multiple co-occurring social and public health problems, Ayanda Zaza Kwinana, a peer educator working at S.H.E. in the Eastern Cape, observed: "I think we should not only provide HIV services, we should provide other services that improve the economic aspect of TGW … many TGW did not attend school and so the economic situation is bad." Ayanda suggested that peer educator training should be broader and take into account the different facets of TGW's lives, for example, the high prevalence of sex work, drug use, etc.: "Some TGW sex workers only trust other TGW to do HIV testing for them."

Like Ayanda, Mama Afrika is now an outreach worker for S.H.E. In this capacity, she helps TGW cope with family and community pressures. Mama Afrika walks through her own and neighbouring villages on a daily basis offering HTS, and screening for STIs and TB, and has accompanied 40 TGW to clinic visits. She faces a backlash from the community, which accuses her of promoting homosexuality. She often experiences verbal harassment aimed at her gender expression and has difficulty dressing and working as a woman as she fears for her safety. Ayanda shares similar experiences of negotiating cultural pressure and her gender expression: "We sometimes face triple stigma: trans, HIV-positive and sex worker. I am a sex worker and I am also a peer educator. I reach out to my clients wherever they work."

The TGW community trusts Mama Afrika. This is reflected in their demand for her health and support services. She uses her lived experience to enhance health worker sensitisation training. According to Mama Afrika: "Referrals to health facilities are difficult for TGW because they do not trust nurses to uphold confidence on the issues that they experience. It takes time to win the confidence of TGW to ensure they test for HIV."

Ayanda also refers TGW to health facilities. Busi is one of Ayanda's clients and friends. She is a TGW living with HIV and uses substances. She lives in a village in the rural Eastern Cape, and works as a sex worker in East London. Busi reached out to Ayanda in her role as an outreach worker to open a case against a client who misread her as a cisgender woman and assaulted her. This was not easy as police officers felt that the client was within his rights to act violently because Busi misrepresented herself. Furthermore, the police felt that because sex work is criminalised, not much could be done for her. Ayanda supported Busi through this ordeal by paying attention to her emotional trauma, ensuring referral to sensitised health services, including access to HTS, and supporting her to lay a charge. Ayanda also referred Busi to an organisation to manage her substance use, although with little success. Busi describes herself as being psychologically able to deal with her substance use. She continues to receive safer sex commodities from Ayanda.

Case study 2: Doing peer outreach work in violent times

Gita November is a 34-year-old TGW living in Cape Town. She established the organisation Themba Bonke, which consists of eight TGW outreach workers. They provide HIV risk-reduction services, facilitate support groups and mentor younger TGW in the Western Cape. According to Gita: "[TGW] are stigmatised and labelled as the carriers of HIV. Because of their gender identity, many of them were kicked out of their family homes because of the perceived shame they bring to their families."

Many TGW use (illicit) substances to cope with the daily stressors of having to navigate the threat of victimisation and the violence they frequently face. According to Gita: "There is very little knowledge about how to manage and treat substance use amongst TGW … it is very important to get training on this as it is making TGW including TGW sex workers vulnerable to HIV infection. Currently we have no partners to refer such cases to."

Outreach workers are often the only source of psychosocial support for TGW survivors of violence. Indeed, for Gita being a TGW and being exposed to the HIV virus herself she can directly relate to the lived experience of her fellow sisters and has a deep understanding of the daily struggles they face.

Themba Bonke offers mentorships in the Atlantis area where older TGW draw from their experiences to mentor and support younger TGW, reducing their vulnerability to HIV.

In her words, Gita advocates: "[We need] to have TGW navigators assist TGW to local [trans-friendly] clinics. Also trans navigators who are trained human rights defenders to assist TGW to the police stations when opening a case. In some of the areas we conduct our outreach it becomes dangerous as we do outreach on foot and many TGW can only be reached at night. Because of no funding we cannot appoint a contract driver."

Case study 3: Using leadership to create bonding, social cohesion and a TGW community in Johannesburg

Zsa-Zsa Fisher is a TGW living in Johannesburg. Asked about the social context in her city, Zsa-Zsa responded: "TGW are stigmatised more than the rest of the LGBTI community. TGW are made to feel small or inferior and most times are disowned by family members, which contributes to the inferiority."

When Zsa-Zsa worked as a TGW outreach team leader at a large NGO she noted the lack of knowledge and understanding of TGW. She recalls providing Bianca, an 18-year-old TGW from Soweto, a South African township in Gauteng, with HTS. Bianca was not certain when she was infected with HIV and by whom as she had many sex partners. According to Zsa-Zsa, two weeks after having received a HIV-positive test result, Bianca was ready to receive additional information. She took time to process her result. During this time, Bianca did a second HIV test with another organisation, which confirmed her status. A month after starting ART, Bianca stopped treatment because it made her sick. After Zsa-Zsa allayed her fears, she supported her to visit and restart treatment at a sensitised clinic. Bianca remains on treatment and encourages other young TGW to test for HIV.

Zsa-Zsa became involved in the LGBTI Safety Council for Gauteng through her earlier work with different NGOs and governmental departments. She identified a need to expand on this and formed the Trans Power Care Centre. Her goal "is to make sure that the TGW community within Johannesburg is acknowledged and given as many opportunities as any other persons. This being done in a non-prejudiced manner."

This goal drives Zsa-Zsa because in her community, "many TGW are unemployed and are severely stigmatised within their communities and within the health sector. There is a lack of skills distribution and education for TGW."

Unlike other TGW, Zsa-Zsa combines the qualities of activism and glamour. As Miss Gay South Africa 2017/18, she has a following of TGW who admire her leadership in the glamorised industry of gay beauty pageants, where she advocates for TGW rights.

Discussion

The case studies describe a persistence of common issues affecting TGW that TGW outreach workers support their clients to overcome. These issues include: stigma and discrimination; the consequences of non-conforming gender expression; scarce employment opportunities; the inadequacies of biomedically-focused HIV services, and limited resource allocation for TGW programming.

First, stigma and discrimination make it difficult for TGW to trust other people. Frequently there are also community perceptions of TGW as carriers of HIV. Stigmatising attitudes towards TGW are often also held by healthcare workers. Health facilities and providers that lack the knowledge, experience or desire to care for the unique clinical and social needs of TGW often contribute to stigmatising TGW. The result is differential access to healthcare services, which creates a barrier to the achievement of health. Transgender outreach workers bridge these gaps and foster social connections within the transgender, healthcare and broader communities.

Next, the gender expression of TGW challenges cultural expectations resulting in a disruption of home and family, with cascading effects impacting the mental health, as well as educational and employment opportunities of TGW. In fact, non-adherence to cultural expectations associated with sex at birth is often viewed as bringing shame to their households. For many TGW the threat of discrimination, prejudice, ostracisation and violence exists for people opting out of *ulwaluko*.[31]

Thirdly, the lack of education and employment opportunities for TGW leads to some TGW entering the sex industry, some to survive and others to be affirmed as women.[32] In South Africa, all aspects of sex work are criminalised. This increases vulnerability to violence and illness and reduces access to legal recourse and health services for sex workers.[33] The case studies highlight the need for skills building and education for TGW to increase their economic opportunities. The case studies also reflect how many TGW are survivors of verbal, physical and sexual violence. Outreach workers have to overcome the discrimination they experience and limited acknowledgement of the issues affecting TGW among health, social service and law enforcement agencies to support survivors of these violations. Services that support TGW to reduce the potential harms of substance use and that enable access to hormone therapy and gender affirming surgery are also limited. The complex social and health issues reflected in the case studies highlights the limitations of viewing TGW through a narrow HIV, biomedical or health lens. Programmes in other countries have demonstrated the effectiveness of combining HIV programming with gender-affirming therapies to retain TGW in HIV care.[19]

A final common theme is the limited allocation of resources to programmes intending to improve the health and wellbeing of TGW holistically. In going beyond HIV, the NDoH has made provision for TGW to access reproductive health services that meet their needs.[34] These needs include specialised clinics and increased access to hormone therapy and surgery. Furthermore, the Adolescent Sexual and Reproductive Health and Rights Framework commits to addressing the needs of underserved groups, including TGW.[35] The health of TGW would improve holistically if these policies were implemented effectively within the public healthcare system. Donor funding for TGW will come to an end, and government financing of TGW is essential for sustainability as well as to increase NDoH support for TGW beyond the HIV prevention sub-directorate.

Limitations

This chapter relied largely on grey literature and feedback from selected organisations. This may have limited the identification and presentation of other challenges and approaches used in TGW outreach programming, thus reducing the scope of experience and the ability to draw lessons.

Conclusions and recommendations

TGW outreach workers described their lives and those of their beneficiaries beyond HIV as they navigate health, socio-economic and structural issues on a daily basis. In the current South African landscape donor funding for TGW is focused on HIV, which has the (unintended) potential to enable a discourse where TGW are blamed for 'spreading HIV'.

Peer outreach workers play a vital role in engaging with the TGW community and helping TGW to navigate clinical and social services. TGW outreach workers are reaching their peers and providing essential services in an array of contexts. Champions of TGW have emerged and established TGW-led organisations that create spaces for TGW to be visible and to network.

In this context and in light of the issues that the case studies identify, we recommend:

- HIV programmes for TGW should have consistent and meaningful community engagement and include healthcare worker sensitisation as recommended in normative guidance.[2]
- Findings from the ongoing HIV bio-behavioural survey among TGW (the Botshelo Ba Trans study) should be used to inform HIV-related decision-making. The TGW-led nature of this study should be considered as best practice for future TGW research.
- NDoH should work towards enabling access to hormone therapy at the primary health care level, removing requirements for a psychologist's recommendation.
- The NDoH should allocate funding for and increase the number of centres specialising in TGW health. This will also lead to an increase in the number of TGW benefitting from gender affirming surgery.
- In addition to existing services, government, funders and development partners should support the capacitation of TGW outreach workers to counsel their peers around hormone therapy (and the risks of self-medication); gender-affirming surgery; violence mitigation strategies and harm reduction.
- HIV programmes for TGW should work alongside programmes such as the Love not Hate Campaign to document crimes against TGW on the basis of their gender identity. Findings should be disseminated to the National Departments of Health, Social Development, Justice and Constitutional Development and Police to advocate for safer environments for TGW to realise their health.
- Programmes for TGW should adopt evidence-based interventions that outreach workers can deliver to empower TGW, and work towards improved socio-economic conditions.

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9 Development of a national strategic framework for a high-quality health system in South Africa

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The Constitution of South Africa enshrines the right to quality health care and provides the basis for numerous policies and legislation aimed at improving access, eliminating inequalities and increasing health system safety. To date, quality initiatives have been unco-ordinated and fragmented across the public and private health sectors. In addition, lack of a sound action plan for implementation of quality-improvement strategies has led to limited impact on health services. There is need for a strategic framework to address policy issues, organise service delivery, and monitor the impact of initiatives seeking to improve quality outcomes.

This chapter outlines the development of a multilevel national strategic framework to institutionalise and guide planning, delivery and measurement of health systems quality in South Africa. A situational analysis was done of existing policies and implementation initiatives and lessons were learned from international case studies, providing a sound evidence base for implementation of the framework.

Lack of a sound action plan for implementation of quality-improvement strategies has led to limited impact on health services.

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Introduction

Despite a clear agenda for quality health care and significant annual expenditure, health system shortcomings continue to endanger the health and lives of South African citizens, resulting in a loss of confidence among users.[1] Discontent with service quality has escalated medico-legal claims, burdening both health services and healthcare professionals.[2] In addition, poor quality is associated with patient safety hazards, duplication of efforts, variable standards of care, unsafe work areas, and labour grievances.[3] Numerous quality challenges, including under- and over-utilisation of services, limited resources and inadequate referral procedures, are exacerbated by the high burden of disease and significant inequality between the public and private health sectors.[3]

Evidence suggests that promoting healthcare quality improves health service access and health outcomes, and increases life expectancy.[4,5] Indeed, the right to quality health care is enshrined in the South African Constitution, which provides the basis for multiple policies and legislation promoting sustained quality improvement. However, lack of a clear overarching quality strategy to drive health reform has limited translation of these policies into practice. To date, quality initiatives have been uncoordinated and fragmented, within the public and private health sectors

Strategic frameworks promote a common understanding of the concept of quality[6] in health system improvement (Box 1) and allow for consensus on national quality-of-care goals.[6] The core concepts are based on Joseph Juran's triad of quality planning, quality control and quality improvement. Quality planning includes policy decisions, with clear goals, responsibilities, resourcing and checks to ensure accountability. Quality control translates these plans into guidelines, measures, systems for professional oversight, and tools such as standards and checklists. Finally quality improvement brings about the changes in individual practises, organisations and systems to achieve the quality goals and better health outcomes. Quality improvement is therefore a change process, which builds on a foundation of quality planning and quality control.[7]

Quality frameworks provide guidance in addressing policy issues towards implementation of national healthcare imperatives, including universal access.[8] Importantly, such frameworks allow for prioritisation of the full care pathway, namely promotion, prevention, treatment and rehabilitation, in order to improve health outcomes across a patient's lifespan. Frameworks also provide a useful tool to measure and monitor the impact and outcome of quality-improvement strategies.[9] In accordance with existing conceptual frameworks, healthcare quality is understood here in terms of structure, processes and health outcomes,[10] and in terms of different dimensions such as safety, timeliness, equity, efficiency, effectiveness, access and patient-centredness.[5]

In South Africa, establishment of a strategic framework is essential for institutionalisation of quality care at frontline management and national levels, and to synthesise interventions undertaken to date.[11] Ideally, such a framework should be people-centred, adaptive to population-specific health needs, and be responsive to patient needs, providing comprehensive care in a safe and timely manner as well as accountability in all health system actions. Furthermore, frameworks should be informed by existing international models, guided by local improvement experience, and characterised by ongoing learning. Lastly, the framework process should be collaborative across sectors in order to address the social determinants of health.[a] Multilevel frameworks are therefore needed to outline strategic and actionable approaches to improve quality of care towards universal health access.[8]

This chapter outlines the processes that informed the development of a multilevel national strategic framework to institutionalise and guide planning, delivery and measurement of health system quality. A situational analysis of existing government policies, strategic documents and implementation initiatives (locally and abroad) in order to leverage best practice, and expert knowledge and key stakeholder engagement were conducted. The strengths and limitations of the proposed framework are discussed, and a roadmap for implementation is provided.

Box 1: Definition of key concepts applicable to quality assurance and quality improvement in health care and health systems, South Africa, 2018

Quality: "the degree to which health services for individuals and populations increase the likelihood of desired health outcomes, which are consistent with current professional knowledge."[5]

Quality of care: "the safe, effective, patient-centred, timely, efficient and equitable provision of healthcare services to achieve desired health outcomes. It takes into account patient safety, meaning the prevention of harm to patients and it employs clinical governance processes to assure quality."[2]

High-quality care: "care that is safe, effective, people-centred, timely, efficient, equitable and integrated."[a,12]

Core dimensions of healthcare quality:[6,12]

- Safe: care that avoids harm to people for whom the care is intended.
- Timely: care that reduces waiting times and sometimes harmful delays for both those who receive and those who give care.
- Equitable: care that does not vary in quality on the basis of age, sex, gender, race, ethnicity, geographical location, religion, socio-economic status, linguistic or political affiliation.
- Efficient: care that maximises the benefit of available resources and avoids waste.
- Effective: evidence-based healthcare services resulting in improved outcomes for those who need them.
- Accessible: health care that is timely, geographically reasonable, and provided in a setting where skills and resources are appropriate to medical need.
- People-centred: care that responds to individual preferences, needs and values.
- Integrated: care that is coordinated across levels and providers and makes available the full range of health services throughout the life course.

Quality planning (QP): a structured process for developing services that ensure population needs are met by the final outcome.[13]

Quality assurance (QA): the oversight process, which includes adherence to standards and guidelines,[13,14] or the arrangements and activities meant to safeguard, maintain, and promote quality of care.[12]

Quality improvement (QI): a properly rationalised sequence of steps implementing evidence-based care,[14] to make the changes that will lead to better patient outcomes (health), better system performance (care), and better professional development (learning).[10]

a Personal Communication: Prof Olive Shisana, National Lancet Commission Meeting, 11 December 2017.

A high-quality health system achieves equitable health outcomes and a long and healthy life for all. Such a health system is:

- Designed to prioritise health promotion and protection, and the prevention, treatment and rehabilitation of conditions that constitute South Africa's disease burden.
- Accountable through effective leadership and governance.
- People-centred in its approach to realising good health by facilitating patient, provider and community participation in health attainment.
- Responsive to patient needs by providing comprehensive care in a timely and safe manner resulting in quality outcomes.
- Adaptive to changing health needs through the collection, analysis and dissemination of information.
- Equitable in the allocation and distribution of resources, ensuring quality health service delivery to all regardless of gender, sexual orientation, socio-economic status and/or geographical location.
- Collaborative with other sectors in addressing the social determinants of health.[a,11]

Methodology

An extensive literature review was done on healthcare quality in South Africa; this included definitions, concepts and measurements of quality, conceptual frameworks of quality, and country case studies. Interviews were also conducted with key health stakeholders in South Africa to ascertain the current situation in the country with regard to quality-improvement policies, strategies and implementation initiatives. A situational analysis was done based on a review of the initiatives implemented to date, both locally and abroad. The literature review and situational analysis were then used to draft a multilevel national strategic framework for a high-quality health system in the country. The draft framework was presented and discussed at a National Lancet Commission workshop on 'measuring quality of health care' for further stakeholder and expert input, which has subsequently been incorporated into the framework.

Review of South African policies and regulation on quality in health care

Health policy development and reform spanning two decades demonstrated an overall commitment on the part of government to improve health systems quality. In 1997, the White Paper on the Transformation of the Health System in South Africa set the foundation for development of a unified health system aimed at delivering quality health care for all citizens, using a primary health care (PHC) approach.[15]

The first Policy on Quality in Health Care (published in 2001, revised in 2007) communicated the strategic intent to unify goals for quality assurance, based on promotion of evidence-based decision making and actions to ensure proper healthcare service utilisation. In particular, this policy proposed development of quality assurance, including effective interventions and monitoring strategies across the public and private sectors, towards the national aim of quality improvement.[3] In this context, a set of norms and standards was launched by the Quality Assurance Directorate of the National Department of Health (NDoH) in 2001.[16] In addition, national and provincial regulations were published seeking to govern the licensing and operation of private hospitals. However, these policies lacked clear imperatives and requirements for implementation and monitoring of quality improvement initiatives.[17] In 2003, the National Health Act[18] recognised the need to ensure quality in health, yet the absence of a strong regulatory framework to set goals, standards and measure quality improvement persisted.

In 2010, the NDoH re-emphasised its commitment to prioritising health systems quality through the "10-Point Plan for Improvement of the Health Sector"[19] and the Negotiated Service Delivery Agreement,[20] which sought to implement key quality assurance activities towards improvement of patient care and satisfaction, as well as advancement of health facility accreditation. In 2012, the NDoH published the Quality Improvement Guide defining quality and how it should be tested, implemented and sustained.[21] However, inadequate planning and monitoring of quality, compounded by low awareness of quality-of-care policies, limited the potential for translation of these guidelines into practice. In addition, interpretation of policies was complicated, and the activities, roles and responsibilities of different healthcare stakeholders was unclear.

In 2013, the independent Office for Health Standards Compliance (OHSC) was established to ensure compliance with national quality standards across the public and private sectors.[22] The Norms and Standards Regulations, gazetted in 2018, further sought to promote quality services by providing a benchmark for compliance to be measured against.[23] Multiple specific national guidelines were published in 2017 to further assist in the provision of quality health care. In addition, the National Health Insurance Policy (2017) articulated the need to ensure universal access to quality health care.[2]

These policies are in keeping with National Development Plan 2030 (NDP), which seeks to promote a shift in quality of healthcare vision, underpinned by goals of universal coverage and reduced disease burden.[24]

In summary, the past two decades has seen a number of policies and regulations aimed at quality assurance and quality improvement across both the public and private sectors, however, implementation of these initiatives has been poor.[25] Importantly, the imperative to increase equal access has overshadowed an equal imperative, namely to ensure that the quality of service improves the health of recipients.

Lessons learned from implementation

The policies and regulations outlined above provided the basis for multiple initiatives, which sought to advance quality assurance and quality improvement. In the public sector, interventions were initially on health system strengthening and aimed to improve access and to re-engineer PHC. However, multiple subsequent initiatives extended this focus to include quality assurance through accreditation, standard setting and audits, as well as Council for Health Service Accreditation of South Africa (COHSASA), the OHSC, the Ideal Clinic Realisation and Maintenance programme (ICRM) and others, and quality improvement through donor-funded projects, Best Care Always, and the Integrated Clinical Services Management (ICSM) programme which developed from the Ideal Clinic initiative.

Prior to regulations requiring compliance with National Core Standards (NCS) and the OHSC, some private hospital providers underwent voluntary accreditation at the facility level by COHSASA, and at an organisational level based on International Standards

Organization (ISO) criteria. COHSASA which was established in 1993 and accredited by the International Society for Quality in Health Care (ISQua) as part of a global movement to drive improvement in safety and health care,[26,27] had functioned as an accreditor for public and private facilities in South Africa. However, initial research did not support a direct relationship between accreditation and improvement in health outcomes in public facilities.[28]

From a private sector funder perspective, the company Health Quality Assessment (HQA), established in 2000 as a non-profit organisation, also performed annual reviews of clinical quality for over half of medical schemes to assist in evaluating and improving the quality of health care received by members. Lastly, both private providers and funders have undertaken and published patient-experience surveys.[17]

In 2008, the NDoH developed the National Core Standards (NCS) as the first national co-ordinated effort to benchmark, measure and enforce quality assurance across all health establishments.[17] A baseline audit of public health facilities conducted in 2011 confirmed poor performance on vital measures in PHC facilities in particular.[29]

The Best Care Always (BCA) campaign, established in 2009, provides an example of a voluntary initiative driven by a small committee of individual health professionals and endorsed by both public and private healthcare sectors. A primary study, conducted in South Africa, described the implementation and impact of a central-line-associated bloodstream infection prevention bundle in Netcare private hospitals between 2010 and 2016.[30] The bundles were incorporated into the NCS for hospitals and have formed an integral component in antimicrobial stewardship when monitoring antibiotic use. More than 200 public and private hospitals participated in this initiative, by implementing at least one infection prevention and control bundle.[30]

In 2013, the ICRM initiative was launched to address deficiencies in the quality of PHC and to lay the foundation for implementation of National Health Insurance (NHI).[31,32] The ICRM provided clear targets for the inputs for clinics, including basic infrastructure such as electricity and water, appropriate physical space, equipment, staffing (based on Workload Indicator of Staffing Need (WISN)), policies, and information systems. These requirements were aligned with the OHSC national core standards, and targets set for clinics to achieve 'Ideal Status'. The Integrated Clinical Services Management (ICSM) model developed out of the ICRM to shift to a more comprehensive quality improvement approach to health systems improvement.

Lastly, the Lancet National Commission was launched in May 2017 to provide guidance to achieving a high quality health system in South Africa in May 2017 following the launch of the Lancet Global Health Commission on High-quality Health Systems in the SDG Era. This was done to galvanise research and action on quality of care across health systems in lower-middle-income countries, and to expand the solution space to include structural solutions.[25]

In summary, support from government and donor-funded partners has resulted in multiple initiatives and pilots implemented to date. However, despite important developments towards quality assurance and improvement, these projects have been largely uncoordinated and fragmented, failing to achieve scalability, integration and coherence.[33] In addition, interventions to date have predominantly targeted facility level care, largely failed to focus on systemic factors, and have been characterised by poor monitoring and coordination between government and key role-players. Moreover, such approaches have focused primarily on quality assurance without addressing all of the quality-improvement spectrum.

Interviews with key healthcare stakeholders in South Africa emphasised that the differences between quality assurance and quality improvement are still not widely appreciated. Stakeholders expressed concerns about low levels of quality associated with patient safety hazards, duplication of efforts, variable standards of care, unsafe work areas and labour grievances. Despite this, they felt that initiatives to date were not necessarily driven by the need for improvement, and placed focus on improving clinical governance rather than changing the system in a broader setting.

They further confirmed that a lack of adequate mentorship as well as training of quality managers at provincial and district level led to a struggle in effecting change. Issues relating to quality improvement to date have been aggravated by lack of accountability on the part of line managers, since inspection and patient satisfaction results are reported directly to the NDoH or OHSC. Stakeholders have agreed that it is imperative to offer quality-improvement training to medical and non-medical personnel.

Conceptual models and lessons learnt from international frameworks

To date, multiple strategies, techniques and conceptual models have been proposed to support the development of frameworks for quality improvement. Conceptual models, such as those of the World Health Organization (WHO),[6,12] Organisation for Economic Co-Operation and Development (OECD),[34,35] Van Olmen et al.[36] and Peabody et al.,[37] provide valuable lessons and insights in developing a national framework. Health system frameworks in developed countries emphasise a patient- and family-centred approach to health care at the facility level. In comparison, healthcare systems in the developing world focus on population-based healthcare goals and quality improvement at community level. However, low- and middle-income countries often lack well-developed and informed frameworks to support quality improvement in health systems. Therefore, a review of existing conceptual models and strategic frameworks in other countries suggest that single-level programmatic changes are unlikely to create the groundswell necessary for organisational orientation towards quality care in South Africa.

A review was done of OECD countries. Quality improvement is a core component of a national health systems framework in countries like Ireland, with emphasis on development of support structures and leadership at multiple levels. In addition, staff engagement and the incorporation of measurement metrics are emphasised as drivers of quality improvement.[11] In New Zealand, the health systems framework aims to improve quality, health equity, and best practices to obtain the greatest value from public health resource utilisation.[38] Emphasis is placed on improving healthcare quality through commitment to ongoing learning, leadership, informed practice, and clearly defined responsibilities for all role-players.[39]

South Africa joined Brazil, Russia, India, and China (BRICS) in 2010 in an association of five emerging national economies. Insights gathered from the development and implementation of national strategies and frameworks for health system quality improvement in these developing nations may ultimately inform similar procedures

in South Africa. In Brazil, many healthcare organisations are now seeking quality certification through a process of accreditation.[40] However, the government is yet to develop a quality framework to support such efforts. In Russia, federal and regional laws have supported transformation of the healthcare system, and government is committed to developing policies that emphasise greater primary care and transition to insurance-based health care. In 2006, a national policy was launched to improve the country's healthcare system through improved funding initiatives.[41] However, no current or past frameworks exist to institutionalise quality improvement. In China, government investment continues to support expansion of health infrastructure and promotion of equal health access as well as universal health coverage. By 2014, the Chinese government had committed to collaborating with the World Bank Group and the WHO to improve policy formulation and deepen health reform towards people-centred, high-quality, integrative health care.[42] In the same year, the Indian National Quality Assurance Framework was established to improve quality standards for district hospitals and community health centres. Guidelines were prepared to define relevant quality standards as well as a robust system of measuring these standards.[43]

A review of country case studies from Ghana, Ethiopia, Mexico, Scotland and Nigeria which had developed National Quality Strategies since 2010 highlighted key lessons.[44] These included the importance of building on earlier in-country quality work, linkages to existing policies, extensive stakeholder engagement, leadership and local ownership, capacity development and funding for sustainability.

In the African setting, Tanzania focused on Kaizen (an approach, named after the Japanese word for "improvement", with activities involving all employees to continuously improve all functions) and quality process methodology and techniques, but without a strategic framework.[45] Uganda developed a Health Sector Quality Improvement Framework and Strategic Plan (2015/16–2019/20) to promote equal access to quality health care. The strategic objectives of this plan are to strengthen leadership capacity and support quality improvement, with emphasis on promoting innovation and evidence-based models of care. This framework requires evidence-based norms, standards, protocols and guidelines to identify gaps and measure performance improvement.[46] In Ethiopia, the government established a roadmap, which focused on introduction of community-based health insurance, PHC coverage, expansion of human resources, and development of online learning platforms. The Ethiopian framework emphasises patient-centred health care that is safe, effective and accessible, as well as multiple inputs to improve performance. Similar to the OECD model, the framework is laid out across four stages of care for lifelong commitment to health. The framework also seeks to identify indicators across priority health areas, including maternal and child health, non-communicable diseases, infectious illness, and surgical services.[47]

Development of a national strategic framework

Lack of an overarching framework to consolidate policy and integrate initiatives has led to limited impact on health systems quality and health outcomes in South Africa. Given the ideal of

Figure 1: Proposed National Strategic Framework for a high-quality health system in South Africa, 2018

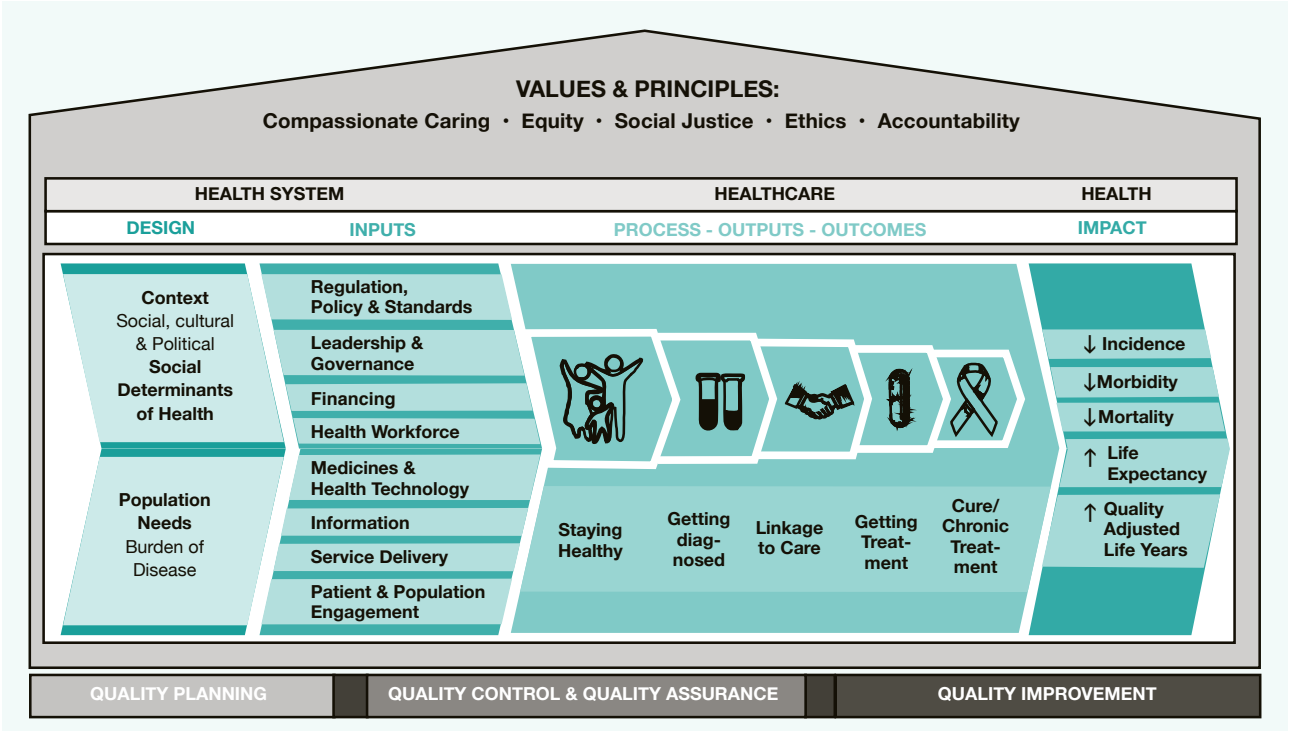
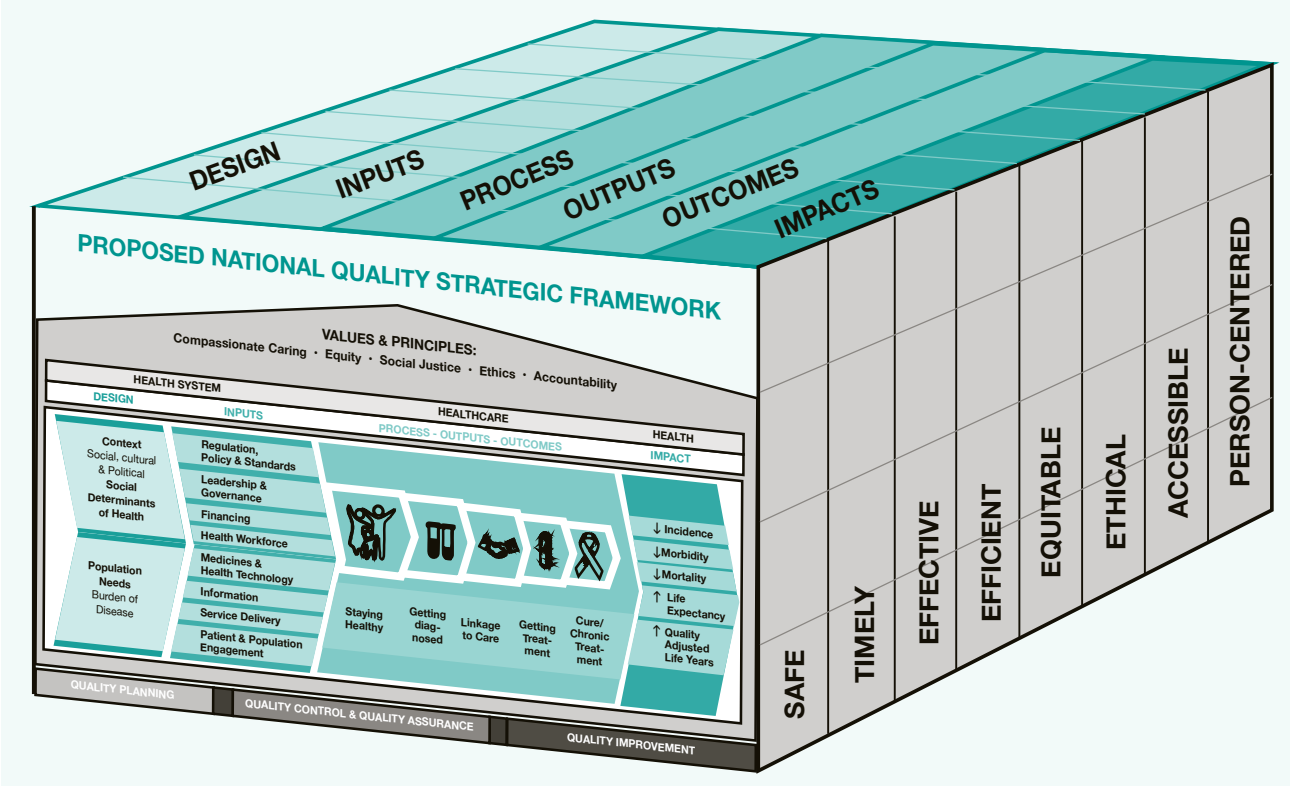


Figure 2: Proposed National Strategic Framework for a high-quality health system with a metrics matrix, South Africa, 2018



attaining a high-quality health system as defined by the National Lancet Commission,[a] and based on insight gathered from the policy review and strategic analysis, a strategic framework was developed for quality improvement in South African health systems, as illustrated in Figure 1.

The proposed framework is built on the values and principles of compassionate care, equity, social justice, ethics and accountability, [a,11] and aligns with explicit national goals and population outcomes.[34]

The framework provides quality perspectives around health systems, health care and health outcomes. Guided by Donabedian's approach, the logic model for a quality health system included the design, inputs, processes, outputs, outcomes and impacts.[10] Inputs included national regulations, policy and standards, as well as the WHO building blocks of financing, the health workforce, medicines and health technology, and service delivery.[46,48] Process, output and outcome requirements were framed around a life course from primary prevention, early detection of disease, accessible and effective treatment, rehabilitation, as well as chronic and palliative care with continuity of care.[35] Impacts included population health outcomes in terms of disease incidence, morbidity, mortality, and quality of life. These were set within the local context, taking socioeconomic and cultural determinants of health and the burden of disease into account.[6,36,37]

Importantly, the design and implementation of the proposed framework encompassed the full spectrum of Juran's trilogy[7] for developing sustainable countrywide practices built on a strong evidence base. The framework incorporated the principles of quality planning as the structured process for ensuring that population needs are met.[13] Quality assurance was incorporated to ensure that the impact of quality health care aligns with broader strategic goals; and standards and guidelines[14] are adhered to with the ultimate goal of safeguarding, maintaining and promoting quality of care.[12]

A strategic quality care framework would be fruitless without the inclusion of metrics to measure the attainment of intentions. Quality metrics apply to each section and element of the framework, as well as across its multiple dimensions. In accordance with the South African National Lancet Commission,[a] the metrics included a focus on quality care that is safe, timely, equitable, efficient, effective, ethical, accessible and patient-centred. These dimensions were applied across the logic model and key stages of the care pathway, as shown in Figure 2.

It is imperative that all key role-players who provide input (including government entities, regulatory bodies, public and private health sectors, as well as other sectors) form transdisciplinary relationships to form a cohesive and integrative health system.[49] In addition, patient and population engagement was incorporated as a fundamental aspect of input to ensure a framework designed with population-based healthcare needs in mind.

Actioning of the proposed framework

The ultimate success of the proposed strategic quality framework is predicated upon a sound action plan for implementation. A number of challenges must be overcome in order to action the proposed framework including: fragmentation at national, subnational and facility level; poor coordination among implementing partners and government institutions; and competing priorities within the health sector and across multiple sectors impacting health.[4]

The proposed framework addresses the shifting burden of disease in

South Africa as well as socio-demographic, economic and cultural determinants of health as they relate to health service quality. It also strives to find a balance in addressing a heterogeneous landscape at varying stages of development for implementation of quality health services. These key aspects should be addressed during the implementation phase.

Conclusions

In South Africa, the successful implementation of universal health coverage via NHI necessitates a sound foundation of quality care across health systems. To date, policies and interventions have achieved moderate success, but a holistic approach is required to restore trust and confidence in health services across the public and private sectors. The proposed framework presented in this chapter builds on and complements current policies and initiatives, provides stakeholders with a common language of quality, as well as a tool to facilitate policy coherence and locate initiatives in the quality cycle. These developments may ultimately improve co-ordination and implementation of quality strategies at scale, and provide metrics to monitor and measure outcomes. The proposed framework has several important limitations, including the fact that it remains to be implemented and actioned. However, its strength lies in its incorporation of the full spectrum of Juran's trilogy, and that it is built on sound evidence gathered from a review of best practices and lessons learned locally and abroad. The incorporation of metrics for monitoring and evaluation of outcomes will be an important strength in implementation. Lastly, the novelty of the proposed framework lies in the integration and coherence of quality concepts at population and health-system level, while still providing relevant guidance at facility and community level.

In conclusion, the WHO handbook for developing a National Quality Policy and Strategy (NQPS) can support efforts to institutionalise a culture of quality across the health system.[12] The WHO reminder regarding challenges to overcome when implementing a National Quality Strategic Framework is valuable. Developing an integrated, comprehensive quality strategic framework focusing on the health needs of communities is critical given that the healthcare-seeking behaviours of people are key drivers in how quality is defined and actioned at the frontline.[50] The proposal offered here should be consulted extensively, with further elucidation of each of the key components and the development of detailed metrics.

Acknowledgements

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10 Communicable diseases surveillance and outbreak investigation in South Africa

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Surveillance for communicable diseases is the first and most important step in addressing public health challenges. Surveillance initiates awareness of the magnitude of public health problems, provides evidence for advocacy and action, facilitates accurate planning for service delivery and allows for monitoring of the impact of interventions. In-country disease surveillance programmes are a stipulated component of the International Health Regulations (2005), to which South Africa is a signatory.

This chapter outlines epidemiological trends for a spectrum of communicable diseases affecting the South African public, thus allowing assessment of the impact of health interventions.

The findings support the need for ongoing human and financial resources. The National Public Health Institutes of South Africa Bill will broaden the range of conditions under surveillance by including non-communicable disease, environmental health and injury and violence prevention. This will ensure that these growing public health threats and interventions to ameliorate their impact, are monitored.

Surveillance initiates awareness of the magnitude of public health problems, provides evidence for advocacy and action, facilitates accurate planning for service delivery and allows for monitoring of the impact of interventions.

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Introduction

Surveillance for communicable diseases is the first and most important step in addressing public health challenges. Surveillance initiates awareness of the magnitude of public health problems, provides evidence for advocacy and action, facilitates accurate planning for service delivery and allows for monitoring of the impact of interventions. In-country disease surveillance programmes are a stipulated component of the International Health Regulations (2005), to which South Africa is a signatory.

The National Institute for Communicable Diseases (NICD) was created as a division of the National Health Laboratory Services (NHLS) through the amalgamation of the South African Institute for Medical Research (SAIMR) and the National Institute for Virology (NIV) by the National Health Laboratory Services Act in 2000 (Act 37 of 2000). Over time, the work of the NICD was re-orientated towards addressing public health challenges related to communicable diseases. Seven specialist reference centres within the NICD were created to take responsibility for specific organisms or clinical syndromes. The Division of Public Health Surveillance and Response (DPHSR) was created to house the Outbreak Response Unit (ORU), Provincial Epidemiology team (PET), the National Notifiable Diseases Surveillance Unit and the Field Epidemiology Training Programme (FETP). The NICD took on a public health and surveillance focus including the ongoing collection, analysis and interpretation of communicable disease data, monitoring for the emergence of infectious diseases, outbreak investigation and management, and conducting research directed towards addressing regionally relevant communicable disease challenges.

The major health problems in South Africa remain the HIV and TB epidemics, which directly and indirectly, contribute significantly to premature death and morbidity. This dual outbreak of communicable disease further increases vulnerability to other prevalent communicable diseases, which in total account for 38% of deaths among under fives, and just under 40% of deaths in adults aged 15–45 years.[1] The NICD is uniquely positioned to document impact of health interventions on communicable disease, and progress towards the goals of the National Development Plan 2030. We provide an overview of major surveillance activities initiated and supported by the NICD. These activities contribute to addressing priority disease conditions and illustrate the crucial role of surveillance in documenting the impact of health policy and interventions on public health outcomes.

Surveillance methodology, data management and analysis.

A number of different methodologies are employed by the NICD to meet surveillance objectives, the details of which are provided in references cited and on the NICD website (www.nicd.ac.za). These are:

- secondary analysis of laboratory diagnostic data obtained through the NHLS from the central data warehouse (CDW);
- laboratory-based surveillance complemented in sentinel sites with retrieval of clinical data by patient record review with or without patient interview;
- syndromic surveillance in selected sentinel sites;
- notifiable medical conditions surveillance;
- seroprevalence surveys;
- event-based surveillance through the NICD 24-hour hotline; and
- disease vector surveillance.

Each NICD Centre manages data independently. Where surveillance activities require patient interview or medical record review, data is collected by surveillance officers using paper or electronic case investigation forms. Electronic real-time on-site data entry is supported by external service providers. NICD Centres maintain independent MS Access databases, and assume responsibility for data cleaning. Analysis of surveillance data is highly specific to each disease or condition under surveillance.

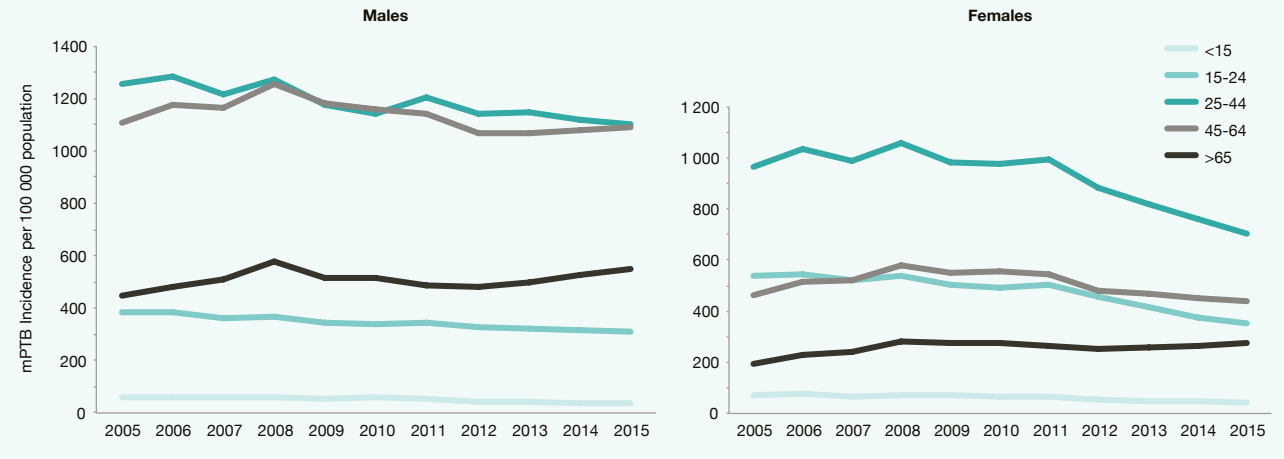
Surveillance for communicable diseases

Tuberculosis

The NICD Centre for Tuberculosis (CTB) conducts surveillance and microbiology reference tests to monitor and inform the epidemiological landscape of TB and drug-resistant TB in South Africa (SA). In turn, surveillance data supports the development of TB control programme goals, determination of appropriate treatment regimens for drug-sensitive and drug-resistant TB, and other interventions. An analysis of NHLS TB diagnostic data between 2004 and 2012 demonstrated a 9% decline in microbiologically confirmed pulmonary tuberculosis (mPTB) incidence from 2008 to 2012 (848 cases/100 000 (95% confidence interval (CI) 845–850) to 774 cases/100 000 (CI 771–776)).[2] This analysis was updated in 2015[2] demonstrating a continued annual reduction in the national year-on-year mPTB incidence of 4.1%, 6.0% and 4.8% for the years 2013, 2014 and 2015 compared with each previous year, respectively (Figure 1). Although this reduction was only half of what was required by the Millennium Development Goals, it exceeds the global average year-on-year reduction of between 1% to 2%.

In 2012–2014, the NICD together with the National Department of Health (NDoH) conducted the largest ever drug-resistant TB survey globally. Over 100 000 patients were enrolled and tested for drug-resistant TB.[3] Surveillance findings confirmed that the prevalence of multi-drug resistant TB (MDR-TB) was stable (2.8%, (95% CI 1·5–2·7) compared to the previous survey conducted in 2001–2 (2.9%, 95% CI 2.4–3.5%)); and lower relative to that reported globally (7.7%). The survey identified a doubling of resistance rates to rifampicin, the main drug for TB treatment (from 1.8% to 3.4%) in patients without any previous history of TB treatment. This indicates primary transmission of drug resistant TB and supports the use of Xpert MTB/Rif as the first line diagnostic assay for detection of TB and rifampicin resistance. The survey also identified a high prevalence of second line drug resistance among those cases with MDR-TB. The prevalence of extensively drug-resistant TB (XDR-TB) was determined to be 4.9% of all MDR cases, which is in line with the global average.

Figure 1: Age-specific incidence rates of microbiologically-confirmed tuberculosis per 100 000 amongst South African males (left) and females (right) from 2004–2015.



Source: Ismail et al., 2018.[3]

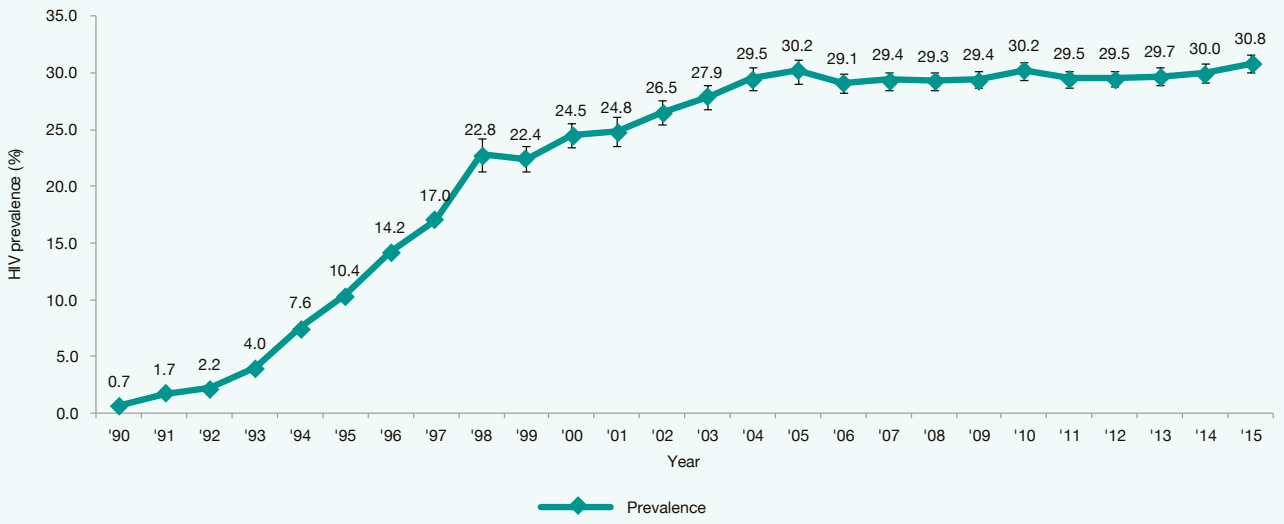
HIV surveillance

The NICD Centre for HIV and Sexually Transmitted Infections (CHIV&STi) co-ordinates and conducts HIV surveillance amongst infants and children, pregnant women, and surveillance for HIV drug resistance amongst persons initiating antiretroviral therapy (ART). These surveillance programmes are important data sources for programme development, determining ART regimens, target setting, monitoring of service delivery and statistical modelling of the HIV epidemic. Secondary data analysis of NHLS HIV DNA polymerase chain reaction (PCR) test results, conducted as part of the prevention of mother-to-child transmission (PMTCT) programme has demonstrated a reduction in mother-to-child transmission (MTCT) rates. In 2006, MTCT of HIV resulted in at least 17% of infants testing HIV positive at six weeks.[4] With aggressive clinical treatment, comprehensive management and a supportive laboratory testing programme, PMTCT transmission rates are now <2%.[5] Validation of this methodology has been demonstrated through analysis of three independent data sources[5] all of which provide very similar MTCT rate estimates.

The NICD has conducted the National Annual HIV and Syphilis antenatal seroprevalence survey collaboratively with the NDoH and other stakeholders since 1990, but took on full responsibility for the survey in 2017. The survey indicates that HIV prevalence has remained relatively stable over the last 10 years of the survey (Figure 2).[6]

The CHIV&STi has conducted retrospective seroprevalence surveys, sentinel site and localised HIV drug resistance (DR) surveillance since 2005.[7,8] Retrospectively analysed serum from the national antenatal seroprevalence survey specimens obtained 2005–2009 indicated that transmitted drug resistance was <5% in Gauteng Province (GP) for all drug classes, and between 5–15% in KwaZulu-Natal Province (KZN) for non-nucleoside reverse transcriptase inhibitors. In 2014, in KZN, fewer than 8% of adult patients were failing first-line ART up to 3 years post-ART initiation. By the end of 2017, data from 6 provinces has shown a rate of 15% resistance to non-nucleoside reverse transcriptase inhibitors.

Figure 2: National Annual HIV prevalence in pregnant women according to the national antenatal sentinel HIV prevalence survey, South Africa, 1990–2015[6]



Source: NDoH, 2017.[6]

Cryptococcosis

The NICD Centre for Hospital-acquired infections, Antimicrobial resistance and Mycoses (CHARM) conducts active laboratory-based surveillance for cryptococcosis to inform policy regarding prevention and early detection. Since 2005, 85 969[9] new cases were detected, the vast majority (95%) with cryptococcal meningitis. The national annual incidence rate has declined by 44% from a peak of 162 cases per 100 000 HIV-infected persons in 2006 to 90 cases per 100 000 in 2015 (Figure 3). The incidence rate of cryptococcosis in 2015 was below that observed in pre-ART era. In response to the high burden of disease, CHARM together with the NHLS, NDoH and other partners, initiated a national laboratory-based cryptococcal antigen (CrAg) screening programme aimed at detecting early cryptococcal disease before progression to meningitis in all HIV-seropositive patients with a CD4 count <100 cells/μL in 2016.[10] From October 2016 to September 2017, 276 125 patients were screened and 15 757 (5.7%) were identified with cryptococcal antigenaemia. This indicated the potential for development of life-threatening cryptococcosis, and the need for urgent preventive fluconazole therapy. The NICD is leading ongoing programme evaluations and is working with partners to enhance the clinical impact of the programme.

Sexually transmitted infection (STI) syndromes

The NICD CHIV&STi conducts surveillance for sexually transmitted infections to ensure that the syndromic treatment guidelines respond to epidemiological changes in disease aetiology, and remain effective at patient and population levels. Syndromic surveillance for STIs at primary healthcare facilities in four South African provinces during the period 2014–2016[11] showed that *Neisseria gonorrhoeae* remained the predominant cause of male urethritis syndrome (MUS). During the period under surveillance, the prevalence of high-level resistance in *N. gonorrhoeae* increased from 30% to 51% for penicillin (p-value for trend < 0.001), 75% to 83% for tetracycline (p-value for trend = 0.008), and 25% to 69% for ciprofloxacin (p-value for trend < 0.001). *Chlamydia trachomatis* was the second most commonly isolated pathogen. Antimicrobial therapy covering both pathogens is therefore appropriate. However, the high prevalence of penicillin, tetracycline, and ciprofloxacin resistance in *N. gonorrhoeae* obviates their use in future national treatment algorithms for genital discharge. Surveillance showed that herpes simplex virus was the commonest detectable cause of genital ulceration, supporting the continued use of acyclovir in syndromic management. Surveillance identified a high HIV seroprevalence among patients with STI, underscoring the need for HIV counselling and testing amongst persons with STI.

Diseases preventable through the Expanded Programme of Immunisation

Polio and acute flaccid paralysis

The NICD Centre for Vaccines and Immunisation (CVI) together with the NDoH and district health department surveillance teams collectively support surveillance for acute flaccid paralysis (AFP), which is the cornerstone of polio eradication efforts. South Africa has been free of wild poliovirus since 1989. The non-polio AFP detection rate in South Africa in 2017 was 2.3 cases/100 000 under 15 years of age in 2017,[12] lower than the 2016 level of 3.0. The detection rate reaches the WHO target of 2.0/100 000 but not the heightened 2015 country target of 4.0/100 000. Surveillance performance needs to be strengthened.

Diphtheria

The NICD Centre for Respiratory Disease and Meningitis (CRDM) conducts event-based surveillance for diphtheria. During 1980–2014, a total of 412 diphtheria cases were reported in South Africa with most (>80%) notified before 1990.[13] In 2015, an outbreak of respiratory diphtheria occurred in two health districts in KZN.[14] Fifteen cases of diphtheria were identified, with ages ranging from 4 to 41 years with a case fatality of 27%. Nine/12 cases (75%) under the age of 18 years were not fully immunized for diphtheria. Subsequently two laboratory-confirmed cases were identified in

Figure 3: Incidence of laboratory-confirmed cryptococcosis (cases/100 000 general population) and the proportion of the HIV-positive population receiving antiretroviral treatment (ART), South Africa, 2005–2015[9]

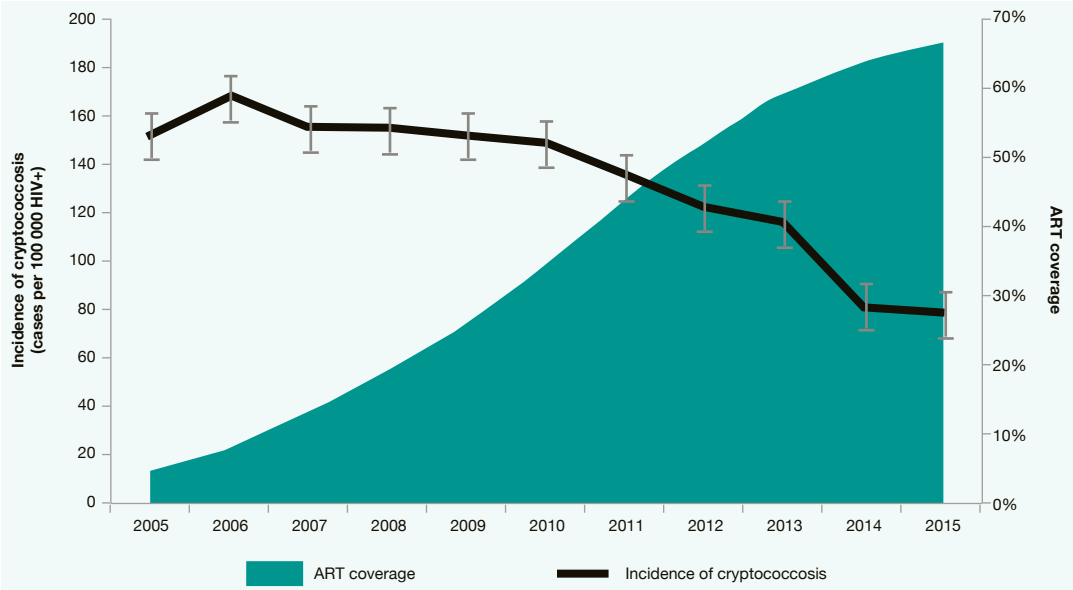
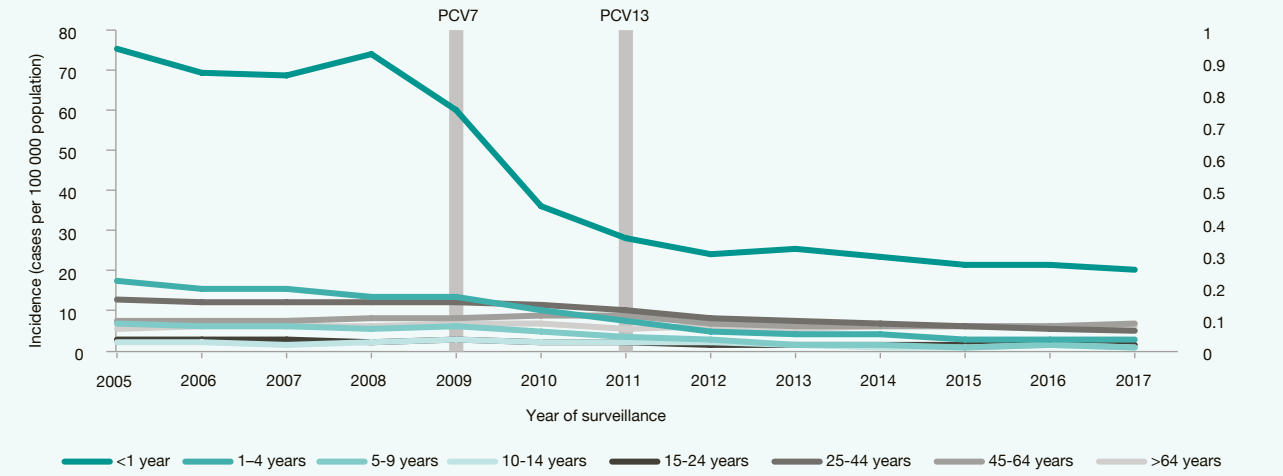


Figure 4: Age-specific incidence rates for laboratory-confirmed invasive pneumococcal disease, reported to GERMS-SA, South Africa, 2005–2017[16]



KZN in 2016, 4 from the Western Cape Province (WC) in 2017, and 4 from KZN in 2018. The majority of cases occurred in children over the age of 6 years. These data indicate the need to strengthen primary and booster immunisation coverage, particularly at 6 and 12 years.

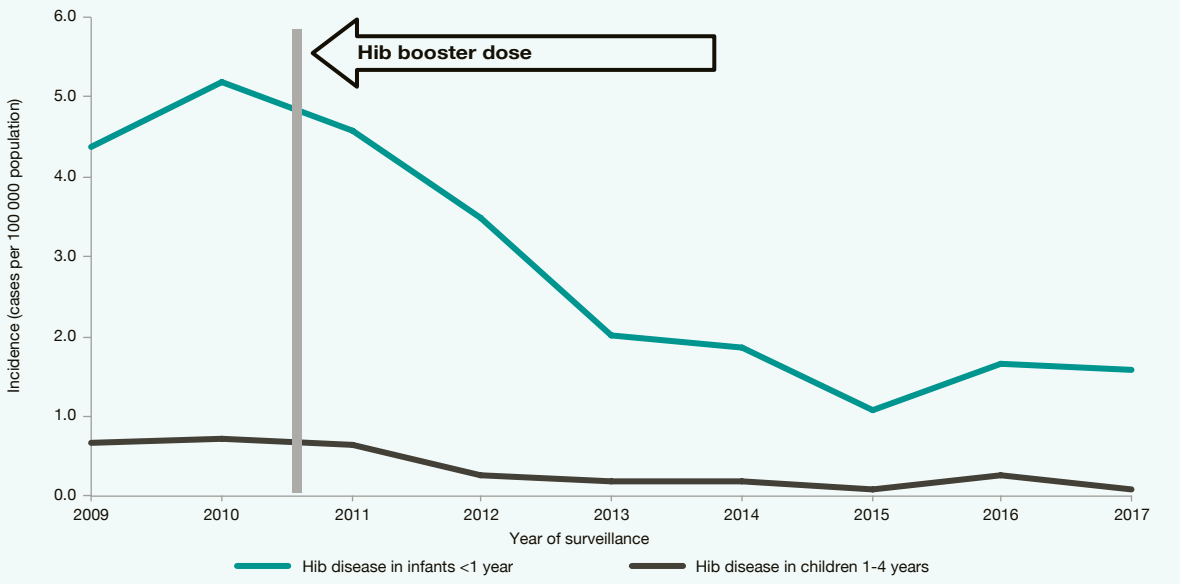
Invasive pneumococcal disease

CRDM conducts surveillance for invasive pneumococcal disease (IPD) to monitor the impact of the pneumococcal conjugate vaccine.[15] The 7-valent pneumococcal conjugate vaccine (PCV-7) was introduced in the South African expanded programme of immunisation (EPI) in April 2009 and was replaced by the 13-valent pneumococcal conjugate vaccine (PCV-13) in 2013. The vaccine reduced the incidence of IPD by 79% in children younger than five years, from 30 per 100 000 population in 2005 to 6 per 100 000 per population in 2017 (Figure 4). The vaccine also reduced IPD by 46% in persons aged five years and older, from 7 per 100 000 population in 2005 to 4 per 100 000 per population in 2017. Cases of IPD are mostly due to serotypes not included in PCV-13.

Invasive *Haemophilus influenzae* type b disease

CRDM conducts surveillance for invasive *Haemophilus influenzae* type b (Hib) disease to monitor the impact of the Hib conjugate vaccine, introduced in 1999. Surveillance demonstrated that Hib disease in children <1 year of age decreased by 65% from 1999–2004. From 2004–2010 the surveillance programme noted an increase in disease driven by vaccine failures in older children and HIV-coinfection.[17] A Hib vaccine booster dose at 18 months was implemented into the EPI schedule in November 2010. Subsequently the incidence of Hib in children <1 year of age decreased by 69%, from an incidence of 5.2 cases per 100 000 population in 2010, to 1.6 cases per 100 000 population in 2017 (Figure 5).[18]

Figure 5: Incidence rates of laboratory-confirmed, *Haemophilus influenzae* serotype b disease, reported to GERMS-SA, in children <5 years old, South Africa, 2009–2017[19]



Rotavirus

The Centre for Enteric Diseases (CED) conducts surveillance for rotavirus and all-cause diarrhoea to monitor the impact of the rotavirus vaccine, to detect seasonal trends and the aetiology of diarrhoeal disease. Surveillance demonstrated a sustained reduction in diarrhoeal disease due to rotavirus and all-cause diarrhoeal disease in children <5 years in South Africa following the introduction of the rotavirus vaccine into the EPI in August 2009.[20] In 2014 and 2015 surveillance findings demonstrated lower rotavirus prevalence and reduced absolute numbers of hospitalized diarrhoea cases in children <5 years compared to 2008. Surveillance has also shown that protection afforded by the rotavirus vaccine is not complete and that annual rotavirus seasons from May-September affecting mostly children <2 years, should be expected.

Measles

CVI together with the NDoH and district health departments surveillance teams conduct surveillance for measles to support the WHO campaign to eliminate measles by 2020, and to detect cases, identify vaccine coverage gaps, monitor the impact of routine vaccination and advise on the need for supplementary immunisation activities. South Africa experienced a major measles outbreak in 2009–10 with over 18 000 laboratory-confirmed cases identified.[21] Seventeen and 14 cases of measles were confirmed in 2015 and 2016 respectively. In 2017, 210/6 256 (3%) suspected-measles cases were laboratory-confirmed.[22] Currently, the national measles incidence rate per million is 3.7, exceeding the World Health Organization's 2020 elimination target of <1 per million population.

Epidemic-prone diseases

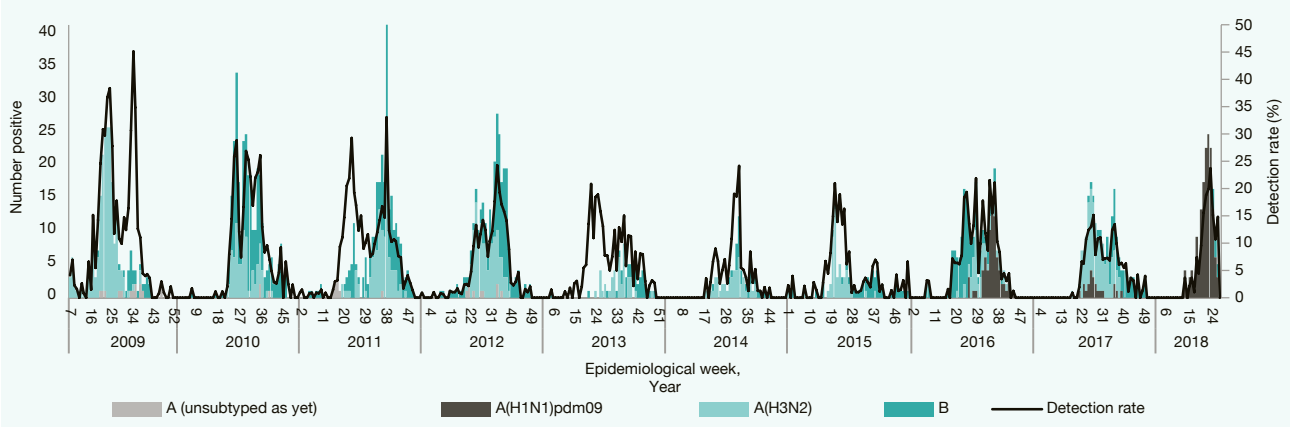
Influenza

CRDM conducts surveillance for influenza-like illness (ILI) to detect seasonal patterns of disease, determine circulating vaccine strains, monitor disease severity and vaccine effectiveness. Data contributes to global vaccine development and surveillance, and supports national vaccine utilisation campaigns. Sentinel surveillance is conducted by general practitioners in private practice since 1984, in primary health clinics since 2012 and in public hospitals since 2009. Surveillance indicates that the average onset of the influenza season over the past 33 years is the first week of June[23] but has commenced between mid-April to the first week of July. The average duration of the influenza season is 14 (range 7–18) weeks. The temporal distribution of influenza strains and the detection rate since 2009 are shown in Figure 6. During the influenza season, approximately 14% of inpatients with lower respiratory tract infection and 25% of outpatients with influenza-like illness will test positive for influenza. Surveillance programmes played a critical role in monitoring the emergence of pandemic influenza A(H1N1) 2009 virus during 2009.[24]

Invasive meningococcal disease

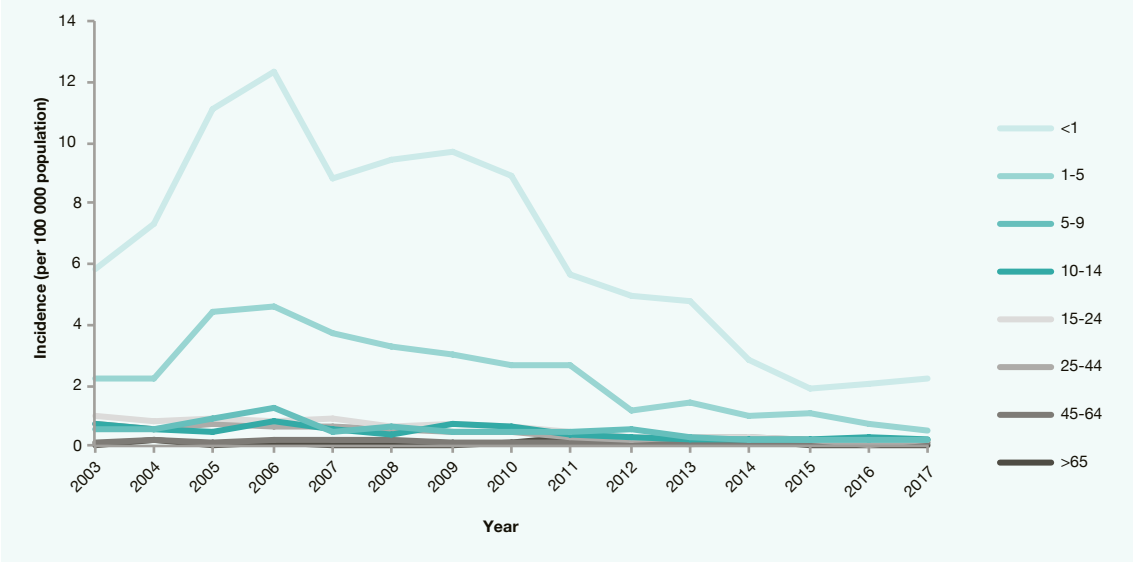
CRDM conducts laboratory-based surveillance for invasive meningococcal disease (IMD) to monitor epidemiological trends and support outbreak and prevention activities. Surveillance has demonstrated a decline in cases from 2003–2017 by 76% from 1.0 to 0.2 per 100 000 population, and the emergence of serogroup W in South Africa in 2005/6.[25] The highest incidence of IMD is in children <1 year of age (2.2 per 100 000 population in 2017) (Figure 7). The case-fatality ratio for IMD was 17%. South Africa experiences IMD from multiple serogroups but the majority of cases are serogroup B followed by W, Y and C.

Figure 6: Results from surveillance for pneumonia (severe acute respiratory syndrome) at public health clinics in five South African provinces, 2009–2018 showing the number of respiratory specimens positive for influenza by types and subtypes, and by detection rate per week



Source: Centre for Respiratory Disease and Meningitis, NICD.

Figure 7: Incidence of laboratory-confirmed invasive meningococcal disease by age category, South Africa, 2003 – 2017



Source: GERMS-SA, NICD.

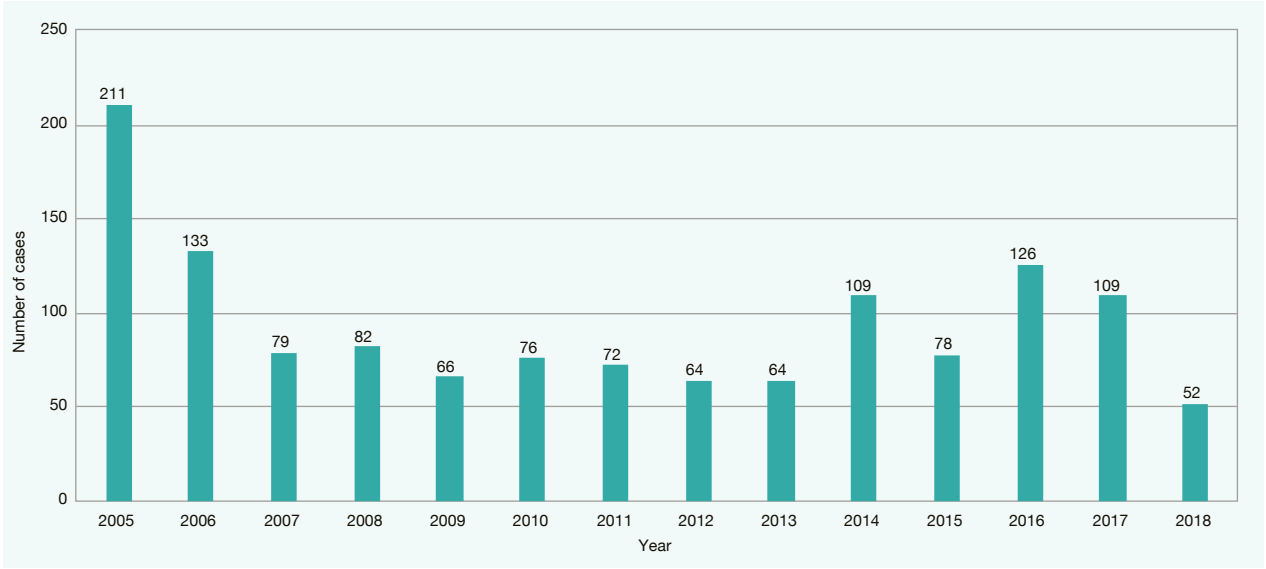
Salmonella Typhi

CED conducts surveillance activities for laboratory-confirmed typhoid to support prevention and control efforts. Findings from 2005–2018[26] demonstrate that typhoid fever remains endemic in South Africa at low levels (<150 cases/year, Figure 8) with localised clusters of cases mainly due to endemic strains. A larger outbreak occurred in 2005–2006 in Mpumalanga Province (MP) associated with contaminated water. Imported travel-related cases are reported, particularly in 2017 following an outbreak in Harare, Zimbabwe.

Vibrio cholerae

CED conducts event-based surveillance for cholera. A large outbreak of cholera was detected and controlled in Limpopo Province (LP) in 2008–2009 with 1 003 laboratory-cases identified.[27] Sporadic cholera cases have been detected and reported (1 in 2011, 1 in 2013, 2 in 2014, 5 to date in 2018), allowing for early implementation of appropriate community and public health activities.

Figure 8: Number of laboratory-confirmed cases of typhoid (isolation of *Salmonella* Typhi from clinical specimens) per year from 1 January 2005 to 1 July 2018, South Africa. (*Case numbers for 2018 reflect burden of disease until 30 June 2018)



Source: GERMS-SA, NICD.

Food-borne illness including listeriosis

Food-borne diseases

CED supports the NDoH, provincial and district health departments to investigate food-borne disease (FBD) outbreaks. 327 FBD outbreaks were reported to the NICD over the period January 2013 to December 2017.[28] These outbreaks caused illness in 11 155 individuals, with 8 680 hospital visits, 494 hospital admissions and 49 deaths. *Salmonella* species was the most commonly identified aetiology identified in stool (29/147, 19.7%) and food (15/132, 11.4%) samples.

Listeriosis

CED supports listeriosis outbreak investigation and, since 2017, conducts surveillance to detect and investigate clusters of cases using whole genome sequencing. Prior to December 2017, listeriosis was not notifiable. Review of private and public laboratory diagnostic data from 2013–2016 revealed an average of 60 to 80 laboratory-confirmed listeriosis cases per year (approximately 1 per week).[29] From July 2017 until August 2018, a nationwide outbreak of listeriosis occurred (Figure 9) with over 1 060 laboratory-confirmed cases and 216 (27%) deaths amongst 806 cases where outcome was known. The source of the outbreak was identified as ready-to-eat processed meat from the Enterprise Foods' Polokwane production facility. A recall of affected products was initiated on 4 March 2018, which effectively controlled the outbreak.

Zoonoses

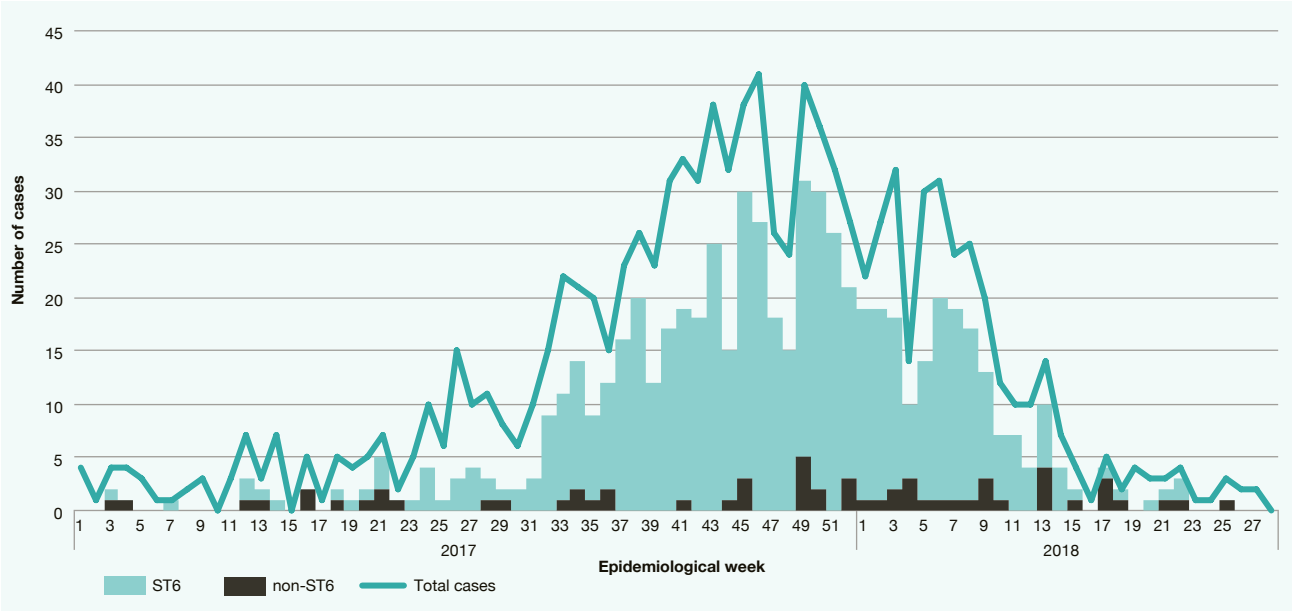
Malaria

The Centre for Emerging, Zoonotic and Parasitic Diseases (CEZPD) conducts surveillance for malaria vectors, insecticide resistance and malaria parasite drug resistance to monitor the distribution of vectors, the effectiveness of the malaria control programme, and to inform national antimalarial drug policy. Vector surveillance during 2017[30] revealed the presence of three malaria vector species – *Anopheles arabiensis*, *An. merus* and *An. vaneedeni* – which have previously been shown to contribute to ongoing residual malaria transmission in South Africa. Most of the specimens analysed were collected from MP (46.8%) and KZN (32.2%) with smaller proportions collected from LP (10.2%) and the Kruger National Park (10.8%). The surveillance information identified that vector control based on indoor residual spraying (IRS) needs to be maintained at a high rate of coverage and should be completed before the onset of each malaria season.

Viral haemorrhagic fevers

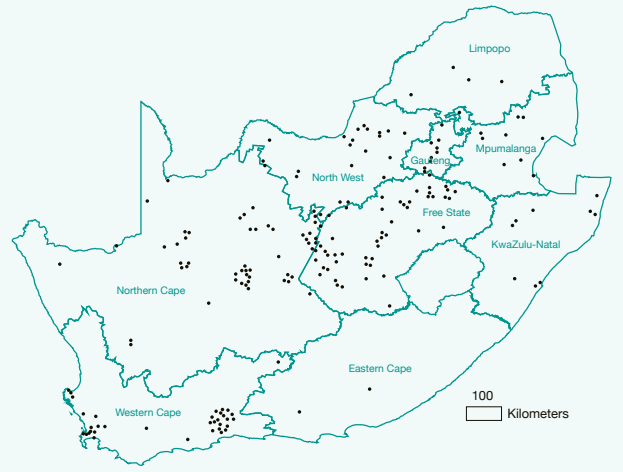
CEZPD conducts event-based surveillance for cases of viral haemorrhagic fevers (VHF) including Ebola virus disease (EVD) and Crimean-Congo haemorrhagic fever (CCHF). No cases of EVD were imported to South Africa during the recent West African outbreak. CEZPD deployed a Field Ebola Diagnostic Laboratory (FEDL) to Freetown, Sierra Leone[31] between August 2014 and June 2016. During the operation, the laboratory tested 11 256 specimens from suspected EVD cases, of which 2 379 were positive. South Africa is endemic for CCHF (Figure 10) and fewer than 10 cases are diagnosed annually. The NICD played a critical role in the investigation, diagnosis and control of a nosocomial disease outbreak of a newly-discovered agent of VHF, the Lujo arenavirus ("Lusaka-Johannesburg"virus) in 2008.[32] The index case was transferred from Lusaka, Zambia, to Johannesburg for medical management. Nosocomial transmission to four patients (three secondary cases and a single tertiary case) occurred.

Figure 9: Epidemic curve of all laboratory-confirmed listeriosis cases in South Africa by date of clinical specimen collection (N=1 060) and sequence type (ST) (n=636), South Africa, 1 January 2017 to 17 July 2018



Source: Listeriosis outbreak situation report, July 2018.

Figure 10: The distribution of over 200 laboratory-confirmed cases of Crimean-Congo haemorrhagic fever (CCHF) confirmed in South Africa, 1981–2017



Source: Centre for Emerging, Zoonotic and Parasitic Diseases, NICD.

Rabies

CEZPD conducts event-based surveillance for rabies to support veterinary public health efforts to control canine rabies, development of guidelines for rabies prevention and health promotion strategies. Since 1983, 456 human cases of rabies have been laboratory-confirmed (Figure 11).

Antimicrobial resistance and hospital-acquired infections

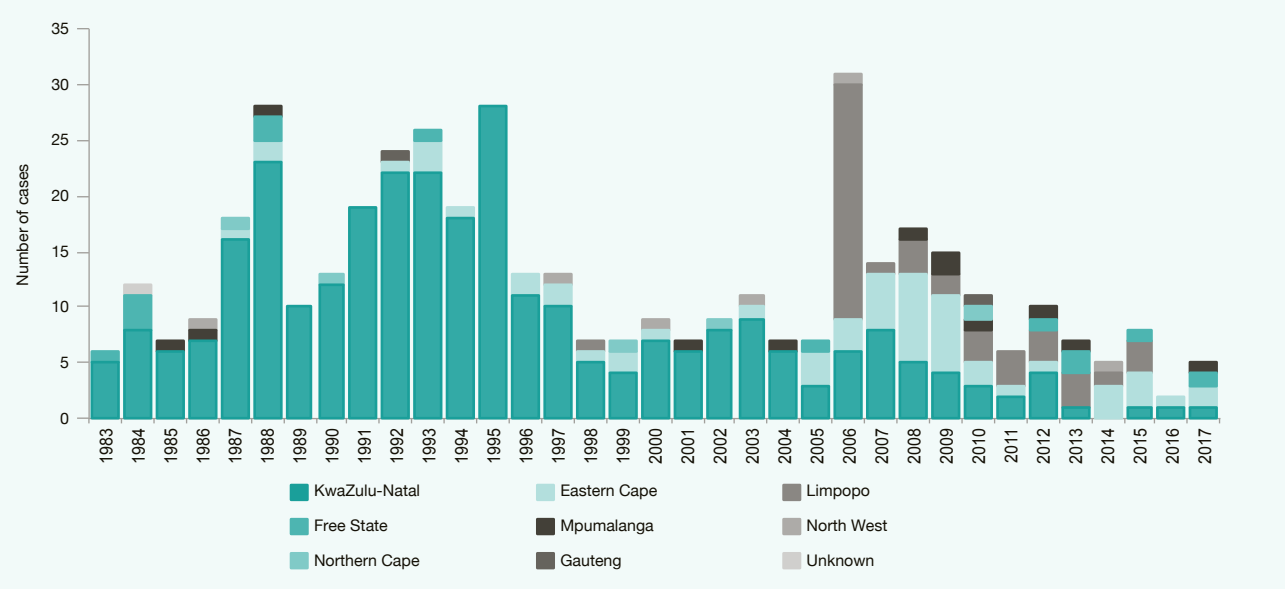
CHARM conducts surveillance for antimicrobial resistance and hospital-acquired infections in support of global and national and facility efforts to monitor, control and prevent the emergence of antimicrobial resistant infections. Surveillance for *Staphylococcus aureus* was conducted from 2010[33] until 2017 indicating that 92% of MRSA cases are healthcare-associated MRSA (HA-MRSA) bacteraemia, and 8% are community-associated (CA-MRSA).[33] Laboratory-based enhanced surveillance for carbapenem-resistant Enterobacteriacae (CRE) has been ongoing since 1 July 2015 using the GERMS-SA platform.[34] Surveillance has demonstrated an increase of these highly-resistant organisms which has major consequences for patient outcomes and healthcare costs.[34] The NICD has developed an internet based 'dashboard' to facilitate awareness of these resistant organisms at hospital, district and provincial levels. Through surveillance for invasive fungal infections, CHARM has documented outbreaks of candidaemia at sentinel hospitals and identified that the newly-emerged and multi-drug resistant *Candida auris* is a major healthcare-associated pathogen in South Africa.[35]

National Public Health Institute of South Africa (NAPHISA) and beyond – the way forward regarding surveillance for communicable disease

This chapter has provided an overview of the major surveillance activities conducted by the NICD together with the NDoH and district health departments over the last decade. Findings demonstrate the effectiveness of major health interventions including the provision of new and improved vaccines (against *Haemophilus influenzae* type B, *Streptococcus pneumoniae*) and antiretroviral therapy. Further, these surveillance activities have contributed immeasurably to strengthening of health systems through provision of data for action, monitoring progress towards targets, planning for service delivery and resource allocation.

The burden of non-communicable disease, including morbidity and mortality due to environmental and occupational harms, injury and violence in South Africa is increasing. Surveillance for these conditions is essential if South Africa is to meet targets of the National Development Plan 2030 (NDP) – specifically an increase

Figure 11: Laboratory-confirmed human rabies cases in South Africa by year and province (1983–2017)



Source: Centre for Emerging, Zoonotic and Parasitic Diseases, NICD.

in life expectancy to 70 years at birth.[36] In support of this, and also in line with international trends, the Parliamentary Portfolio on Health tabled the National Public Health Institute of South Africa (NAPHISA) Bill in 2017.[37] The Bill will broaden the activities of the NICD through the inclusion of public health monitoring activities that focus on non-communicable diseases and conditions. This will ensure that these growing public health threats and interventions to ameliorate their impact, are monitored.

At a policy and political level, sustained support for the NICD over the last 18 years has ensured that the human and financial resources necessary to achieve its mission and aims have been provided. The achievements in surveillance activities underscore the integral role of the NICD in providing surveillance data to monitor health interventions. Further, these achievements identify the value of the NICD as a national asset in preserving and monitoring the health and vitality of the South African public.

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11

Towards universal health coverage for people living with mental illness in South Africa

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Given its human rights-based Constitution of 1996 and as signatory to the United Nations Convention on the Rights of Persons with Disabilities, South Africa is obliged to provide equitable access to care for those with serious mental illness (SMI). Universal health coverage (UHC) means that all people are able to access the health care they need without incurring financial hardship. With the release of the National Health Insurance White Paper in 2017, South Africa confirmed the process of transforming its healthcare system to ensure UHC, including for people living with mental illness (PLWMI).

However, with multiple competing health priorities, there is a risk that mental health may not be addressed, particularly for those with serious mental illness (SMI). The severe functional impairment and psychosocial disability related to SMI limits the individual's ability to access health care, unless specifically catered for by the health system. At present, both the public and private health sectors are characterised by poorly resourced, fragmented, mainly hospital-based mental health care. Notably, if National Health Insurance does not provide financial protection, it is likely to perpetuate inequity and neglect in the health and mental health care of PLWMI.

This chapter explores UHC for PLWMI in South Africa, with consideration given to the burden of disease due to SMI, current mental health services, and national health policy and plans. We conclude with key recommendations to accelerate progress towards UHC for PLWMI, including the need for a paradigm shift in the organisation and funding of mental health services.

With the release of the National Health Insurance White Paper in 2017, South Africa confirmed the process of transforming its healthcare system to ensure universal health coverage, including for people living with mental illness.

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Introduction

South Africa is committed to achieving universal health coverage (UHC) and has embarked on the implementation of a national health insurance system to attain this goal.[1] According to the World Health Organization (WHO), UHC "means that all people and communities can use the promotive, preventive, curative, rehabilitative and palliative health services they need, of sufficient quality to be effective, while also ensuring that the use of these services does not expose the user to financial hardship."[2] UHC embraces the Sustainable Development Goals, which include mental health in parity with general health, in the Declaration and in health targets 3.4 and 3.8.[3]

Thus, UHC should ensure that people living with mental illness (PLWMI) enjoy equitable access to effective mental and general health care, with adequate financial protection. For health financing to be sustainable, the WHO recommends targeted budgeting, appropriate to the health priorities of the country, with cost-effective health systems and efficient utilisation of resources.[2] As stated by Mayosi et al.,[4] "the challenge [in South Africa] remains to scale up appropriate mental health services for the benefit of the whole population." Importantly, this challenge is against the backdrop of South Africa's quadruple disease burden, each competing for its portion of the health budget.

The term 'mental illness' adds to the complexity of priority setting in UHC. It encompasses a broad range of conditions, whether mild, moderate or severe.[5] Such a wide range of illness raises the pragmatic and ethical question of whether to allocate resources to the larger population with common mental illness, such as depression and anxiety, or to those with less prevalent but more severe conditions, such as schizophrenia and bipolar disorder.[5,6] An ideal mental health system should meet the needs of all in an affordable manner.[3] However, the marked functional impairment and disturbed behaviour rendered by severe conditions may predispose this subpopulation to neglect, if not outright discrimination, within the health system.

The term 'serious mental illness' (SMI) is used for health-planning purposes. SMI cuts across diagnostic categories to include any mental, behavioural or emotional disorder in a person over 18 years that causes marked functional impairment. It includes conditions such as severe anxiety, eating disorders and personality disorders, as well as psychotic and mood disorders.[5,7] Unless comorbid with another psychiatric disorder, it excludes dementias, mental disorders due to another medical condition, developmental disorders, and substance use disorders. SMI carries a significantly higher risk of all-cause mortality compared with the general population.[8]

Because of the impact of disability and the risk of neglect in health services, this chapter explores UHC for adults with SMI in the context of South African mental health services and policy development. The acronym PLWMI used in the chapter therefore refers to this patient population.

Burden of disease due to serious mental illness in South Africa

The 2015 Global Burden of Disease Study ranked depression as the 4th and anxiety the 10th leading cause of disease burden due to years lived with disability in South Africa.[9] Using the 12-month prevalence rate of 3.3% for severe depression and anxiety found by the South African Stress and Health Study, Lund et al.[10] estimated the annual cost of these two conditions in lost income at US$4 798 per person. This equated to over US$3.6 billion for the country when extrapolated to the population aged 20–64 years in 2001. There are no nationally representative epidemiological studies of other SMI such as schizophrenia or bipolar disorder. Analysing the 2010 Global Burden of Disease study, Baxter et al.[6] found that in Southern Africa, prevalence data for schizophrenia covered less than 0.1% of the general population and there were no prevalence data for bipolar disorder.

Hence, while the burden of disease due to severe depression and anxiety is well recognised, the burden due to other SMI is unknown. Although international prevalence estimates may be used, these do not reflect the bi-directional relationship between SMI and the significant societal stressors in South Africa, or between SMI and other causes of high disease burden, such as HIV infection, interpersonal violence, and road injuries.[11]

Psychosocial disability and universal health coverage

Consistent with its human rights-based Constitution (Act 108 of 1996),[12] South Africa is signatory to the United Nations Convention on the Rights of Persons with Disabilities,[11] and therefore committed to ensuring the "full and equal enjoyment of all human rights and fundamental freedoms" for people with disabilities in equity with others. The Convention considers people with mental impairment in parity with those with physical, intellectual or sensory impairments. Disability refers to the hindrance to full and effective participation in society resulting from the interaction between the impairment and the person's social and physical environment. Psychosocial disability refers to the stigma, discrimination and inability to participate in society experienced by PLWMI due to the interaction between mental impairment and the environment.[13]

As PLWMI experience an inability to access or utilise health, education and employment opportunities, psychosocial disability entrenches the poverty cycle and perpetuates ill-health. Ensuring the right to health care of PLWMI is further complicated by impaired insight, judgement and cognitive function caused by SMI.[14] Decision-making and help-seeking are often negatively affected and may inadvertently result in denial of treatment for acute illness episodes and of preventive, rehabilitative or palliative care for enduring conditions.

The Convention on the Rights of Persons with Disabilities has far-reaching implications for UHC of PLWMI in South Africa. Equitable access implies that enough additional support is provided by the health system, other government sectors, and civil society to ensure that the right to healthcare services is observed. Quality care must be effective not only in relieving acute symptoms, but also in preventing relapse, impairment, and subsequent disability. Financial protection is needed to prevent further worsening of the poverty cycle associated with SMI.

In short, a transformation of South African society, social services, and the health system is required to facilitate full participation of PLWMI.[11] The National Mental Health Policy Framework and Strategic Plan 2013–2020 (NMHPF)[15] outlines an action plan in which mental health care is delivered in a variety of settings and at different service levels. For PLWMI, community-based mental health

services, general hospital psychiatric units, and psychiatric hospitals are necessary, along with primary health care (PHC) and services from the non-health and non-governmental sectors. The objectives of the NMHPF are consistent with the global objectives monitored by the WHO Mental Health Atlas.[16]

Mental health services in South Africa

South Africa has a two-tier health system, with the total health expenditure split equally between the public and private health sectors.[1] Eighty-four per cent of the population receive care in the public health sector, funded mainly from the national fiscus. The other 16% purchase health care from private providers, using pre-paid health insurance intermediaries (medical schemes) and/or out-of-pocket cash payments. Although both sectors are subject to the same national mental health legislation and policy, the population groups served differ considerably.

Public health sector

As the public health sector caters for those unable to access private health funding, it carries the burden of care for PLWMI with severe psychosocial disability. However, it is characterised by a shortage of mental health professionals. The WHO Mental Health Atlas South African profile (2014),[16] documents 0.4 public-sector psychiatrists/100 000 population, but has no figures for other members of the mental health workforce, including medical doctors, psychologists, nurses, occupational therapists, or social workers. In the case of nurses, the situation is dire, with a projected severe shortage related to changes in nursing education and curriculum.[17]

The public sector mental health system has followed a deinstitutionalisation process since the mid-1990s,[15,18] consistent with global trends in mental health care, the Constitution,[12] and the Mental Health Care Act (17 of 2002).[19] Section 8 of the Mental Health Care Act stipulates that mental health services be provided in a manner that facilitates community care. To implement this, the National Department of Health (NDoH) published human resource norms for severe psychiatric conditions.[20] The norms reflect the 'balanced care model'[3] and specify specialist-level multidisciplinary staffing of community-based mental health services and the development of general hospital psychiatric units. Targets of 10 beds/100 000 population for psychiatric institutions and 28 beds/100 000 population for general hospital psychiatric wards were set, together with figures for community-based residential beds and day care facilities. However, implementation of the Mental Health Care Act was not funded, and mental health financing remained institution-based. This resulted in a haphazard process of deinstitutionalisation with erratic or no development of community mental health services, and, in some areas, re-institutionalisation.[11,21–24]

A WHO survey[21] using 2005 data found general hospital and community residential psychiatric beds in South Africa to be only 10% of the recommended norms, despite a 7.7% reduction in the number of institution beds over the preceding five years to 18/100 000 population. In 2014, South Africa reported 22.7 institution beds/100 000 population to the WHO Mental Health Atlas,[16] but provided no data on general hospital or community residential beds. A continued reliance on institution beds is also reflected in the 2014/15 District Health Barometer,[25] which revealed psychiatric admission rates to be higher in districts with specialised psychiatric hospitals. Most disturbing though is the insidious, inhumane, re-institutionalisation of PLWMI evident in South African prisons[26] and forensic psychiatry units.[27]

In Gauteng, the number of long-stay hospital beds was halved from 70 to 35 beds/100 000 population between 1994 and 2004.[18] Further deinstitutionalisation towards the goal of 10 beds/100 000 population continued until 2008, when repeated readmissions prevented further bed reductions.[18] However, the corresponding development of community-based mental health services and community residential beds was not sustained,[22] and their gross inadequacy was made painfully obvious in the Gauteng Mental Health Marathon Project (GMHMP) in 2015/16 (Box 1). In this project, the last institution beds in the province were rapidly closed, leading to an excessive loss of life.

Box 1: The Tragedy of the Gauteng Mental Health Marathon Project

In a bid to save costs, and justified by the deinstitutionalisation process, 1 442 people with severe psychosocial and other disabilities were transferred out of long-stay medium-care hospitals between October 2015 and June 2016 to either specialised psychiatric hospitals, which were renovated and staffed for the purpose, a government-run care and rehabilitation centre, or non-governmental residential facilities (NGOs).[28]

119 patients (8.3%) died within a year of transfer, and 131 (9.1%) died during the 2016 calendar year.[28] The age-adjusted death rate for 2016 was 63/1 000 people, and the overall standardised mortality ratio was 4.9.

Those transferred to a specialised psychiatric hospital were significantly more likely to have survived than those transferred to the government care centre or an NGO (p=0.004). However, this survival came at a financial cost five times higher than the cost of the original long-stay hospital care and 12 times higher than an NGO.

Factors that led to the tragedy were lack of financial protection, an underestimation of the vulnerability of PLWMI, and a misinterpretation of what constitutes community-based mental health services.

However, the assumption that PHC facilities had the capacity to manage dementia, psychosis and bipolar disorder is consistent with the NDoH health indicators for PHC.[29] Additionally, the resourcing of specialised psychiatric hospitals and a lack of specialist support at district level is consistent with the hospi-centric provision for psychiatric care in the National Health Insurance (NHI) White Paper.[1]

Some general hospital psychiatric units have been established in Gauteng. More geographically accessible and less stigmatising than psychiatric hospitals, these are better positioned for UHC. However, a high workload, poor continuity of care with community-based services, frequent readmissions related to poor medication adherence, and an unfavourable nurse: patient ratio have been described in one such unit.[30] An exploratory study among nurses at the same unit revealed significant nursing stress, partly related to the severe aggression among inpatients, and partly to a lack of senior management support. This situation is described further in the case study at the end of this chapter.

Rural areas are particularly under-resourced, and possibilities for task-sharing and remote supervision using tele-psychiatry have been considered to improve mental health care services.[31,32] However, task-sharing is not a panacea. An adequate human resource mix is required, with enough mental health professionals to provide training and continued supportive supervision. In North West, the integration of SMI into PHC is hampered by a lack of community-based psychiatrically trained nurses and the remoteness of specialist supervision, which is based at the psychiatric hospital.[31] In KwaZulu-

Natal, a 75% shortage of general hospital psychiatric beds and undeveloped community-based mental health services means that specialised hospitals are the mainstay of mental health care and of outreach to PHC facilities.[11] However, these are poorly maintained, with inadequate annual budgetary increments; the mean five-year increase between 2006 and 2010 was less than half that of general hospitals (19% versus 51%).

In the Eastern Cape, marked variations in bed distribution exist, with no psychiatric beds in Alfred Nzo and Ukhahlamba districts.[24] With only 2.7 general hospital beds/100 000 population, mostly in the OR Tambo district, PLWMI throughout the province are almost solely dependent on colonial-era psychiatric hospitals (15.8 beds per 100 000 population). A health ombud investigation at one of these institutions[33] revealed it to be dilapidated, with a history of marked neglect by the provincial health authorities. However, hospital discharge presented an ethical dilemma: with no community-based mental health services, poor psychosocial support of families, and insufficient accommodation for homeless PLWMI, the right to receive care close to home could not be observed. Evidence suggested that the community was unable to care for SMI without formal support, and prolonged institutionalisation was deemed the more humane option. That the Health Ombud found no "deliberate human rights violations" but rather "systemic failures", implies that significant health system reform is needed to observe the right to appropriate mental health care services.

Private health sector

As access to private health care requires employment-linked medical scheme membership and personal financial resources, the private health sector caters for PLWMI with either limited functional impairment or substantial family support. It follows that the prevention of psychosocial disability, through early identification, treatment and rehabilitation of SMI, and maintenance care to control symptoms and prevent relapse would be prioritised. However, the Council of Medical Schemes[34] only reports on mental institution acute inpatient care, with average length of stay as the only health indicator. This may be related to the Prescribed Minimum Benefits,[35] which prioritise brief acute hospitalisation for PLWMI, with an alternative option of limited outpatient psychotherapy for selected disorders. Ambulatory preventive, rehabilitative or palliative mental health care is not financially covered, not even for schizophrenia, a severely disabling, chronic, relapsing psychiatric disorder.

In summary, both public and private sector care for PLWMI fall far short of UHC, the Convention on the Rights of Persons with Disabilities, and the Constitution. Both are hospi-centric; public sector care is predominantly in poorly resourced institutions, and private sector care prioritises acute hospitalisation. Underpinning both is a lack of financial protection for PLWMI and their service needs.

Policy and plans for mental health in South Africa: 2012–2018

Following the launch of the National Development Plan: Vision for 2030,[36] with its call for a "long and healthy life for all South Africans," the NDoH endorsed the NMHPF, integrated mental health into general health policies and plans, and established routine indicators for mental health in general data collection (Table 1). The commitment to improved coverage of mental illness and integration of mental health into general health services is not in question. However, service provision does not appear to reflect this commitment. Now, in the early stages of NHI, is a good opportunity to consider factors in policy and plans that may hinder or advance UHC of SMI.

Primary mental health care

Primary mental health care is cited repeatedly in policy and plans as a means to improve mental health coverage.[1,41,45] Accordingly, the National Indicator Data Set[29] lists a number of disorders expected to be treated at PHC level, including SMI such as psychosis and mania. However, such illness may not be within the scope of practice of PHC practitioners. While there is good evidence that, with specialist support, PHC medical practitioners can care for depression and anxiety, evidence of integration of other SMI into PHC is lacking.[31,32,46] Where evidence exists, the best practice appears to be collaborative care between specialists and PHC practitioners.

In South Africa, nursing staff form the backbone of PHC and task-sharing with nurse prescribers is utilised for numerous conditions, but not for mental illness.[43,44] In the case of PLWMI, the Adult Primary Care and NDoH Standard Treatment Guidelines describe the nurse's role as to identify SMI, make an assessment, and facilitate referral for medication. PHC nurses may also provide psychosocial interventions, family support, adherence support, and ongoing monitoring of mental and physical health. Although an essential human resource for UHC of PLWMI, the psychiatrically trained PHC nurse is dependent on adequate support and accessible referral systems.

Community-based mental health services

National Health Insurance will provide for psychiatric care in hospitals, from regional level and above.[1] Because they are stand-alone, specialised psychiatric hospitals are the only service to have dedicated mental health funding. In the case of community-based mental health services, NHI includes them as a PHC service. However, the intervention pyramid of the NMHPF positions them at a specialist service level, back-to-back with general hospital psychiatric units. The NMHPF further recommends that human resources of community-based mental health services are scaled up to match the NDoH norms for a specialist-level multidisciplinary team. Therefore, these are specialist level services which operate in the community rather than the hospital setting.

The NMHPF organisation of services is consistent with the 'balanced care model',[3] whereby community-based mental health services are the mainstay of psychiatric care, with general hospital psychiatric units providing acute symptom relief. Organising psychiatric services in this manner is recommended for middle-income countries as it facilitates task-sharing and collaborative care. Additionally, through inter-sectoral collaboration with local non-health and non-

Table 1: Mental health in national policies and strategic plans, South Africa, 2012–2018

Policy	Inclusion of mental health	Monitoring
Integrated School Health Policy 2012[37]	Screening and treatment of mental health conditions made a school health requirement.	Mental health screening included in the school health tick register for all learner categories[29]
Strategic Plan for the Prevention and Control of Non-communicable Diseases 2013–2017[38]	Recognises the high prevalence and disability burden due to mental illness and its association with lifestyle health risk factors. The 10th target is to increase the number of people screened and treated for mental illness by 30% by 2010.	Household surveys: • SANHANES–1[39] measures psychological distress, trauma exposure and post-traumatic stress disorder • National Income Dynamics Study[40] measures depressive symptomatology
National Mental Health Policy Framework and Strategic Plan 2013–2020[15]	Adapts the WHO Mental Health Action Plan to South Africa. Outlines areas for action with eight specific objectives.	Mental health included in general hospital data and psychiatric hospitals:[29] • average length of stay • bed occupancy rates • mental health separations • involuntary admission rates • inpatient deaths
Health Strategic Plan 2014/15 to 2018/19[41]	Promises to "scale up decentralised integrated primary mental health services which include, community-based care, PHC clinic care and district level hospital care". Strategic objectives include improving access to mental health services, with a target of screening and treating 35% of the prevalent population.	Mental disorder screening and treatment rates included at PHC level: • depression, anxiety, dementia, psychosis, mania, suicide, developmental disorders, behavioural disorders, and substance use disorders[29]
Ideal Clinic Programme[42]	Subcomponent 16 includes availability of mental health and allied health practitioners in integrated clinical service management.	Element 31: 35% of all PHC patients screened for mental illness. Element 110: Patients have access to mental health services. Checklist for patient records: mental state examination.
National Health Insurance (NHI) White Paper, 2017[1]	Recognises the burden of disease due to mental illness. Mental health to be prioritised in early stages of the fund. Community-based mental health at PHC level. Psychiatry included in general regional, tertiary, and central hospitals as well as specialised hospitals. Mental health included in Adult Primary Care[43] and at all service levels in the NDoH Standard Treatment Guidelines and Essential Medicines List.[44]	Guideline adherence and availability of essential psychotropic medicines.
NDoH Annual Performance Plan 2018/19 to 2020/21[45]	Aligned with Sustainable Development Goal 3: to promote mental health and well-being. Mental health and forensic mental health included under PHC, non-communicable diseases sub-programme; strengthen district mental health. NHI Grant: Personal Services Component to include strategic purchasing of services from psychiatrists and psychologists.	Re-engineering of PHC and inter-sectoral collaboration. Number of District Specialist Mental Health Teams established. NHI Grant: • Number of psychiatrists and clinical psychologists contracted • Number of people screened and treated for mental health problems • Percentage reduction in the backlog of forensic mental observations

government sectors, community-based mental health services enable a favourable environment for PLWMI and promote population mental health and well-being. By being accessible and person-centred in their approach to care, community-based mental health services fulfil the Convention on the Rights of Persons with Disabilities and the Constitution, and facilitate UHC for PLWMI. It is however uncertain if such services, if they are perceived to be a function of PHC, will be adequately financed under NHI.

The NDoH Annual Performance Plan 2018/19–2020/21[45] does not include community-based mental health services. However, it includes District Specialist Mental Health Teams, forensic mental health, and primary mental health care under the PHC programme, which is allocated 0.6% of the total health budget. Other PHC services competing for the same budget include all diseases except those of the priority programmes, PHC trauma and emergency medicine, oral health, nutrition, and environmental and port health. Although the PHC budgetary allocation for non-communicable diseases is to be increased over the next three years, budget allocated to professional-level salaries will be reduced, suggesting that the human resource posts required for the District Specialist Mental Health Teams are unfunded. While there is a short-term allocation from the NHI personal services grant to address the backlog of forensic psychiatry and community-based mental health services, this is a temporary arrangement which does not seek to correct the chronic systemic failures.

For quality assurance of psychiatric care, national health indicators are hospi-centric, monitoring admission rates, involuntary admissions, average length of stay, and inpatient deaths. Of concern is that there is no post-discharge monitoring, although the first year after discharge presents the highest risk period for mortality of PLWMI.[8] There are no health indicators for community-based mental health services, no monitoring of illness relapse or adverse incidents among community-dwelling PLWMI, and no user-level outcome measures.

In summary, although NHI promises to align public and private health sectors in delivering an evidence-based package of mental health

care with a comprehensive PHC approach, it does not cover the provision of specialist level community-based mental health services, and hospi-centric psychiatric care is still prioritised. Given that South Africa has a largely deinstitutionalised mental health system, the lack of financial protection for community-based mental health services is inexplicable. As made apparent by the GMHMP, it is not possible to provide accessible care for community-dwelling PLWMI appropriate to the level of severity of illness without funding. The funding of community-based mental health care should be equal in magnitude to funding of institutional care. However, the financial burden of community-based care may be borne by multiple stakeholders, and it is believed to be more cost-effective than institutional care in that it achieves improved mental health coverage, psychosocial functioning, and quality of life among PLWMI.

Conclusion

Notwithstanding South Africa's human rights-based Constitution, health legislation and international treaties, the country could continue denying accessible care to PLWMI under current NHI policy. By not acknowledging and financing community-based mental health services as a multidisciplinary psychiatric service, the Mental Health Care Act and NMHPF remain unfunded mandates. For PLWMI, UHC is complicated by the functional impairment of those needing care. A health system which restricts specialist care to hospitals will perpetuate psychosocial disability. Promotive, preventive, curative, rehabilitative and palliative mental health care may remain inaccessible to those most in need.

Recommendations

The following recommendations could be catalytic in achieving UHC for PLWMI:

- A paradigm shift in the organisation and financing of mental health services is needed, so that specialist staffed community-based mental health services become the mainstay of psychiatric care, with support from general hospitals for acute admissions and specialised hospitals only for those with the most severe mental impairment. Thus, ambulatory, preventive and promotive care should be prioritised, with an inter-sectoral collaborative approach and support of integrated primary mental health care. In the rural setting, where specialist staff are scarce, funding of technology should be included, such as that needed for tele-psychiatry, in order to facilitate remote specialist support.
- A mental health workforce should be developed within PHC and community-based mental health services. All nurses should receive basic training in psychiatric nursing. While posts must be developed for community-based multidisciplinary teams according to the NDoH norms manual, posts for other practitioners such as clinical associates, registered counsellors, lay health workers and lay counsellors need to be included to enable task-sharing.
- A national programme guideline describing pathways to care for PLWMI, with consideration of scope of practice, task-sharing duties, the NDoH standard treatment guidelines, and requirements of the Mental Health Care Act is needed. Inter-sectoral duties must be delineated according to service-delivery agreements negotiated at national level.
- Health indicators should provide quality assurance regarding care outcomes and not only PHC headcounts or hospital-level data. To prevent another tragedy such as the GMHMP, regular community-based clinical audits incorporating user-level outcome measures are advised.

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The experience of nurses working in an acute mental health care unit in a Johannesburg hospital

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Introduction

There is a dearth of information on how nurses working in mental health wards cope with their jobs. This study was conducted in the acute mental health care unit at Helen Joseph Hospital, Johannesburg, a tertiary, training facility linked to the University of the Witwatersrand. The aim was to explore and describe situations that nurses encountered on the job, the impact thereof on these nurses, and the support available to them. The hospital is designated as an acute 72-hour psychiatric assessment, care and treatment unit. The unit has 40 beds, with 10 nurses per shift.

Ten nurses were interviewed, all of whom had been working in the acute care unit for more than a year. The nurses had from three to 30 years of nursing experience, and both male and female nurses were represented in the study. Major themes were identified using thematic analysis, and all ethical and research protocols were complied with.

Key findings

A recurring theme highlighted by all 10 participants was that they had been in life-threatening situations during the course of their work. Participants recalled incidents in which patients were aggressive or assaulted them, leaving them feeling as though their lives had been in danger. At times, these experiences resulted in a physical injury that had to be treated medically.

Management's response was perceived as unsupportive. Participants felt 'blamed' for these incidents, especially in instances where management suggested that the nurses might have provoked the patients.

Participants felt that priority was given only to physical injuries, while emotional and psychological effects were not considered. Debriefing was only offered in the case of severe incidents.

Only two participants felt that they had adequate training to assist them in daily challenges, such as care of aggressive patients and restraining of these patients. Eight participants felt that they were not equipped or sufficiently prepared to work in an acute care unit given their training, with some suggesting that they had been allocated to the unit 'accidentally' due to rotation within the hospital. Requests for transfers had been mostly unsuccessful, which resulted in participants feeling like captives in the unit.

Two participants suggested that they were stigmatised by other hospital staff as having mental health problems of their own because they worked in a mental health care ward.

Participants said that patient deaths were traumatic for them, especially in the case of suicide. They recounted several instances in which they were exposed to patient suicide in the unit (hanging, drowning and jumping through a window). Participants felt that patients did not intend to commit suicide but wanted to escape the unit and be in a 'free environment'. They also reported feeling blamed by management after suicides had occurred. No debriefing or ongoing counselling service was offered in these cases.

Support systems

On the whole, the nurses felt more comfortable discussing their support systems than their coping mechanisms, possibly out of fear of being judged for adopting questionable or unhealthy coping strategies.

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All participants said that they received limited support from management. They said that the only support was to be sent for a physical examination after a severe attack requiring medical attention, and then possibly debriefing, depending on the severity of the incident. All participants felt that the level of support and intervention from management was inadequate.

In terms of collegial support, participants noted a positive sense of togetherness and strong support. They felt that their colleagues were able to empathise genuinely with their experiences and connect with their concerns on a personal level.

The participants spoke highly of their families in providing support. All participants stated that their families (mostly immediate families) gave them emotional comfort and assistance. They also mentioned that family members would call and check up on them and give them encouragement.

Coping mechanisms

Participants cited 'talking about their feelings' as a way of coping. This assisted them in alleviating some of the negativity they were feeling, and was in their opinion a healthy method of coping.

Debriefing occurred in group settings; the nurses said that debriefing occurred rarely, but that they made use of it when it was offered. Participants stated that they would like to be offered more debriefing, or any form of psychological assistance, on a regular basis and not only after a critical incident.

The hospital does provide an Employee Assistance Programme (EAP). The EAP is designed to assist hospital employees with a range of wellness aspects that address social, psychological and emotional needs; however, no therapeutic or debriefing services are included. Participants indicated that they seldom made use of this service, ostensibly because of its perceived ineffectiveness.

Participants reported taking sick leave as a way of coping with their challenges, and recuperating after difficult shifts or critical incidents.

Recommendations

There is a need for more ongoing support from management, i.e. involvement with and follow up of nurses, and not just medical support after a critical incident occurs. It is recommended that management have monthly meetings with the nurses, or have a one-off meeting to address the concerns and issues raised by the participants.

The need for therapeutic services is evident. Such services could form part of the EAP, with formal debriefing sessions organised with appointed therapists. This would allow nurses to process their feelings and experiences, which may foster positive coping strategies.

Ongoing in-service training specific to nurses is recommended. In-service training may be in the form of workshops that focus specifically on mental health issues, including how to deal with challenging patients, and knowledge of treatment modalities and their efficacy. The content of these workshops should be determined via a needs assessment conducted among staff of the unit. Liaisons with staff from Sterkfontein Hospital may also assist with training workshops, as experiences and advice could be shared. These workshops could also update nurses of new methods of practice that may develop.

Visible security within the unit is recommended, as one security guard at the entrance of the unit is insufficient. An additional security guard should be placed at the nurses' station to intervene with aggressive patients, and panic buttons should be installed to trigger an alarm in threatening situations so that security may respond timeously.

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12 Perceptions on and quality of clinical practice guidelines for stroke management in a rural health district

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Emerging Public Health Practitioner Award

Stroke is a catastrophic illness, with around 360 South Africans suffering a stroke per day, of which 110 die and 90 are left with a life changing disability, thus causing strokes to be the leading natural cause of disability and the fourth most common cause of death. Due to the absence of a cure for stroke, rehabilitation aims to restore function in an individual who has suffered a stroke. People living in rural areas are more vulnerable to developing stroke than their urban counterparts due to disparities in health care services and availability of health care providers. South Africa still lacks dedicated stroke units that concentrate services and care expertise for stroke survivors, and this is more acute in rural areas.

The use of clinical evidence-based practice assists with the provision of a uniform level of care across all levels. Existing evidence suggests a low uptake of clinical practice guidelines amongst health care practitioners because of lack of knowledge and/or the quality of the actual guidelines.

The aim of this study was to understand the perceptions of rural therapists of clinical practice guidelines for stroke management and to assess the quality of stroke clinical practice guidelines using the international Centre for Allied Health Evidence (iCAHE) guideline quality checklist.

Recommendations include the review and revision of the clinical practice stroke guidelines provided to rural therapists; taking into account the human and material resources in rural areas; and the development of a clear strategy and plan of action to disseminate and promote implementation of the guidelines.

Evidence suggests a low uptake of clinical practice guidelines amongst health care practitioners

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Introduction

In 2013, stroke accounted for 84.4% of all deaths from cerebrovascular diseases in South Africa, and it was declared the fourth major cause of disease burden and disability worldwide, following heart disease, HIV and AIDS, and unipolar depression.[1,2] Studies show that the prevalence of stroke is even higher in rural settlements than urban areas owing to differences in the profiles of rural and urban dwellers.[1,3] Approaches to the management of acute stroke in rural areas are considered suboptimal, thus creating inequities between patients in urban settings and their rural counterparts.[1,3]

A multi-disciplinary team approach is needed for stroke management due to the varied symptoms that survivors present with, including slurred speech, numbness, blurred vision, weakness or paralysis, severe headache, and confusion. The efforts of rehabilitation practitioners, guided by clinical practice guidelines (CPGs), are critical in assisting stroke survivors to achieve or maintain optimum physical function.[4,5]

Rehabilitation practitioners involved in the management of stroke include physiotherapists, occupational therapists, speech therapists and audiologists. However, it has been reported that therapists working in rural areas often lack access to continuous professional development (CPD) activities that assist in keeping them up to date with new knowledge on specific topics, including stroke.[6] To fill this gap, CPGs contextualised for rural therapists are required so that therapists are able to provide the best up-to-date clinical interventions for stroke patients.

CPGs are scientifically developed statements to assist health practitioners with health decision-making, thereby reducing disparities in patient care.[7,8] CPGs assist with evidence-based information for the management of specific medical conditions, including stroke.

Research studies have explored different issues pertaining to guideline utilisation by healthcare practitioners.[8] For example, the mode of information transfer is essential in the implementation of CPGs.[9] A guideline that is too long is less likely to be read or used, especially in rural public health facilities where extra demands are made on the time of therapists due to staff shortages.[1,3]

Furthermore, the mode of CPG dissemination varies from country to country, the most common method being by postal mail.[9,10] The way practitioners receive CPGs impacts on the level of implementation and use, as some practitioners have reported being unaware that CPGs exist.[11] This shows that merely disseminating CPGs will not result in optimal uptake. Other factors reported to impact on guideline uptake include: lack of time to read the guidelines; complex patient presentation including co-morbidities; not being supported by peers or colleagues; lack of focus on multi-disciplinary interventions; and preference for using personal clinical experience.[8,12]

The publication and implementation of CPGs does not always guarantee good-quality guidelines. Therapists who perceive clinical guidelines as being of poor quality will have negative attitudes about them, which results in the guidelines not being used.[13,14] Rating the quality of a clinical guideline helps to identify gaps that need to be filled before a guideline can be accepted for use.[15]

This chapter reports on a study conducted to ascertain the knowledge, attitudes and practices towards CPGs in the treatment of stroke and possible strategies to improve guideline implementation and uptake. It also reports on the results of an assessment of the quality of existing stroke CPGs using the international Centre for Allied Health Evidence (iCAHE) guideline assessment tool.

Therapist perceptions of CPGs in stroke management

Sixteen rehabilitation therapists (seven physiotherapists, five occupational therapists, and four speech therapists and audiologists) employed in three district hospitals in rural Mpumalanga were interviewed. The therapists were selected based on their involvement in stroke rehabilitation.

Knowledge of stroke CPGs

Twelve of the 16 participants had never been exposed to the CPGs. The remaining four participants had either been exposed to the guidelines at university, through their supervisor, or at provincial level, e.g. through the provincial physiotherapy forum. Some therapists reported being aware of the existence of the guidelines but never having actually perused them, as evidenced in the following quotes.

> *I haven't really gone through them [the guidelines]…. I heard about them…. I think it's that thing that they are here and if you need to look at them then you are more than welcome to. [Participant 4]*

> *Is it not like a procedure on what to do? For example, this disorder – what are the procedures, the assessment tools, the instruments and stuff? [Participant 16]*

> *I think they [the guidelines] are somewhere in the file but I have never seen them. [Participant 14]*

Attitudes towards stroke CPGs

The results indicate that the therapists had a positive attitude towards the CPGs. Participants suggested that the guidelines could improve the rehabilitation process, assist in comprehensive patient management, and provide increased learning and updated information. This is reflected in their comments on the value of guidelines.

> *I think guidelines do give kind of a goal in a way, so I think treatment of the patients will be more focused. [Participant 9]*

> *If there's a clinical guideline for stroke that says 'do this and this, and first try this', at least you know that when you are running out of ideas you have clinical guidelines to refer to. [Participant 15]*

> *Obviously the guidelines would change the way I do patient care because I can at least have a reference point where I can always go back and check. [Participant 8]*

Although most of the therapists had not been exposed to stroke CPGs, they had an understanding that having access to the guidelines and utilising them would improve their patient care.

> *I would love to have these guidelines. I cannot say I am confident with stroke patients but if there is a guideline that*

is going to help me then I'm sure I can develop more, and one of these days I can be confident enough. [Participant 15]

Practices related to stroke CPGs

Two main themes emerged: in terms of patient care, therapists stressed the importance of educating families to conduct home-care programmes, and in terms of barriers to the utilisation of guidelines, they stressed the importance of taking a holistic approach to patients.

We don't have as many resources as we would like, and keeping family members heavily involved I think is very important. [Participant 9]

The patient might be presenting with maybe RVD [retroviral disease], or other conditions that might affect the patient's function, so they didn't add those kind of things. With them a stroke patient is still presenting with hemiplegia and it's just a straightforward thing, but there are some other clinical things they haven't added. [Participant 11]

Newly qualified therapists (community service therapists) had very little experience in managing stroke patients; their reliance was mainly on undergraduate university training.

Yeah, I think it's the combination of my clinical background, the information from my colleagues, as well as the person who is accompanying the patient. [Participant 7]

They reported that having access to a CPG would improve their rehabilitation process with stroke patients. This highlights an unmet need to provide training in public health facilities where community service therapists are employed as they felt that using a stroke CPG would make them feel more confident in managing stroke patients.

A review by Spiers and Harris came to similar conclusions, namely that more support should be provided to allied health professionals working in rural and remote communities in order to improve the health outcomes of rural patients.[16]

Compared with other studies which found that physiotherapists regard guideline utilisation as time consuming, therapists in this study reported that using a CPG would save them time during patient rehabilitation.[10] This difference in opinion could be because many therapists in this study had not utilised guidelines before and therefore did not have a sense of the time required to read and implement them.

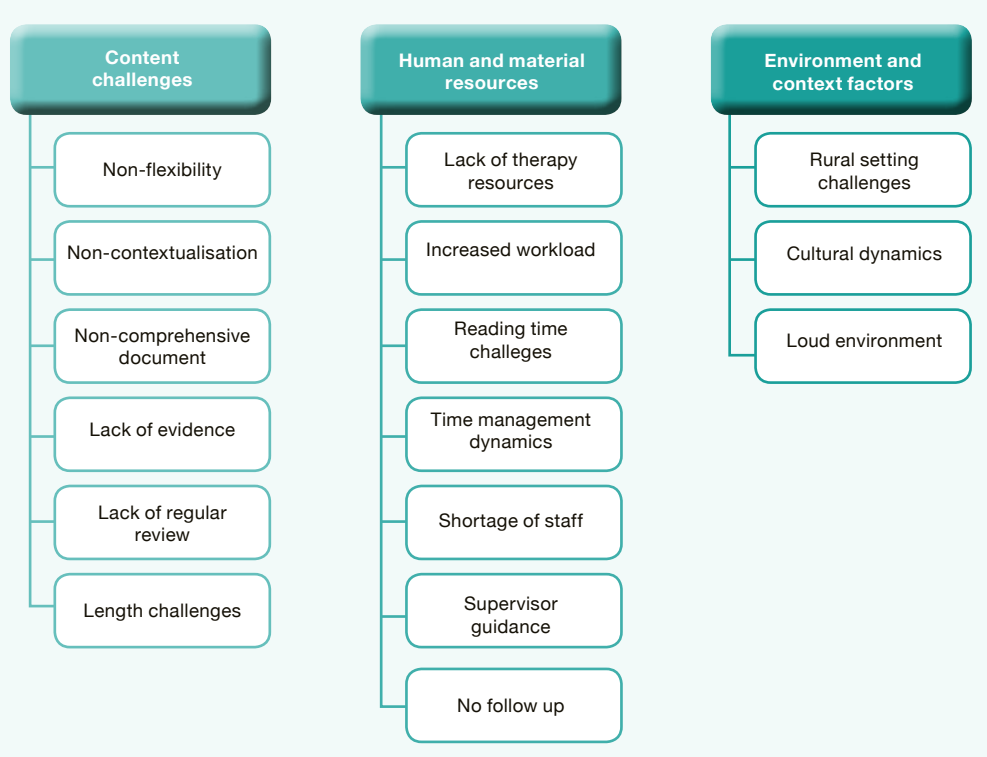
The barriers experienced by the therapists in implementing stroke CPGs are given in Figure 1.

Strategies to improve the implementation of stroke CPGs

Therapists suggested various strategies to improve the dissemination and implementation of stroke CPGs. These suggestions included staff training, and changing the design and content of the current clinical guidelines disseminated in rural district hospitals. According to the therapists, these initiatives are currently not in place and would play a major role in improving the implementation of CPGs in their local context. This is consistent with reports from other studies, which state that the mode of clinical guideline dissemination ultimately affects guideline utilisation.[9,10]

Therapists reported that they preferred electronic communication, especially email, as a way to receive information on clinical guidelines, despite reported problems with internet connectivity in rural areas. This preference highlights the need to strengthen internet connectivity in public health facilities to make service delivery more efficient.

Figure 1: Barriers affecting utilisation of stroke CPGs, Bushbuckridge, Mpumalanga, 2018



Maybe if they [the guidelines] had some sort of app because everyone is forever on their phone, so like have a small app or what-not so you can quickly go through for reference, it would work wonders. [Participant 14]

Currently there is neither training nor an implementation strategy on how best to use clinical guidelines. The therapists in this study suggested that training should measure effectiveness of the strategy and assess practitioner knowledge and understanding. This is in keeping with recommendations from authors who proposed an active strategy for guideline implementation that included interactive education and discussion sessions, feedback, and reminders to physiotherapists.[10] Research findings have reported on a correlation between workplace-based initiatives and corresponding improvement in the uptake of CPGs.

Maybe they can in-service us on these guidelines, then we are aware of these guidelines that are developed. [Participant 5]

The therapists suggested that stroke CPGs should be designed differently to make them more user-friendly. Recommendations included improving the design and layout; developing shorter, more succinct guidelines; the addition of graphics; and giving the guideline development date.

Assessing the quality of stroke CPGs

All 16 therapists were asked to rate the quality of the stroke guidelines available at their hospitals using the iCAHE tool developed by Grimmer-Somers et al.,[15] which consists of 14 yes/no questions. The total score was the sum of 'yes' responses. Therapists who had never seen the guidelines were given time to peruse them before rating.

Percentage scores were calculated using the iCAHE quality ratings obtained from each therapist, per profession. The percentages were categorised as follows: 0–24% (poor quality); 25–49% (fair quality); 50–74% (good quality); and 75–100% (excellent quality).[13]

Speech therapists and audiologists (STAs) scored their stroke guideline at 35.7%, physiotherapists (PTs) scored their guideline at 20.4%, and occupational therapists (OTs) gave their guideline a rating of 18.6%.

Overall, the scoring was low for each professional stroke guideline used in Bushbuckridge local municipality. All three categories of allied rehabilitation practitioners submitted an iCAHE score below 50%, representing poor to fair quality. The stroke CPG provided to physiotherapists and occupational therapists scored poor quality, while the guidelines for speech therapists and audiologists was scored as fair quality. The low scoring by all therapists could be related to the low uptake of these stroke guidelines. Even though speech therapists and audiologists scored their guidelines slightly higher than the physiotherapists and occupational therapists, their overall uptake was still very low due to the negative perception of the CPGs. It is possible that this perception may also have been influenced by their rural context. The differences in stroke CPG quality scoring among the three professions could be an indication of lack of collaboration among the developers of the guidelines. As stroke is a condition requiring a multidisciplinary approach,[4] CPGs intended for stroke management should be developed as a multidisciplinary initiative with input from all the stakeholders.

Conclusion and recommendations

The results suggest that therapists in rural Mpumalanga have limited knowledge and awareness of stroke CPGs. Rating of these guidelines by the therapists also provides insight into why therapists who have been exposed to the guidelines do not use them.

Two further findings from this study are the need to develop multidisciplinary stroke CPGs, and the importance of considering the context (in this case rural) when designing and implementing clinical guidelines.

The following recommendations are pertinent for stroke CPG developers.

- Review and revise the clinical practice stroke guidelines provided to rural therapists, taking into account the human and material resources in rural areas. These guidelines should then be scored using the iCAHE quality checklist, and piloted before dissemination and implementation.
- Develop a clear strategy and plan of action to disseminate and promote implementation of the guidelines which includes running workshops with the intended users. Make guidelines easily accessible to therapists living in rural areas. The use of mobile technology should be incorporated into the guideline dissemination plan.
- Guideline developers must also consider developing guidelines that are not too long to read as this discourages therapists from reading them.

The heads of therapy departments and rehabilitation directors should create the space and time for therapists to read and engage with the CPGs on a regular basis. Audits of CPGs should take place quarterly or bi-annually. Heads of department should discuss CPGs during national rehabilitation forums so that they can share ideas with other provincial therapy departments.

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Review

13

Assessment of food environments in obesity reduction: a tool for public health action

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The nutrition transition in sub-Saharan African countries has contributed to increased incidence of overweight and obesity, which constitutes a major public health risk. This is especially the case where dietary patterns are influenced by the ready availability of fast foods, resulting in a high intake of fat, sugar and salt. This low-quality diet increases the risk of non-communicable diseases (NCDs). By measuring the food environment geographically, healthy food access gaps can be identified and nutrition-sensitive preventive interventions can be developed.

Addresses of food retailers were geocoded to quantify the total number of grocery stores (healthy options) and fast-food outlets (less-healthy options) within wards across Gauteng, the most densely populated province in South Africa. The Modified Retail Food Environment Index (mRFEI) was then computed, representing the percentage of 'healthy' food retailers in the area.

The mRFEI was widely heterogeneous across Gauteng, ranging from a minimum of 5% to a maximum of 100%, with an average of 33%. The index was highest in the most affluent wards and lowest in the poorest wards, with the latter including a high number of informal settlements. This diverse result was consistent with the high levels of socio-economic inequality that have been observed in Gauteng.

For countries such as South Africa currently undergoing rapid nutritional transition, it is imperative to be creative in finding cost-effective ways to identify the structural drivers of NCDs. Through supporting healthy food environments, the public health goals of reducing and preventing obesity and improving nutrition can be reached in settings with a high and increasing burden of obesity.

By measuring the food environment geographically, healthy food access gaps can be identified and nutrition-sensitive preventive interventions can be developed

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Introduction

In 2015, overweight and obesity contributed to four million deaths globally, with cardiovascular disease accounting for 70% of those deaths, followed by diabetes (15%).[1] While obesity is prevalent in both high-income countries (HICs) and low- and middle-income countries (LMICs), it affects the poor disproportionately and contributes to growing health inequities at all levels.[2]

Non-communicable diseases (NCDs) are driven by a complex interplay of multiple risk factors. However, a low-quality diet, which can lead to obesity, combined with reduced physical activity, increases the risk of NCDs such as hypertension, diabetes, cardiovascular disease and cancer.[3,4] In HICs, NCDs have also been inversely associated with socio-economic status, with some studies finding increased consumption of fast food among low-income and black populations.[4–6] Morland and Filomena also found disparities in the availability of healthy food between racially segregated urban neighbourhoods in the USA, where there were hardly any supermarkets in predominantly black areas.[7] In another study conducted in Australia, Burns and Inglis found that those living in advantaged areas had better access to supermarkets, while those living in disadvantaged areas lived in closer proximity to fast-food outlets.[8]

In 2016, South Africa had the highest prevalence of obesity among sub-Saharan African countries,[9] with 68% of women and 31% of men considered overweight or obese.[10] Sub-Saharan African countries have undergone a nutrition transition towards a diet high in sugar and saturated fats but low in fibre,[11] which has contributed to the emergence of overweight and obesity as a critical public health problem.[6,12]

There is currently a global discourse on the introduction of planning laws to regulate the spread of fast-food stores[13,14] and food environments that are not supportive of healthy eating.[15] 'Food environment' can be defined as the physical, economic and social factors that impact the availability, accessibility and adequacy of food within a region, or as the everyday stimuli that encourage a consumer's food choices in a particular way.[16] Various factors influence the choices people make in acquiring and consuming food; these include household income, proximity to food store location, food price, pervasive and persuasive food marketing, and convenience.[3,17,18]

Numerous studies have also found associations between the number of neighbourhood fast-food outlets and obesity rates, as fast-food consumption is linked to increased body mass index (BMI) and weight gain.[4,9,19–22] Promotion and low price of fast food, and easy access to it, are probably major drivers of obesity and related NCDs.[1,23] However, there are no structured prevention interventions to improve food environments in South Africa, and prevention is still aimed largely at an individual level.[3]

Several studies conducted in other countries have found significant associations between the number and proximity of fast-food outlets and the high frequency of purchasing such foods.[14,24–26] In South Africa, the fast-food industry is experiencing exponential growth, with a predicted annual growth rate of 9% for the 2014–2019 period.[27] In measuring the food environment, food access gaps can be identified, allowing for the development of nutrition-sensitive preventive interventions that prioritise high-risk areas.[9]

Overview of study

The purpose of this study was to calculate the Modified Retail Food Environment Index (mRFEI)[28] at the ward level in Gauteng (GP) and to assess whether food environments varied according to socio-economic status, thereby generating evidence to inform policy on the drivers of the obesity epidemic. Obesity is a risk factor for most NCDs,[29] yet measures to reverse the increasing prevalence of overweight and obesity are still largely absent.[30] Utilisation of a tool such as the mRFEI is an example of an easy method that looks beyond the health system in the prevention of obesity and NCDs.

Setting

Gauteng was selected as a relevant location to assess the food environment as it has well-developed infrastructure, making it easier to find geo-located food outlets as there are proper street addresses, which would be more difficult in areas that are predominantly rural. Furthermore, there is a high level of socio-economic inequity in GP, making it an appropriate location to assess whether food environments differ by socio-economic status. The study was conducted at ward level. Based on 2011 demarcations, there were 508 wards, with population density ranging from 4 to 66 664 persons per km^2 across the various wards.[31]

The mRFEI

The mRFEI is an environmental indicator of food access or the proportion of 'healthy stores' within a defined neighbourhood relative to all accessible stores. The definition of 'healthy' and 'less-healthy' food retailers is based on the Centers for Disease Control and Prevention (CDC) definition, which states that healthy food retailers include grocery stores and supermarkets, while less healthy food retailers are fast-food restaurants.[32]

The mRFEI was chosen to quantify the retail food environment because it includes both unhealthy and healthy food outlets in a single measure to give a comprehensive picture of the food environment.[33] In the South African context, supermarkets and grocery stores were used as a proxy for healthy food based on typical food available in this type of retail format, while fruit and vegetable markets were excluded due to lack of data. The assumption is that grocery stores stock healthy foods such as fruit and vegetables, meat and whole grains. The four major grocery store chains accounting for 97% of sales in the South African formal food sector were selected for calculation of the mRFEI; these were Shoprite Checkers, Pick 'n Pay, Spar, and Woolworths.[11] Different size stores were included, namely convenience stores, supermarkets and hypermarkets.[34]

Only fast-food outlets were chosen as a proxy for unhealthy foods in the assessment. Full-service restaurants (e.g. Spur) were not included as the quality of food differs between fast-food outlets and full-service restaurants, with full-service restaurants often providing healthier food options for health-conscious clients.[35] Food outlet locations were collected from the retailers' websites and Google Maps and geocoded using ArcMap version 10.5.[36] Once the geographical co-ordinates of the outlets were recorded, further analysis was done in ArcMap. The mRFEI was then computed using a formula developed by the CDC. The index measures the number of 'healthy' (grocery store) and 'unhealthy' (fast-food outlet) food retailers within wards across GP, as defined by typical food offerings in the specific store types. The mRFEI shows the percentage of retailers considered 'healthy' out of the total number of food retailers.

Area-level deprivation and socio-economic indicators

In addition to assessing the food environment, socio-economic factors in the wards were also assessed to investigate if there were any correlations between the food environment and socio-economic factors. The South African Index of Multiple Deprivation (SAIMD) was used to assess the socio-economic factors, together with census and community survey data from Statistics South Africa (Stats SA).[37,38] The SAIMD is a relative measure of multiple deprivation expressed at small-area (ward) level and takes into account the four dimensions of deprivation, namely employment deprivation, education deprivation, material deprivation, and living environment deprivation. The four dimensions are combined and weighted equally to construct the overall deprivation score.

All wards in the country are divided into 10 deciles according to their poverty rates, with decile 1 being least deprived and decile 10 being the most deprived. Gauteng has very few wards in deciles 8, 9 and 10 (for a detailed breakdown of the indices and indicators see Noble et al.[39]). The SAIMD deciles were calculated for the entire country; consequently, the inequality among wards in GP was masked as GP has low levels of deprivation compared with other provinces in South Africa. This prompted an exploration of selected socio-economic factors such as household income and employment rates in individual wards, using data directly from Stats SA.

Key findings

In November 2016, there were 1 559 unhealthy food outlets and 709 healthy food outlets in GP (Table 1).

Table 1: Total number of food outlets in Gauteng, South Africa, 2016

Unhealthy outlets	Total (N)	Healthy outlets	Total (N)
KFC	202	Checkers	245
Steers	194	Pick 'n Pay	201
Debonairs Pizza	182	Spar	151
Wimpy	164	Woolworths Food	112
ChesaNyama	159		
McDonald's	140		
Nando's	115		
Roman's Pizza	88		
Chicken Licken	79		
Fishaways	64		
The Fish and Chip Co.	42		
Burger King	29		
Panarottis	23		
Pizza Hut	21		
Barcelo's	20		
Anat	18		
Andiccio24	16		
Chickin Tyme	3		
Total	1 559	Total	709

Distribution of healthy food outlets is highly inequitable in GP. Wards with the highest number of stores with healthier food options were located predominately in suburban areas (Figure 1).

Figure 1: Distribution of healthy food outlets and ward-level SAIMD deciles across Gauteng, 2016

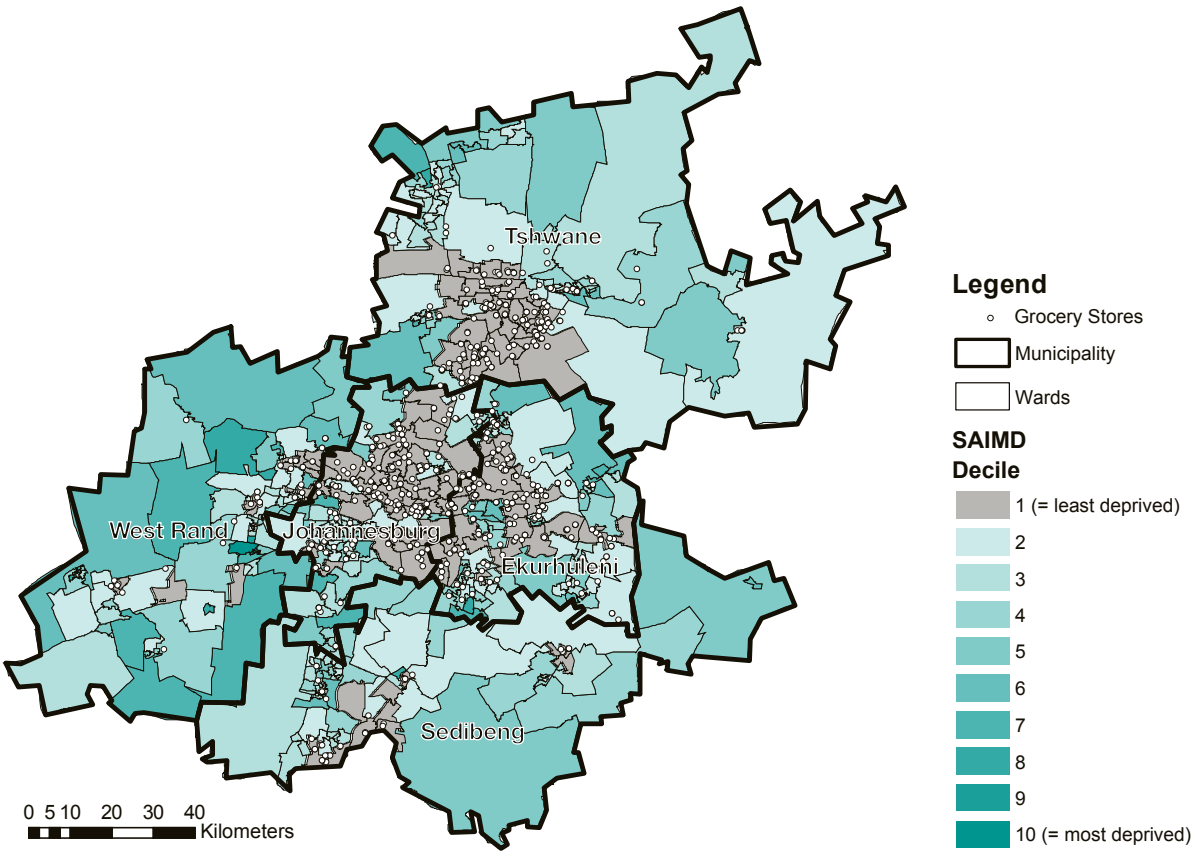
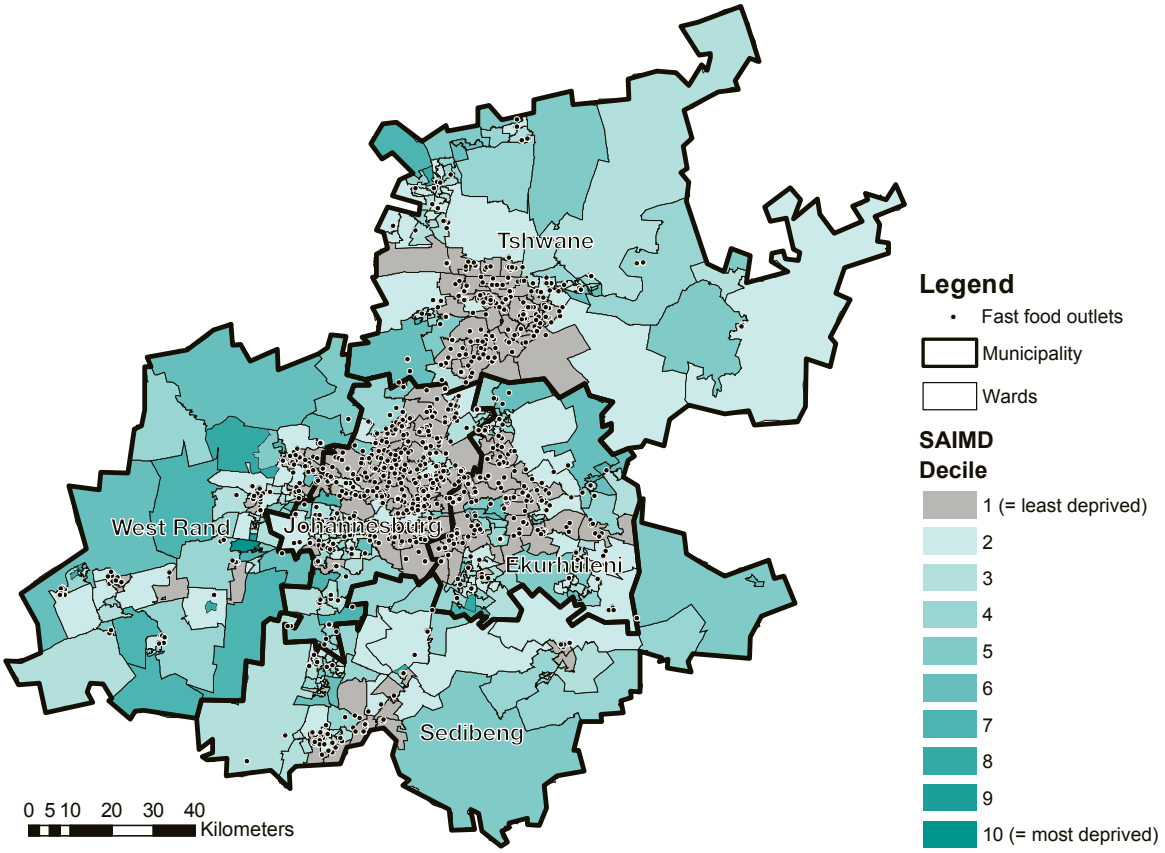


Figure 2: Distribution of unhealthy food outlets across Gauteng, 2016



Although the distribution of unhealthy food outlets showed a similar pattern, there was also a high concentration of fast-food outlets in wards located in the inner city of Johannesburg and in black communities (Figure 2). The highest number of unhealthy food outlets in one ward was 29, while the highest number of healthy food outlets in a ward was only 17 (Tables 2 and 3). Wards with the highest number of unhealthy food outlets were located mainly in Johannesburg (Table 2).

Table 2: Wards with the highest number of unhealthy food outlets, Gauteng, 2016

	Ward no.	Main suburbs	Municipality	No. of fast-food outlets
1	46	Lynwood	Tshwane	29
2	106	Bryanston	Johannesburg	28
3	74	Melrose North	Johannesburg	23
4	103	Sandton	Johannesburg	21
5	93	Paulshof	Johannesburg	20
6	54	Ridgeway	Johannesburg	20
7	60	Braamfontein	Johannesburg	20
8	112	Noordwyk	Johannesburg	20
9	115	Craigavon	Johannesburg	20
10	97	Wilgeheuwel	Johannesburg	20

Table 3: Wards with highest number of healthy food outlets, Gauteng, 2016

	Ward no.	Main suburbs	Municipality	No. of grocery stores
1	91	Mooikloof Hills	Tshwane	17
2	78	Zwartkop, Bronberrik	Tshwane	14
3	103	Sandton	Johannesburg	13
4	22	Boksburg Noord	Ekurhuleni	13
5	85	Waparand	Tshwane	12
6	46	Lynwood	Tshwane	10
7	106	Douglasdale, Bryanston, Rivonia	Johannesburg	10
8	75	Welgedacht	Ekurhuleni	10
9	92	Activia Park, Barvallen	Ekurhuleni	9
10	20	Bedfordview, Morninghill	Ekurhuleni	9

The highest incidence of wards with no grocery stores was observed in low-population-density wards, which was to be expected. The maps (Figure 3) show how the mRFEI varied across the wards in GP. The majority of wards had low mRFEI percentages for healthy food outlets, either zero or in the range from 20% to 39.9%. Very few wards had percentages above 59.9% (Table 4). The low mRFEI percentages could be indicative of highly obesogenic environments.

Figure 3: mRFEI at ward level in the different municipalities in Gauteng, 2016

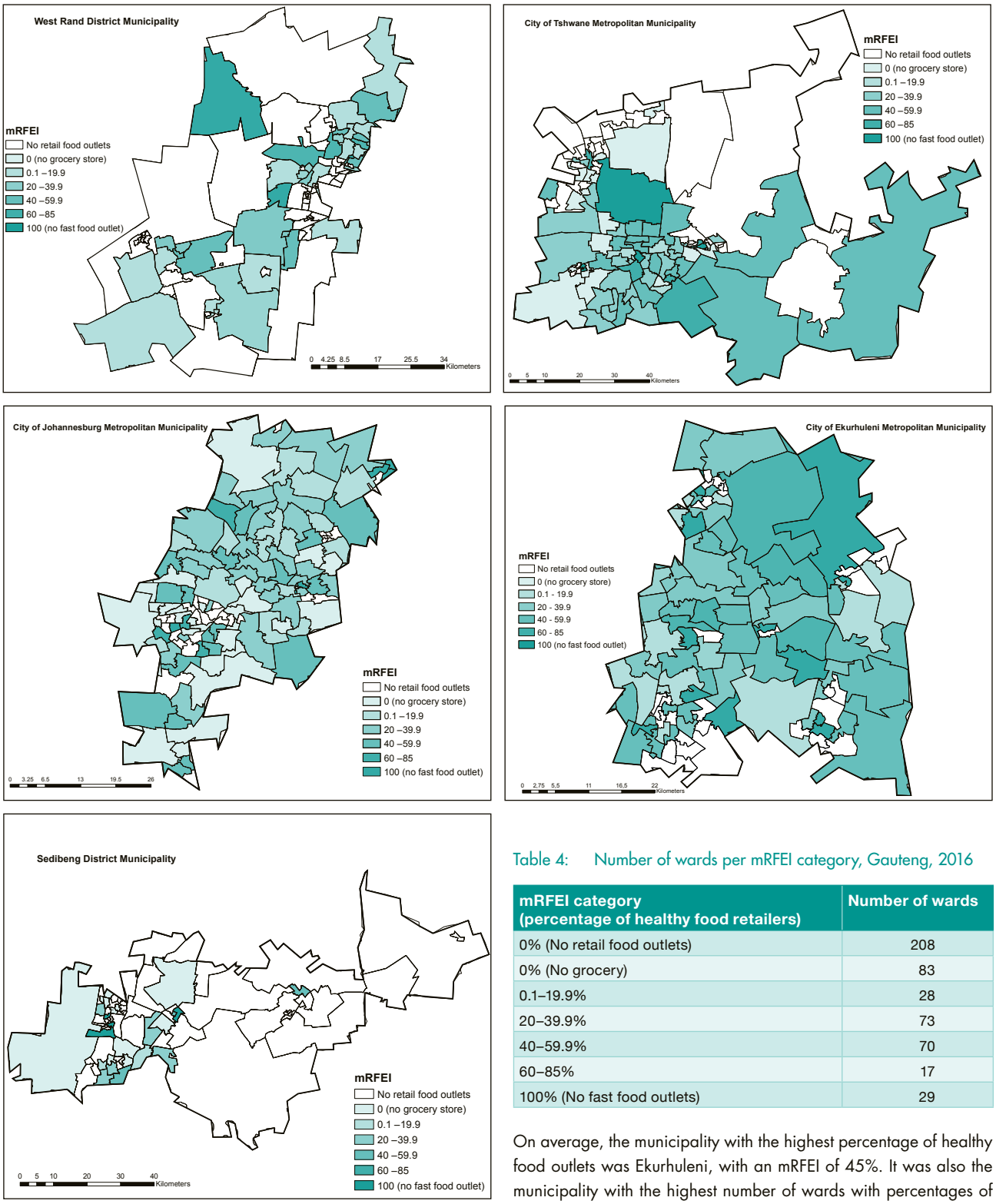


Table 4: Number of wards per mRFEI category, Gauteng, 2016

mRFEI category (percentage of healthy food retailers)	Number of wards
0% (No retail food outlets)	208
0% (No grocery)	83
0.1–19.9%	28
20–39.9%	73
40–59.9%	70
60–85%	17
100% (No fast food outlets)	29

On average, the municipality with the highest percentage of healthy food outlets was Ekurhuleni, with an mRFEI of 45%. It was also the municipality with the highest number of wards with percentages of 100, indicating that several wards only had healthier food outlets available. The worst-performing municipalities were Johannesburg and the West Rand, which on average had percentages of 28 and 27 respectively, indicating that only 27/28 out of 100 stores in those municipalities were likely to provide healthier food options (Table 5). Overall, in GP there are healthy food options in 33 out of 100 stores. The West Rand and Sedibeng, the most rural municipalities in GP, had the highest number of wards with no retail food outlets.

Table 5: Descriptive statistics of mRFEI by municipality, Gauteng, 2016

Municipality	Mean	Standard error	Median	Min.	Max.	Number of wards	No retail food outlets	Wards with no grocery store (%)	Wards with no fast-food outlet (%)
Johannesburg	28	2.76	23	0	100	130	32	21	5
Tshwane	33	3.35	33	0	100	105	37	16	4
Ekurhuleni	45	3.85	46	0	100	101	32	12	12
Sedibeng	29	7.22	17	0	100	72	47	15	6
West Rand	27	4.88	13	0	100	100	60	16	3
GP	33	1.76	30	0	100	508	208	16	6

Correlation between the mRFEI and socio-economic factors

According to the SAIMD, Gauteng is the second-least-deprived province in the country, and Tshwane and Johannesburg are among the 10 least-deprived municipalities.[39] The majority of the 10 worst-performing wards in GP were in predominantly black areas, with the exception of three wards where whites were slightly in the majority (Table 6). These wards only had fast-food outlets, without a single healthy food outlet.

Several township areas had high population densities yet there were no food retail outlets in those wards. One such example was Zola in Johannesburg, with a population density of approximately 14 000 people per square kilometre (km^2). Zola is a low-income area where 100% of the population are black and 6.5% of households live in informal settlements. Only 35% of the people living in this area are employed.[40]

Wards with the lowest percentage of healthy food outlets also had relatively low population densities (20–2 500 people/km^2), with the exception of one ward in Tshwane that had a high population density of over 16 000 people/km^2. This ward also predominantly included black residents who were low middle-income earners. However, the area had very few informal dwellings (0.2%), and approximately half of the population was employed.

The third-lowest category of areas with a low percentage of healthy food outlets (mRFEI 20–39.9) were high-population-density wards in Johannesburg and Tshwane with low-income black residents. Table 6 shows that most of the top 10 wards with only fast-food outlets were in black areas, although only two of those wards fell in the fourth SAIMD decile, indicating higher levels of deprivation compared with the other wards. However, a few wards also fell in the least-deprived decile; they had high average annual household income compared with other wards, and were mostly occupied by whites. Two wards with a high percentage of informal dwellings were among the wards with only unhealthy food outlets. In one of those wards, most households (55%) were living in informal dwellings. Another ward in a black community had a very high population density (over 10 000/km^2) yet there wasn't a single grocery store or supermarket in the immediate area (Table 6).

Wards with the highest deprivation index in GP (between decile 7 and 10) had no formal food retail outlets at all. The majority of these wards were in the West Rand, and the population was composed mainly of low-income blacks living predominantly (over 90%) in informal dwellings. A similar trend was observed in wards in the other GP municipalities. The majority of wards with fast-food outlets only fell in the third SAIMD decile, i.e. among the least-deprived wards, and the number of wards decreased as the SAIMD decile increased from low deprivation to high deprivation.

Table 6: Top 10 wards with fast-food outlets only (i.e. mREFI = 0), Gauteng, 2016

Ward no.	Municipality	Main suburb	SAIMD Decile (10=most deprived)	Majority ethnicity	Average annual household income	Population density	Informal settlements (%)	Employment rate (%)
74	Johannesburg	Melrose North	1	White (47%)	115 100	1 929	0.3	74.2
12	West Rand	Welverdiend	2	White (54%)	57 300	35	1.2	45.2
55	Johannesburg	Lindbergh Park	1	Black (50%)	57 300	4 132	0.8	60.3
96	Johannesburg	Lion Park informal settlement	4	Black (74%)	29 400	454	54.6	60.2
8	West Rand	Bhongweni	2	Black (54%)	57 300	663	6.6	37.4
122	Johannesburg	Zakariyya Park	4	Black (91%)	14 600	810	33.6	43.1
53	Johannesburg	Slovoville	2	Black (100%)	57 300	700	2.3	45.4
48	Johannesburg	Dobsonville	2	Black (99%)	29 400	10 159	11.4	45
94	Ekurhuleni	Generaal Albertspark	1	White (48%)	230 700	955	0.9	69.8
15	Tshwane	Mamelodi	1	Black (99%)	29 400	2 805	3.3	46.1

Discussion

Although individuals make decisions about food choices in a complex set of physical and social environments,[35] the social patterning of NCDs is influenced by differential exposure to obesogenic environments leading to the consumption of excess calories.[41] The mRFEI revealed that GP is a highly obesogenic environment, especially the wards in Johannesburg. The geographical distribution of grocery stores in GP is similar to the pattern in Cape Town (the Western Cape being the least-deprived province) in that grocery stores are concentrated in higher socio-economic areas.[11] This trend is also similar to what has been observed in HICs such as the USA and Australia, where the type of food outlet changes according to neighbourhood economic status.[7,8]

According to Rudolph et al.,[42] fast-food outlets, small shops and restaurants play an important role in day-to-day provisioning among the urban poor in GP, with 55% of households sourcing food from these outlets at least once a week or more often, especially in the inner city. In the lower- to middle-income and predominantly black communities, fast-food outlets are typically more available than in high-income and white communities in urban areas.[35] In addition to this, communities living in those areas had low average annual household income. This pattern has also been observed in the UK, where fast-food outlets cluster in areas of deprivation.[2]

Preference for unhealthy food is further encouraged and intensified by the low price, as purchasing power is known to be a key determinant in whether an individual is willing and able to pay more for healthy food,[16] and healthy food typically costs around 60% more than less-healthy food.[35] Furthermore, due to the high number of informal settlements in GP it is possible that families are purchasing fast food as they do not have adequate utilities in the home to cook food; this further emphasises the need for outlets that provide healthier food options for purchase in such areas.

In many LMICs there are few regulatory frameworks preventing the promotion of processed fast foods and sugar-sweetened beverages (SSBs).[43] However, it has become evident that policy interventions against obesity should be directed at both the individual and the food environment to support healthy choices, as effective government policies and actions are necessary to increase healthy food options.[44]

In targeting the food environment, healthy choices are significantly easier to make at the individual level (rather than trying to compel the individual alone to make healthy choices via health-promotion and educational programmes). Such policies also tend to be more sustainable as they affect the entire population, thus they can concretely reverse the environmental drivers of obesity.[3] Several countries such as Ecuador, Australia, India, Brazil, Mexico[45] and Chile have implemented policies to prevent obesity (warning labels on high-fat, sugar and salt foods). Other countries have gone even further by increasing import and excise tariffs on SSBs and other high-sugar products.[44]

Policy interventions that limit the number of fast-food outlets in communities, and that lower the cost of healthy foods and increase the cost of unhealthy foods, can assist in reversing the environmental drivers of obesity.[46] However, without formal structures and policies similar to the restrictions placed on tobacco, food companies will continue to shape and influence the polices that should be controlling them, and the negative trajectory of fast-food expansion will continue to result in collateral health damage.[13]

The mRFEI is a powerful tool for public health professionals and provincial administrators to identify areas where access to healthy food is limited. However, this study and the mRFEI tool also have limitations. The study only considered the residential food environment, and assumed that people live in the same areas in which they work. Furthermore, assumptions were made about the types of food sold in grocery stores. The study was also limited to retail food outlets that could be geo-located via Google Maps. There may have been a number of retail food outlets not included in the analysis, in addition to food sold in the informal food sector, which is quite significant in South Africa.

Further research should explore the links between the mRFEI and epidemiological data such as NCD morbidity and mortality and assess how the mRFEI differs in provinces that are not as highly urbanised as GP. In addition, it would be worthwhile to investigate the informal food environment in GP, especially in the areas that were most deprived and that had no formal food retail outlets.

Conclusion

The NCD pandemic is widespread globally and is emerging as a major public health issue in South Africa. Obesity has been identified as a key driver, yet prevention strategies have targeted individual behaviour-change. Policy makers need to address the structural drivers of obesogenic environments. In addition, the available data are often aggregated at high levels (low granularity, e.g. provincial) thus hiding health disparities at local level. The mRFEI provides a tool for policymakers to visualise the food environment at ward level, allowing them to implement interventions to reduce obesogenic environments.

The NCD burden can be prevented by addressing diet and creating health-promoting living environments. Government should commit to addressing unhealthy food environments by adopting a wide-ranging, health-in-all policies approach. Municipalities can play a fundamental role in this by introducing by-laws that limit the number of fast-food outlets in communities. They can also zone land using urban-planning tools and use intentional urban design to promote citizen health. This process will necessitate multi-sectoral collaboration with different departments and industries to ensure that health is not negatively impacted by the activities of other sectors such as trade and industry. Urgent action is needed to mitigate the adverse effects of the rapidly changing food environment in South Africa. Policy makers need to understand the structural and environmental factors contributing to the health and wellbeing of communities.

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Review

14 Status of South Africa's National Health Research System: a 2018 update

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South Africa's pursuit of universal health coverage requires contextualised scientific knowledge to guide the development of health system-strengthening strategies. Urgent concerted action is needed to strengthen the national health research system (NHRS), with a view to generating high-quality knowledge and promoting its utilisation in population health.

This chapter reports on a study that evaluated some aspects of South Africa's NHRS which includes the computation of a NHRS barometer score.

The overall NHRS barometer score was 83.7% with indications that South Africa needs to address deficits in NHRS human and physical resources, and financing. However, the overall score for South Africa exceeds those of many other African countries, thus providing important lessons and opportunities for learning.

South Africa needs to address deficits in human and physical resources, and financing of the national health research system.

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Introduction

South Africa's pursuit of universal health coverage (UHC) requires contextualised scientific knowledge to guide development of health system-strengthening strategies, and to spur inter-sectoral action tackling the social determinants of health. Urgent concerted action is needed to strengthen the national health research system (NHRS), with a view to generating high-quality knowledge and promoting its utilisation in population health.

In 2015, South Africa invested around 8% of its gross domestic product (GDP) and about 14% of general government expenditure on health.[1] The country fell short of the Organisation of African Unity's (OAU) Abuja Declaration target by one percentage point.[2] Current health expenditure is 54% domestic general government health expenditure, 44% domestic private health expenditure, and 2% external health expenditure.[1]

The United Nations Sustainable Development Goal 3 focuses on ensuring healthy lives and promoting well-being for all, at all ages. Target 3.8 aims to achieve UHC.[3] Currently, South Africa's total health expenditure per person per year is less than the projected minimum of US$ 533 (57% of which should be from government) needed to attain UHC.[4] This partially accounts for the suboptimal essential health services coverage index of 67% in 2015.[5]

The first NHRS status report published by Senkubuge and Mayosi in 2012 highlighted the weaknesses inherent in the system.[6] A survey conducted by the World Health Organization (WHO) in 2014 estimated South Africa's NHRS barometer score at 79%, higher than the average of 37% for high- and upper-middle-income African Region countries.[7] In 2015, the sixty-ninth WHO Regional Committee for Africa adopted a regional strategy on research for health[8] calling upon Member States to strengthen their NHRS.

The purpose of the 2018 survey (reported on here) was to gauge South Africa's progress in NHRS strengthening, three years after adoption of the regional strategy.

The specific objectives of this study were to: assess some aspects of the South Africa's NHRS; estimate NHRS barometer scores for South Africa; identify facilitating and constraining factors; and make recommendations to enhance South Africa's NHRS.

A number of studies have attempted to assess the status of NHRS in WHO African Region countries by applying the Pang et al.[9] conceptual framework, which consists of two goals and four functions. Since the purpose of the article by Pang et al.[5] was to propose a theoretical framework, it did not delve into how to operationalise the framework, and none of the African Region studies reviewed for this study attempted to develop an index or barometer for tracking NHRS performance.[10–15]

To date, only two published studies in the African Region have attempted to develop a NHRS index to monitor performance over time. In 2015, Kirigia et al.[16] developed the Malawi national NHRS index, and in 2016, Kirigia et al.[16] used regional data collected in 2014[14] to develop a NHRS barometer for use in the African Region. The barometer has four functions (governance of research for health (R4H); developing and sustaining resources for R4H; producing and using research; and financing of R4H), and 17 sub-functions. The authors categorised individual countries as below average if their NHRS barometer score was less than 50%, average if the score was 50%, and above average if over 50%. The overall African Region score was 42%, while South Africa's score was 79%, signifying above-average NHRS performance.

Methods

South Africa's NHRS barometer was developed using the following six steps proposed by Kirigia.[17]

Step 1: Delineate the goals and functions of NHRS

The Pang et al.[9] NHRS conceptual framework was applied, consisting of two goals (advancement of scientific knowledge, and utilisation of knowledge for health development) and four functions, namely NHRS leadership and governance; developing and sustaining resources for NHRS; producing and using R4H; and financing of NHRS.

Step 2: Delineate the sub-functions under each NHRS function

The sub-functions, listed in Table 1, were used to calculate the South African NHRS Barometer.

Table 1: Sub-functions used to calculate South Africa's NHRS barometer, 2018

A.	**Leadership and governance**
1.	Existence of a national policy on R4H
2.	Existence of laws/legislation relating to R4H
3.	Existence of a R4H strategic plan
4.	Existence of a national research ethics review committee
5.	Existence of a national R4H priority list/agenda
6.	Existence of a national health research focal point/unit
B.	**Developing and sustaining resources**
7.	Existence of a health research programme/directorate/department in the Ministry of Health (MoH) (Health Research and Policy (HRP))
8.	Number of technical and support staff in HRP per 100 000 population
9.	Whether HRP has internet connectivity
10.	Presence of a Medical Research Council
11.	Number of universities conducting R4H per million population
12.	Existence of non-governmental organisation(s) (NGOs) undertaking R4H
C.	**Producing and utilising research**
13.	Existence of a health research management forum
14.	Existence of knowledge-translation platform(s)
15.	Total number of R4H publications per 100 000 population in 2017
D.	**Financing R4H**
16.	Presence of R4H budget within government budget
17.	Government allocation to R4H as a percentage of NDoH budget in the 2017/18 financial year

Source: Kirigia, 2018.[17]

Step 3: Collect data on each NHRS sub-function

The study used the EDCTP African Participating States: National Health Research System Assessment Questionnaire,[17] which has 10 sections. The questionnaire was administered to both the National Department of Health (NDoH) and the Department of Science and Technology (DoST) and relevant local documents were reviewed. The data were analysed using Excel Software.

Step 4: Scoring of NHRS sub-functions

Thirteen of the 17 sub-functions were binary variables (the existence or non-existence of a NHRS attribute). Each sub-function scored 1 if it was reported to exist, and 0 if it did not. Four sub-functions were continuous variables. Further information on how the actual scores were calculated is provided elsewhere.[7,16]

Step 5: Calculate NHRS barometer sub-function indices for South Africa

The formula used to calculate indices for the 17 sub-functions was similar to that used by the United Nations Development Programme to calculate the Human Development Index,[18] the Health Development Governance Index,[19] Malawi NHRS Index,[16] African NHRS Barometer,[7] and EDCTP African Participating States NHRS Barometer.[17]

Step 6: Calculate the overall NHRS barometer score for South Africa

South Africa's overall NHRS barometer score was calculated as an arithmetic mean of sub-function indices 1 to 17.

Results and discussion

Leadership and governance

Article 27(1) of South Africa's Constitution states that "Everyone has the right to have access to: (a) health services, including reproductive health care; (b) sufficient food and water; and (c) social security…."[20]

Chapter five of the 1997 White Paper for the Transformation of the Health System discussed essential national health research, and stipulated that the Directorate of Health Information, Evaluation and Research be responsible for developing a national health research and funding strategy, coordinating an essential health research programme, and ensuring utilisation of health systems research in policy, planning, service delivery, health services management, and evaluation.[21] It called for participatory development of an action-oriented R4H agenda to address major population health problems.

In 2001, South Africa developed a health research policy.[22] Goals included development of a NHRS; promotion of innovation in health and service delivery; advancement of knowledge; development of a coordinated and adequately funded research agenda; development of capacities to conduct and utilise R4H; and encouraging uptake of research in health system development.[22]

In 2014, the country developed the National Development Plan 2030.[23] The chapter 'Promoting health' set out nine priorities, with the last priority being to improve quality by using evidence. This priority underscores the need to base health policy, planning, resource allocation, public health and clinical practice on empirical evidence, which in turn requires an efficiently functioning NHRS.

The NDoH Strategic Plan 2015/16–2019/20 details how right to health services will be realised.[24] One of the strategic objectives is to ensure that research contributes to the improvement of health outcomes. The NDoH intends to accomplish this by developing and implementing a national health research strategy by 2019/20. The strategy will build on the priority R4H agenda and seven recommendations of the 2011 National Health Research Summit.[25] The recommendations include allocation of 2% of the national health budget to health research and development (R&D); doubling the number of health researchers in five years; developing health research infrastructure in academic health complexes; creation of a National Priority Health Research Fund; improving the efficiency of the Medicines Control Council (MCC); development of a National Planning, Coordination and Translation System for Health Research; and developing a NHRS monitoring and evaluation mechanism.[25]

The vehicle for progressive realisation of the right to health services is the National Health Insurance Fund (NHIF), established by the National Health Insurance Bill.[26] The goal of the NHIF is to realise sustainable and affordable UHC for all South African citizens and permanent residents. The Act requires the NHIF to contribute to the development and maintenance of a National Health Information Repository and Data System to facilitate research, monitoring and evaluation, and access to information. Optimal operation of the NHIF system will demand various forms of evidence from R4H.

Chapter nine of the South African National Health Act of 2003 (National Health Research and Information),[27] mandates the Minister of Health to establish a 15-person National Health Research Committee (NHRC) to develop a national R4H priority agenda; ensure that R4H agendas and resources focus on national priority health problems; develop an integrated national strategy for health research; and coordinate the research activities of public health authorities. It also establishes a National Health Research Ethics Council (NHREC), which is mandated to develop guidelines for institutional research ethics committees (IRECs), register and audit IRECs, and advise national and provincial departments of health on all research ethics matters. The Act also requires every institution at which R4H is conducted to establish an IREC and register it with NHREC.

The Medicines and Related Substances Act 101 of 1965, as amended by Act 72 of 2008, together with Act 14 of 2015, provided for establishment of the South African Health Products Regulatory Authority (SAHPRA).[28–30] In February 2018, SAHPRA replaced the MCC. It operates as an autonomous juristic entity mandated to monitor, evaluate, regulate, investigate, inspect, register and control medicines, scheduled substances, clinical trials, medical devices and related matters in the public interest.

On 20 July 2018, the Minister of Health published the 'Material Transfer Agreement of Human Biological Materials' for use by all providers and recipients of the biological material used in research or clinical trials under the HRECs.[31] South Africa does not have national guidelines on development of collaboration agreements for health research involving institutions and agencies outside the country. However, each university or science council has its own set of guidelines, and the country subscribes to the Research Fairness Initiative (RFI), which has specific guidelines.

Table 2: South African NHRS 'leadership & governance' barometer score, 2018

Sub-functions	Actual score (A)	Maximum score (B)	Minimum score (C)	Sub-function NHRS index (D)=[(A-C)/(B-C)]
National Health Research Policy 2001	1	1	0	1
Health Research Legislation/Law: Chapter 7 of the National Health Act (61 of 2003)	1	1	0	1
Health Research Strategic Plan: National Health Research Summit Report 2011	1	1	0	1
Functional National Ethics Review Committee/NHREC/HREC	1	1	0	1
National Health Research Focal Point/Unit	1	1	0	1
National Health Research Agenda 2011	1	1	0	1
Average 'leadership & governance' barometer score				1

A memorandum of understanding (MoU) between the NDoH and national research institutions (e.g. the South African Medical Research Council (SAMRC), university health science faculties, medical schools and schools of public health) could be an important instrument in governing, growing and nurturing the working relationships. In the context of NHRS, a MoU[32] might cover development (training and mentoring) of human resources for NDoH and Provincial Departments of Health (PDoHs), consultancy services, technical advice, research, and knowledge translation. A MoU in the form of annual performance plans exists between the NDoH and the SAMRC. Despite the fact that medical schools work closely with the NDoH, there are no MoUs governing the relationship.

Leadership and governance of the NHRS in South Africa is primarily performed by the NHRC, and the NHREC.

Table 2 shows the NHRS 'leadership and governance' function barometer score. Since each of the six sub-functions had an index of 1, the average leadership and governance function score was 1 (or 100%), implying optimal performance (flourishing).

Despite the 100% score, there is room for improvement. For example, the national health research policy, the health research strategic plan, and the national health priority research agenda are over six years old and need to be updated.

Developing and sustaining resources

At national level, the Health Research Unit (HRU) in the NDoH's Programme on Health Information, Health Research, and Monitoring and Evaluation, and the Health Innovation Unit (HIU) in the Department of Science and Technology, are mandated to coordinate, monitor and evaluate implementation of the national priority R4H agenda.

In South Africa, R4H is mainly conducted by three categories of institutions. In addition, the National Health Laboratory Services (NHLS) also conducts important research for the country. Of the three main institutions, the SAMRC follows a decentralised model, with most research carried out by university MRC units.[32] It is a public entity, established in 1969, with a mandate to improve the health of the country's population through research, development and technology transfer. Key facilitating factors include SAMRCs multi-disciplinary staff; close links with the NDoH; acknowledged scientific excellence; and international linkages. Key constraints are insufficient research funding; and retention of young scientists.

Second, Health Systems Trust (HST) was established in 1992 as an NGO. The organisation conducts health systems research, provides technical support, and disseminates information aimed at developing comprehensive national, provincial, district and community health systems in southern Africa.[33]

The third category of R4H institution is universities. Approximately 11 universities have health sciences faculties that produce human resources for health and conduct health research. Further, 13 universities are involved in production of biomedical sciences human resources and conduct biomedical research.[34]

Although the universities do not have MoUs with the NDoH, the medical schools work closely with the NDoH and PDoHs to provide training for the health workforce and human resources for health research; to undertake R4H for the NDoH when commissioned; and to serve as experts on advisory panels to the NDoH. All the universities are autonomous, but receive funding from government.

Key facilitating factors for most universities conducting R4H are competent teaching/academic staff, and growing scientific output. Eight local universities are ranked among the top 1 000 universities in the world.[35] Key constraining factors are insufficient research funding, and inadequate research equipment in some universities.

Table 3 shows the NHRS 'developing and sustaining resources' barometer score, with some sub-function indices of 100% and others below average.

Table 3: South African NHRS 'developing and sustaining resources' barometer score, 2018

Sub-functions	Actual score (A)	Maximum score (B)	Minimum score (C)	Sub-function NHRS index (D)=(A-C)/(B-C)
Health Research Programme/Unit (HRP)	1	1	0	1
Number of technical & support staff in HRP per 100 000 population	0.01769	100	0	0.00018
Whether HRP has internet connectivity	1	1	0	1
Presence of SAMRC	1	1	0	1
Number of universities conducting R4H per one million population	0.42	1	0	0.42
Presence of NGOs undertaking health research	1	1	0	1
Average 'developing and sustaining resources' barometer score				0.737

The average barometer score for developing and sustaining resources was 0.737 (73.7%). In order to maximise this function, both the number of universities undertaking R4H and human resources for health research per population need to increase.

Producing and utilising research

As mentioned, the NHRC is mandated to develop and update national strategy on R4H, and to prioritise the R4H agenda and ensure adherence. The NHRC convened the first National Health Research Summit of health stakeholders in July 2011, with the second Summit held in the last quarter of 2018.

Each university and science council has a scientific research committee that reviews research proposals/protocols for scientific quality and correct study design before they are sent to the HREC for ethical review.

The country has a number of platforms for collating, translating, synthesising and communicating research to inform health policy and practice. The SAMRC houses Cochrane South Africa, an independent non-profit network[36] that undertakes systematic reviews of published literature on what does and does not work in health care. Cochrane South Africa also manages the Pan African Clinical Trials Registry, and the South African Guideline Excellence Project (SAGE), which uses globally generated evidence and local knowledge and skills to support the development, adaptation and implementation of health-related guidelines for South Africa.[37] Cochrane South Africa also contributes to the Collaboration for the Evidence-Based Healthcare and Public Health in Africa network[38] and the Effective Health Care Research Consortium[39] to bridge primary research, evidence synthesis and implementation into policy-and-practice.

As mentioned, the HST undertakes health systems research and works with the NDoH to translate knowledge from research into policy and practice.[40] In 2013, HST spearheaded the development of the National Health Research Database (NHRD) that enables the NDoH and PDoHs to monitor research activities and utilise information in decision-making. Since 2005, HST has produced the annual District Health Barometer, monitoring trends in inequities in health outcomes and health-resource allocation and delivery, and tracking the efficiency of health processes across provinces and districts. Since 1995, HST has also published the annual *South African Health Review*, with peer-reviewed chapters on health policy development, implementation of health system reforms and interventions, and performance of national and local health systems.[40]

South Africa also has disease-specific knowledge-translation platforms, such as the TB and HIV Think Tanks, which bring together experts to assist in guiding the country's TB and HIV response. According to White et al.,[41] the TB Think Tank contributed to the strategy accelerating progress towards the WHO TB control targets, development of the HIV and TB investment case, and the decision to create a dedicated grant for TB.[41] The HIV Think Tank worked on the monitoring and evaluation framework and strategy for Ward Based Primary Healthcare Outreach Teams, the good practices compendium of community health workers, research on non-communicable diseases and HIV comorbidities, and a harmonisation guideline for provinces.[42,43]

The SAMRC, HST and universities primarily disseminate their R4H through scientific publications in peer-reviewed journals, books and chapters, research briefs (including policy briefs), annual reports, conferences, and information on websites. Some of the research is also converted into patented innovations.

Information available through the Web of Science search engine indicates that in 2017, South Africa's total publication count in all research areas was 23 094.[44] Of that, 7 073 publications (31%) were in the health sciences, i.e. 12.5 publications per 100 000 population, double the number of health science publications per 100 000 population in 2014.[45] Foreign country organisations accounted for 66% of the health science publications.

Table 4 shows the barometer score for producing and utilising R4H. Two sub-functions had indices of 1 (or 100%), implying optimal performance.

In 2017, the total number of R4H publications in South Africa was 12.5 per 100 000 population, compared with 15.46 in Brazil,[a] yielding a publication index of 0.81 (or 81%). The barometer score for this function was 0.937 (93.7%). The deficit in performance can be bridged by increasing the number of peer-reviewed R4H publications.

Table 4: South African NHRS 'producing and utilising R4H' barometer score, 2018

Sub-function	Actual score (A)	Maximum score (B)	Minimum score (C)	Sub-function NHRS index (D)=(A-C)/(B-C)
Existence of NHRC that convenes National Health Research Summit	1	1	0	1
Existence of knowledge-translation platforms	1	1	0	1
Total number of R4H publications in 2017 per 100 000 population	12.5	15.46 (Brazil)	0	0.81
Average 'producing and utilising R4H' barometer score				0.937

a Calculated using data from PubMed.com.

Financing research for health

In South Africa, R4H is funded mainly by government tax revenue, big pharma clinical trials and private healthcare expenditures, and multilateral and bilateral donor funding. International NGOs, private sector companies, and local NGOs fund some R4H in the country.

In the 2017/18 financial year, the overall government budget was R1 409 215.4 billion, of which R42 625.7 billion (3.02%) was allocated to the NDoH.

The government's budgetary allocation to all research was approximately R10.1 billion, of which 74.4% went to the Department of Science and Technology (DST) and 8% went to the NDoH. The NDoH research allocation amounted to R812.8 million, of which 80.9% went to the SAMRC, 13.6% to R4H within the NDoH, and 5.5% to research-related activities within the NHLS.

Of the DST research budget of R7.5 billion, about R776.2 million (10.3%) was spent on aspects of NHRS. Of the latter, 10.5% was spent on health innovation, HIV treatment and prevention, and the International Centre for Genetic Engineering and Biotechnology; 14.1% on health-related research infrastructure, South African Research Chairs, and support of international grants; and 75.4% on science councils committed to health research, e.g. the HSRC, the Technology Innovation Agency, the CSIR, and the National Research Foundation. Therefore, the entire government NHRS-related spending was approximately R1.5 billion, which was 0.0037% of the overall NDoH budget. This is greatly short of the Algiers Declaration,[46] the Bamako Call to Action on R4H,[47] and the Mexico Summit Statement on health research[48] recommendation to countries to invest at least 2% of national health expenditure on research and NHRS capacity strengthening.

Table 5 shows the barometer score for financing R4H, as determined by the two sub-function indices.

The average 'financing R4H' score was 0.50 (or 50%). A lot needs to be done to attain the recommended investment of at least 2% of national health budget on NHRS capacity strengthening.

South Africa's overall NHRS barometer

Table 6 shows the South African NHRS barometer scores for 2018. None of the 17 sub-functions had a zero index (which would have meant non-existent); two scored less than 1%; one scored 42% (below average); one scored 81% (above-average); and the remaining 13 sub-functions scored 100% (flourishing).

The average barometer function scores were 100%, 73.7%, 93.7%, and 50.11%. Thus the overall NHRS barometer score for South Africa in 2018 was 83.7% (above average, but short of optimal performance by 16.3 percentage points), compared with 79% in 2014.[7]

Table 6: South African NHRS barometer scores, 2018

Functions and sub-functions	NHRS index (D)=(A-C)/(B-C)
A. Leadership and governance	**1**
1. National Health Research Policy 2001	1 (or 100%)
2. Health Research Legislation/Law – Chapter 7 of the National Health Act, Act 61 of 2003	1 (or 100%)
3. Health research strategic plan: National Health Research Summit Report 2011	1 (or 100%)
4. Functional National Ethics Review Committee	1 (or 100%)
5. National Health Research Focal Point/Unit	1 (or 100%)
6. National health research agenda 2011	1 (or 100%)
B. Developing and sustaining resources	**0.737**
7. Health Research Programme/Unit	1 (or 100%)
8. Number of technical & support staff in HRP per 100 000 population	0.00018 (0.018%)
9. Whether HRP has internet connectivity	1 (or 100%)
10. Presence of SAMRC	1 (or 100%)
11. Number of universities conducting R4H per a million population	0.42 (or 42%)
12. Presence of NGOs undertaking health research	1 (or 100%)
C. Producing and utilising research	**0.937**
13. Existence of NHRC that convenes Summit	1 (or 100%)
14. Existence of knowledge-translation platform(s)	1 (or 100%)
15. Total number of R4H publications in 2017 per 100 000 population	0.81 (or 81%)
D. Financing R4H	**0.50**
16. Presence of health research budget within government budget	1 (or 100%)
17. Government allocation to health research in the 2017/18 financial year	0.00041 (or 0.041%)
Overall NHRS barometer score ((sum of sub-function indices divided by 17) x 100%)	0.837 x 100 = 83.7%

Table 5: South African NHRS 'financing R4H' barometer score, 2018

Sub-functions	Actual score (A)	Maximum score (B)	Minimum score (C)	Sub-function NHRS index (D)=(A-C)/(B-C)
Presence of health research budget within government budget	1	1	0	1
Government allocation to R4H as proportion of NDoH budget in the 2017/18 financial year	0.003728	9.162241866 (Cameroon)	0	0.00041
Average 'financing R4H' barometer score				0.50

Recommendations

Leadership and governance

- Update the national R4H policy, national strategic plan on R4H, and national priority R4H agenda (with a clear implementation framework).
- Strengthen research management capabilities at provincial level.
- Develop/adapt national guidelines for the management of intellectual property and knowledge-transfer activities management in international research collaboration agreements between South African institutions and external partners. According to the European Union, such guidelines should include: a system that enables the protection of intellectual property rights, a technology transfer framework, and a fair law-enforcement system.[49] This would complement the existing national Material Transfer Agreement and standardise existing individual university guidelines.
- Spearhead development of MoUs between the NDoH and national universities with health sciences faculties and those involved in biomedical research. The MoU may cover health workforce development, technical advice, R4H, and other matters of interest to the NDoH.
- Continue promoting south-south and north-south R4H collaborations and networking for excellence.
- Continue discussions on genomic research and its potential benefit to African countries.

Developing and sustaining resources

- Upgrade health research infrastructure in the 10 lowest-ranked universities.
- The newly established SAHPRA should fast track clinical research approvals.
- Upgrade more clinical research facilities to the standards of the WHO Good Clinical Laboratory Practice,[50] the FDA,[51] and the European Medicines Agency.[52]
- Continue investing in doctoral degree training to create a critical mass of multidisciplinary human resources for health research, and postgraduate trainers and mentors.

Producing and utilising research

- Sustain/increase investment in the existing knowledge-translation platforms (SAMRC, HST, Think Tanks, etc.).
- Sustain incentives for universities and the SAMRC to optimise production of peer-reviewed publications, patents, and other knowledge products.
- Support the ongoing development of South Africa's National Health Research Observatory.[53] The observatory should have modules on NHRS goals and functions, among others. It should also have an inventory of all R4H human and physical resources in the country.

Financing research for health

- Institutionalise a system of national R4H accounts to track health-related R&D spending.[54]
- Commission a study to inform development of sustainable innovative health-related R&D financing mechanisms to meet the Algiers Declaration target, namely at least 2% of MoH budget allocated to NHRS strengthening.[46–48]

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Health information as a catalyst for community health system engagement

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Introduction

This case study reviews lessons learned from an intervention bringing together two familiar but often un-connected domains, namely health information systems and community engagement. Health information is a fundamental building block in the health system, and community engagement is recognised as a critical foundation for the delivery of quality, people-centred and resilient health services.[1–3] While South Africa has made impressive progress in both domains over the last 20 years, challenges persist.

Health information systems are often fragmented, costly, inefficient, and based on data of uncertain quality.[4,5] In South Africa, there is also little experience with effective use of health information in decision-making, especially at primary health care level.[6,7] Efforts to promote community engagement also face various challenges, including a technocratic, hospi-centric and over-worked health system; community distrust and disenchantment with health staff; and lack of policies, models and resources for effective community engagement.[2,3]

This case study reports on initial findings from the iALARM project (Using Information to Align Services and Link and Retain Men in the HIV Cascade) in a Cape Town sub-district. The project collects, synthesises and distributes health information and research to a diverse set of health system and community stakeholders to catalyse more effective forms of community engagement and to strengthen the local health system. A combination of ethnographic and action research methods were used to document lessons learned.

The iALARM project

The focus of the iALARM project is to improve men's poor performance in the HIV cascade.[8] The project centres on the linkage and retention task team, which brings together people from different levels of the public-sector health system as well as community members, non-governmental organisation (NGO) staff, and local activists. New forms of health information are introduced at monthly task team meetings, and conversations are facilitated to catalyse new ideas, relationships and programmes to better support men's access to HIV prevention, treatment and care. The project is a collaboration between the University of Cape Town (UCT), Brown University (in the US), the South African Medical Research Council (SAMRC), the University of California, San Francisco (UCSF), and Sonke Gender Justice.

The linkage and retention task team

The task team consists of a core of 20 regular members who meet monthly at the Men's Wellness Centre (a project run by Sonke Gender Justice). Members include nurses, community health workers, sub-district managers, facility and programme managers, health information officers, HIV/AIDS, STI and TB (HAST) coordinators, NGO and community-based organisation (CBO) staff and volunteers, community members, and local health activists. Staff and students from the University of Cape Town, the SAMRC, and Brown University host the meetings and prepare the materials for each month's discussions.

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The original intention of the intervention was to use unique, 'harmonised' forms of routine health information available from the Provincial Health Data Centre (PHDC), which integrates clinical records across multiple municipal, provincial and national routine health information databases.[9] However, at monthly task team meetings, it became apparent that other forms of information were also needed and the focus was expanded to include 'headcount' data from routine monthly reports (RMRs), local qualitative research on masculinity and HIV, published scientific literature, government and academic databases, and other sources of health information.

The first half of the meeting generally involves a presentation and discussion of health information: summaries of cascade performance, changes in headcount data, syntheses of qualitative research findings, and even testimonials from local HIV-positive men. The second half of the meeting addresses possible responses to this information. While UCT staff and students may, and do, get involved in carrying out some of the emerging ideas, the main objective of the meeting is for task team members to take the ideas forward.

Setting up the task team

In recruiting for the task team, recurring complaints were heard about both health information systems and community engagement. For example, health staff (especially at the frontline) expressed frustration with health information processes. Clinic staff described data as being generated in forms and registers, filtered 'up' the system, and never heard of again. Clinic managers spoke about routine data primarily in terms of monthly performance review meetings with their managers. At the same time, however, there was strong belief in the value of health information and its potential to inform and improve services.

Similar patterns emerged when asking those in the health system about community engagement. They described how community members and local NGOs were vocal in their complaints about the health services, but that there were few spaces where health system and community members could engage regularly on these issues. Clinic health committees were generally perceived as inconsistent and ineffective. The local Multi-Sectoral Action Team (MSAT), a sub-district-level body meant to coordinate health system and community responses to HIV, was also reported to be ineffective. Community actors reported similarly frustrating experiences, both with health information and attempts to engage with the health system. They too expressed desire for greater access to health information and better engagement with the health system to improve the health of their communities.

Creative conversations

Given these past experiences, there was uncertainty regarding how the first task team meetings would unfold. There was concern that health staff might feel judged or that some community members might struggle to understand and engage with health data. There was also uncertainty as to whether interest in working with new forms of health information and engagement would be more than a distant ideal.

From the start, however, what has been strongly and consistently apparent is the hunger task team members have for health information, and the enthusiasm and creativity they bring to discussions regarding what this information means and how it can be used. Health system staff have engaged positively with criticism from community and NGO members and they have talked together about ideas to improve services and relationships. Health staff have in turn explained their frustration in delivering services to male patients who appear to them as reluctant to accept advice. These conversations have not always been easy, but they have been respectful and productive.

Lessons from the task team's first year

Several key lessons have emerged so far. The first is that bringing diverse actors together with novel forms of locally relevant health information can catalyse productive conversations and new ideas that improve the health system and coordination with community organisations. There seem to be few if any other collaborative spaces of this kind. The ability to engage not only across the health system/community divide, but also across different levels of the health system and with diverse NGOs and CBOs in the area, has also been an important element in the team's design.

A second lesson has been the value of open-ended forms of engagement in the task team's discussions and objectives. The task team is not a space for formal oversight or for the co-option of community members for service delivery. Instead, the task team functions as a flexible, responsive and creative space to generate discussion and ideas for solving problems. At the same time, not being part of a formal governance structure, or day-to-day operations limits its potential sustainability and impact. While the task team does not replace forms of community engagement that involve governance or service delivery, experience thus far has shown that this collaborative kind of engagement is possible and desired, and can be productive when properly supported.

What kind of information is most useful?

Valuable lessons have also been learned about what kinds of health information are useful and how to use them. The initial plan had been to bring regularly updated sub-district-level cohort data on the current performance of local men in the HIV cascade. This information is not currently available at this level of the system and across different services, and task team members were keen to review these data on an ongoing basis and to adjust their services accordingly.

There was concern that we (the authors) might not be able to receive, analyse and synthesise PHDC data on a regular enough basis given capacity constraints. We were also concerned about the meaning and quality of some of the data, largely because of concerns about the underlying data sources at the frontline. There was additional concern that the PHDC was still working out the details of its complex efforts to link individual records across multiple databases, and we were not always sure we understood enough about the data we were working with.

Two key learnings emerged in relation to these concerns. First, task team members were much more interested in working with a diverse and evolving set of health information than with the same monthly cascade report every meeting. For example, whenever a graph from the cascade report was reviewed, the ensuing discussion would raise possible explanations as well as gaps in knowledge and questions about appropriate responses. This led directly to requests for different forms of information that would support the developing brainstorming discussion.

What became clear was the importance of having a diverse 'ecology of evidence',[10] combining not only cascade reports, RMR headcounts, qualitative research, and WHO reports, but also informal knowledge and experience such as personal testimonies, news reports, lists of local organisations and projects, personal and professional networks, etc. The mix of formal and informal bodies of knowledge has become a central feature in the task team meeting discussions, and an important source of the value team members ascribe to the process.

Another learning has been the value of 'good-enough' information in these discussions. Task team members occasionally raised questions about the accuracy or timeliness of the data, but for the most part, new ideas to support men have not required precise or up-to-the-minute information. Small-to-moderate errors in quantitative estimates have not been problematic. Instead, what has been valuable is the local relevance of the information. The ability to see one's own clinic or neighbourhood in the data sparked conversations about local dilemmas and solutions that would not have been likely if the information had been aggregated at district or provincial level.

Conclusions and recommendations

Below are some of the key lessons learned; which may be relevant to other efforts to improve data use and community engagement.

- There is a desire for new forms of health information and new forms of engagement (if effectively facilitated). People are willing to break out of conventional ways of thinking and doing when given the opportunity.
- It is important to promote conversations across different sectors of the community and different levels of the health system.
- Responsive and open-ended forms of engagement are generative. This does not diminish the important place of community-driven forms of accountability and oversight. Rather, the lesson here is that significant forms of community engagement can – and may need to – happen outside of existing spaces.
- It is effective to use a wide array of forms of health-information that are locally relevant and sufficiently trustworthy. In this intervention, concerns about data quality usually mattered much less than whether or not the data spoke to local contexts and experiences.

Recommendations for those working with health information and community engagement are as follows:

- Focus on a specific health problem around which a diverse set of actors can be mobilised. The actors should share a common set of interests and objectives and work towards concrete local actions.
- Think broadly about the types of information that might be relevant to the health problem at hand, and develop capacity (ideally among both health system and community actors) for finding and synthesising this information efficiently and in a manner that can be understood by all involved.

Insights from this case study may help to inform new ways of thinking about the production, circulation and use of health information as well as new forms of engagement between health systems and communities.

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Health and Related Indicators 2018

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Introduction

The World Health Organization's Director-General, Dr Tedros Adhanom Ghebreyesus, has written that "all roads lead to universal health coverage", emphasising that this is the goal, but not the means.[1] He pointed out that countries "take different paths – using either public or private providers", but also that countries "will need to know where they stand on universal health coverage, benchmarked against others". In addition, he emphasised that universal health coverage (UHC) is not an end in itself, but enables attainment of the other health-related Sustainable Development Goals (SDGs). Together with the World Bank, the World Health Organization (WHO) has provided guidance on tracking progress towards UHC in the form of the UHC service coverage index.[2,3]

Sustainable Development Goal 3.8 focuses on more than just population coverage: "Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all". The two SDG indicators adopted for this goal by the United Nations Statistical Commission are:

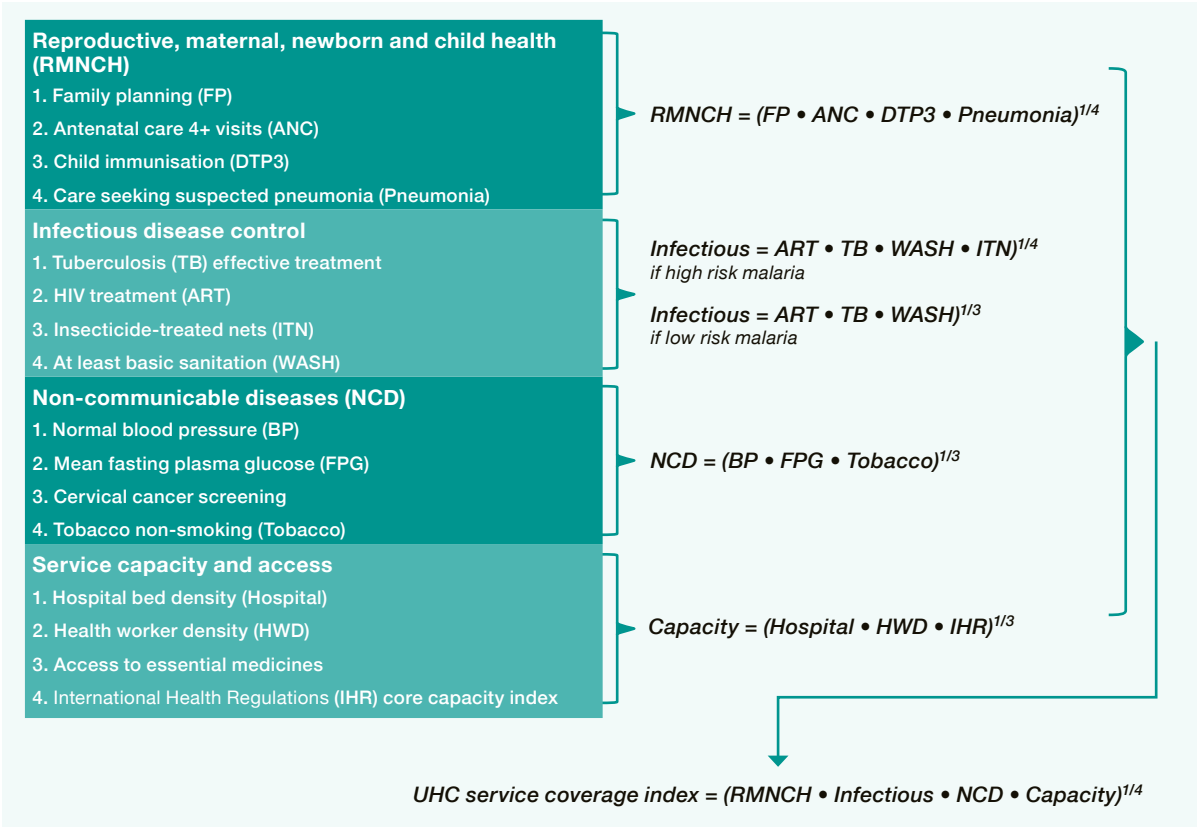
- SDG indicator 3.8.1: Coverage of essential health services (defined as the average coverage of essential services based on tracer interventions that include reproductive, maternal, newborn and child health; infectious diseases; non-communicable diseases; and service capacity and access; among the general and the most disadvantaged population); and
- SDG indicator 3.8.2: Proportion of population with large household expenditures on health as a share of total household expenditure or income.

The first of these requires consideration not only of the proportion of the population able to access each of the listed services, but also the quality of those services.[4] Quality encompasses not only effectiveness (whether the desired health goals are attained or not), but also patient safety (avoidance of harm to those who receive health care) and responsiveness (including patient-centredness).

UHC service coverage index

The UHC service coverage index is based on 16 indicators, 4 for each of the elements listed in indicator 3.8.1. In each case, the selection of an indicator was informed by whether it measured effective service coverage (i.e. sensitive to the quality of services delivered), and also whether it could be disaggregated by key dimensions of inequality. The index was then calculated as the geometric mean of the value for each component, with that value of the geometric mean of the individual indicators for that coverage element. The components of the UHC service coverage index are shown in Figure 1.

Figure 1: Calculating the Universal Health Coverage (UHC) index



Source: Tracking UHC 2017.[3]

Notes: See source for details on calculation and rescaling of the index components.

Calculating the UHC service coverage index for a particular country depends on the availability of high quality and appropriate data, firstly at the national level, and then at various levels of disaggregation needed to assess key dimensions of inequality (such as wealth quintile, educational attainment, place of residence, sex and age).

Hogan et al.[2] have described the development of the indicator, and also the compromises that have been necessary in order to capture some elements. For example, the proportion of women who have four or more antenatal visits during a pregnancy does not capture the quality of antenatal care. A more sensitive indicator would be the proportion of births where a skilled attendant was present, but such data are not available for all countries, making comparison difficult.

Of the 16 indicators, two were considered to measure effective service coverage, seven measured service coverage (but not whether it was effective or not) and the balance (7) were proxy measures. An example of a proxy measure is the mean fasting plasma glucose based on household surveys, which barely captures the extent, let alone the effectiveness, of the management of diabetes.

Hogan et al. have also carefully described what more ideal data sources would be, for those indicators which are currently based on a compromise allowing for maximal inter-country comparisons. In some cases, such data are already available in South Africa, at least for the national level. This has allowed for a comparison between the index components reported for South Africa by Hogan et al. and the best-available data. They reported an SDG coverage index figure for South Africa of 67, indicating that recent primary data was available for 62% of the indicator elements. Globally, the median index was 65 (with a range from 22 to 86), with an average of 72% of indicators based in recent primary data.

A comparison of the data for South Africa, reported by Hogan et al., and the best-available and most recent data is shown in Table 1. In each case, the source of the data relied on is indicated, as well as the extent to which those data can be disaggregated by wealth quintile (W), educational attainment (E), place of residence (R), sex (S) and age (A). Where a more appropriate local indicator could be used, that is also indicated, so that the value reported by Hogan et al. and the best available data can be compared.

The resultant best-estimate index was 66.2. In addition, the first level of disaggregation is shown in Table 2, with data for each indicator presented by province. The resultant SDG coverage index varied from 63.4 in Limpopo to 70.4 in the Western Cape. Performance on the RMNCH indicators is consistently stronger than in other dimensions of the index, reflecting the intensive interventions in this area of service delivery.

Table 1: UHC service coverage index, South Africa

Section	#	Tracer indicator	Hogan values for SA	SA Indicator	Disaggregation	SA value	SA sources
RMNCH	1	Demand satisfied with modern methods in women aged 15–49 years who are married or in a union (%)	84	Demand for family planning satisfied with modern methods	W, E, R, A	**75.7**	SADHS 2016
	2	Four of more visits to antenatal care (%)	87	Antenatal care coverage	W, E, R, A	75.5	SADHS 2016
				Births attended by skilled health personnel (preferred where available)	W, E, R, A	**96.7**	SADHS 2016
	3	Children aged 1 year who have received three doses of a diphtheria, tetanus, and pertussis vaccine (%)	75	DTaP-IPV-Hib-HBV 3rd dose coverage	Geo (local municipality)	**83.1**	DHIS 2017/18
				DTaP-IPV-Hib 3rd dose coverage (alternative)	W, E, R, S	65	SADHS 2016
	4	Care-seeking behaviour for children with suspected pneumonia (%)	65	Percentage of children with symptoms of ARI for whom advice or treatment was sought.	W, E, R, S Number too small to disaggregate below national	**87.6**	SADHS 2016
Infectious	5	Tuberculosis effective treatment coverage (%)	49	Combines 2 indicators: Case detection rate (all forms) TB treatment success rate (ETR.net)	None – Case detection only available nationally	**56.4**	ETR and Global TB 2016
	6	People with HIV receiving antiretroviral therapy (%)	49	People with HIV receiving antiretroviral therapy and virally suppressed (Antiretroviral effective coverage)	Geo (province)	**38**	Johnson et al. 2017 (estimate for 2015)
	7	Population at risk who sleep under insecticide-treated bednets (%)	Omit if low risk malaria		-	-	
	8	Households with access to at least basic sanitation (%)	73	Population using safely managed sanitation services	Geo (province) Household indicator so no disaggregation by personal characteristics	**80.9**	Stats SA GHS 2016
NCDs	9	Prevalence of non-raised blood pressure regardless of treatment status (%)	73		(age 15+) W, E, R, S, A	**63**	SADHS 2016
					(age 15+) W, E, R, S, A	78.9	NiDS 2015 (alternate source)
	10	Mean fasting plasma glucose (mmol/L)	5.71 (value in mmol/L) 69.5 (rescaled to range of 0–100)	Diabetes treatment coverage (Percentage of people with diabetes receiving treatment)	R, S, A, Ethnic No provincial values reported although data were collected at this level	**3w7.5**	SANHANES 2012
				Diabetes effective treatment coverage (Percentage of diabetics treated and controlled)		19.4	SANHANES 2012 (more restrictive indicator)
	11	Cervical cancer screening in women aged 30–49 years (%)	No value given	Cervical cancer screening coverage	Geo (local municipality)	**61.2**	DHIS 2017/18
	12	Adults aged at least 15 years who had not smoked tobacco in the previous 30 days (%)	79			**77.5**	SADHS 2016
						79.7	NiDS 2015 (alternate source)

Section	#	Tracer indicator	Hogan values for SA	SA Indicator	Disaggregation	SA value	SA sources
Capacity	13	Number of hospital beds per person	28 (not clear if this is the value per 10 000 or the rescaled value)	Hospital bed density (beds per 1 000 target population)	Geo (local municipality)	**100** **(2.2 per 1 000, over threshold of 18 per 10 000)**	DHIS 2017 plus estimate of private beds (2014)
	14	Number of health professionals per person: comprising physicians, psychiatrists, and surgeons	0.8, 0.4, 6.4 (ratios, not rescaled)				
				Medical practitioners per 100 000 population Value for SA is 31.6 medical practitioners per 100 000 uninsured population	Geo (province)	**35.1** (physicians only). SA	PERSAL does not report by specialisation
				General MPs registered. 0.52 per 1 000 total population. Includes those overseas or not working		58.3	HPCSA 2016
				General MPs + Specialists registered. 0.78 per 1 000 total population. Includes those overseas or not working		86.5	HPCSA 2016
	15	Proportion of health facilities with availability of the WHO-recommended core list of essential medicines	No value given	Inverse of Tracer items stock-out rate (fixed clinic/ CHC/CDC)	Geo (local municipality)	**74.7**	DHIS 2017/18
	16	International Health Regulations core capacity index	100		None	**91**	WHO-provided value
Index calculation							
RMNCH						85.4	
Infectious						55.8	
NCDs						57.8	
Capacity						69.9	
Index			**67**			**66.2**	

Notes: Disaggregation dimensions possible: W = wealth quintile; E = educational attainment; R = place of residence e.g. urban/rural; S = sex; A = age.

Source and indicator issues:

- Immunisation – despite improvements with the latest population estimates used for the denominator, routine data (DHIS) are still substantially higher than survey-based estimates of immunisation coverage (SADHS). Both systems use a different methodology and both may have biases.
- Raised BP – SADHS has a lower proportion of the population with non-raised BP than NiDS, although this could possibly be due to the cleaning processes and classification of BP categories.
- Diabetes – data were collected by SADHS but not yet reported. SANHANES collected data at provincial level but the paper only provides disaggregation at national level (and other dimensions).
- HR and bed capacity – because of the challenge in obtaining private sector data, this analysis has focused on public sector staff and beds and the uninsured population. Hospital bed density was rescaled and capped at a threshold of 18 per 10 000 population, which is the minimum observed in high-income countries. Health worker density was rescaled and capped on the basis of threshold values as a proxy for access to services. Physician density had a threshold of 0.9 per 1 000, hence 31.6 medical practitioners per 100 000 population is 0.316/0.9 x 100 = 35.1 coverage on a scale of 0 to 100.

Table 2: UHC service coverage index, by province

Category	Tracer	Indicator	Year	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
RMNCH	1	Demand for family planning satisfied with modern methods	2016	75.0	72.7	74.6	75.0	66.5	78.6	73.3	77.5	84.4	75.7	SADHS 2016
	2	Births attended by skilled health personnel	2016	92.7	96.3	97.6	96.4	97.8	96.4	97.6	96.0	99.2	96.7	SADHS 2016
	3	DTP3 coverage	2017	67.2	78.7	84.9	78.4	98.0	91.2	97.5	78.2	93.5	83.1	DHIS
	4	Percentage of children under 5 years of age with suspected pneumonia taken to a health facility	2016										87.6	SADHS 2016
Infectious	5a	*Case detection rate (all forms)*	*2016*										*69.0*	Global TB Report 2017
	5b	*TB treatment success rate (ETR.net)*	*2015*	*83.2*	*80.2*	*84.4*	*82.9*	*80.6*	*82.2*	*77.0*	*78.4*	*80.3*	*81.7*	DoH TB
	5	Tuberculosis effective treatment coverage (%)	2015	57.4	55.3	58.2	57.2	55.6	56.7	53.1	54.1	55.4	56.4	DoH TB and Global TB 2017
	6	People with HIV receiving antiretroviral therapy and virally suppressed	2015	35.0	42.0	32.0	47.0	34.0	34.0	48.0	38.0	40.0	38.0	Johnson et al. 2017
	8	Proportion of people with access to improved sanitation	2016	84.8	82.8	90.7	76.9	57.1	67.4	82.4	68.7	94.3	80.9	Stats SA GHS 2016
NCDs	9	Prevalence of nonraised blood pressure regardless of treatment status	2016	57.6	58.1	67.2	59.0	75.4	57.9	54.4	71.2	54.5	62.8	SADHS 2016
	10	Percentage of diabetics treated and controlled	2012										37.5	Stokes et al. 2017
	11	Cervical cancer screening coverage	2017	64.0	50.9	47.7	79.9	56.6	78.7	40.3	68.9	58.2	61.2	DHIS
	12	Adults aged at least 15 years who had not smoked tobacco in the previous 30 days	2016	75.8	75.6	78.0	81.3	85.8	76.9	66.9	81.7	65.2	77.5	SADHS 2016
Capacity	13a	*Usable beds (all levels) per 1 000 uninsured population*	*2018*	*2.3*	*2.0*	*1.7*	*2.1*	*1.5*	*1.3*	*1.9*	*1.3*	*2.2*	*1.8*	DHIS
	13	Number of hospital beds per person (scaled)	2018	100	100	94.3	100	80.9	70.1	100	71.2	100	100	DHIS
	14a	*Medical practitioners per 100 000 population*	*2018*	*32.3*	*27.6*	*34.0*	*34.2*	*23.4*	*27.8*	*43.9*	*28.1*	*34.3*	*31.6*	PERSAL
	14	Medical practitioners per 100 000 population (scaled)	2018	35.9	30.6	37.8	38.0	26.0	30.9	48.8	31.3	38.1	35.1	PERSAL
	15	Tracer items stock-out rate (fixed clinic/ CHC/CDC)	2017	79.1	65.5	83.0	88.0	47.6	76.6	54.4	66.0	95.8	74.7	DHIS
	16	International Health Regulations (IHR) core capacity index	2017	91.0	91.0	91.0	91.0	91.0	91.0	91.0	91.0	91.0	91.0	World Health Statistics 2018

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA
RMNCH	77.6	82.0	85.2	82.7	86.0	88.4	88.7	83.5	92.2	85.4
Infectious	55.4	57.7	55.3	59.1	47.6	50.7	59.5	52.1	59.3	55.8
NCD	65.4	60.7	63.0	72.6	71.5	70.5	52.7	73.7	59.1	57.8
Capacity	71.3	65.4	72.0	74.3	55.0	62.4	70.1	60.5	75.9	69.9
Index	66.9	65.8	68.0	71.7	63.4	66.6	66.4	66.4	70.4	66.2

Note: Hospital bed density (indicator 13a) was rescaled and capped (indicator 13) at 18 per 10 000 population, the minimum observed in high-income countries. Health worker density was rescaled and capped on the basis of threshold values as a proxy for access to services. Physician density had a threshold of 0.9 per 1 000, hence medical practitioners per 100 000 population (indicator 14a) is divided by 0.9 to estimate coverage on a scale of 0 to 100 (indicator 14).

A broader measure of performance against SDG targets has been reported, in which the geometric mean of 37 SDG indicators was calculated.[5] On that basis, South Africa was reported to have achieved an index of 46 (again on a scale of 0 to 100), below the global median of 56.7. The highest index scores were recorded for Singapore (86.8), Iceland (86.0) and Sweden (85.6), and the lowest for Afghanistan (10.9), the Central African Republic (11.0) and Somalia (11.3). It is important to note that different computation methods as well as the larger basket of indicators produce an index that is not comparable to the UHC coverage index. Across all of the 230 Tier I and Tier II SDG indicators (for all 17 SDGs), Statistics South Africa has reported that data are available on 63%.[6] This highlights the challenges that face every country in strengthening data collection and analytical capacity. The World Health Statistics 2017 stated that "very few of the 42 selected health-related SDG indicators.... were adequately measured in most countries".[7] Boerma et al. have pointed to the dangers inherent in global monitoring efforts that rely on estimates, predictions and complex computational approaches.[8] The apparent certainty of such global depictions of progress must not be allowed to detract from the necessity to invest in national capacity. In particular, country ownership is critical, and must involve not only national public health managers and policymakers, but also academics. One could add that true accountability also demands close engagement with civil society. As Kieney et al. have pointed out, the intermediate objectives of national health policies, plans and strategies must encompass not only quality, equity and efficiency, but also accountability, resilience and sustainability.[9] An example of a global accountability mechanism is the Countdown to 2030, tracing progress in relation to reproductive, maternal, newborn and child health.[10] In addition, Richard Horton's timely reality check also needs

to be borne in mind: "UHC is neither a destination to be reached nor a panacea for delivering better health, even in its broadest definition", and "No country ever completely reaches all its people with all health service. Disparities are endemic. And even for those people who are covered, sustaining that coverage throughout their lives is a permanent technical, financial, and political struggle".[11]

The need to disaggregate all available data in a variety of ways has been underscored by the report of the Lancet Commission on the future of health in sub-Saharan Africa.[12] The report noted that "Africa's health indicators remain behind those of other continents and major health inequities exist", with health outcomes "worst in fragile countries, rural areas, urban slums, and conflict zones, and among poor, disabled, and marginalised people". The commission called for all countries to invest in "information and communication technologies to provide up-to-date, accurate, and disaggregated data required to inform national and local health policy and planning, and day-to-day management". A stepwise approach to improving national health inequality monitoring has been proposed and guidance provided in the form of a WHO manual.[13,14] The World Health Statistics 2018 noted that disaggregated data are more available for reproductive, maternal, newborn and child health (RMNCH), and showed how access to 7 core RMNCH services varied by wealth quintile among low- and middle-income countries (LMICs).[7]

Yet another complicating factor in the depiction of health status is presented by the concept of multmorbidity. The Academy of Medical Sciences in the United Kingdom has identified multimorbidity as a key global research priority.[15] The authors point out that multimorbidity may become the norm rather than the exception, especially in ageing populations, but more importantly that it appears to be more prevalent in those of lower socioeconomic status, and that "some patients with multimorbidity account for a disproportionately higher share of the healthcare workload and healthcare costs than would be expected from the individual component conditions". A particular sub-set of multimorbidity is represented by syndemics, defined as "the aggregation of two or more diseases or other health conditions in a population in which there is some level of deleterious biological or behaviour interface that exacerbates the negative health effects of any or all of the diseases involved".[16] The authors argue that "syndemics underline the importance of the disease clustering within populations, the social, psychological, and biological reasons that diseases cluster, the ways comorbid diseases affect each other, how important these interactions can be to the health burden within the populations, the pathways of disease interaction, and the way in which the health of human beings is affected by the physical and social environments in which they live".[16] Mendenhall et al. have shown how the prevalence of diabetes, HIV, tuberculosis and depression are higher in low-income urban populations in South Africa than in the general population, and how current approaches to the delivery of care ignore the demonstrable linkages between these conditions.[17]

This chapter presents national data, disaggregated to provincial level where possible, and in some cases by ethnicity, age and sex. As before, while this chapter attempts to identify most of the key international and national data sources and literature on a range of health indicators, it cannot claim to be exhaustive. The data provided in this chapter are only a sub-set of those available. More data, particularly those showing trends over time, can be accessed on the Health Systems Trust (HST) website (www.hst.org.za). In addition, a substantial set of district-level data are presented in the District Health Barometer reports, which are also accessible from the HST website.

Although attention is drawn to known data quality or interpretation issues, it is not possible to verify, adjust and correct every data source in detail. Caution is therefore advised with regard to which types of indicators are presented and whether their use is suitable for the intended purpose.[18]

Indicator definitions: The definitions of all indicators appearing in the tables are given at the end of the chapter on page 233.

Trends and time-series: For most indicators, data are given for several years, often from multiple different sources. In most cases these data can thus not be used to assess trends and changes over time due to possible differences in methodology and data presentation issues. Even data from regular surveys may not be comparable over time, or revised data for a historical time series may be released, as for example with the General Household Surveys and mid-year population estimates. This may result in different values being published compared to previous editions. Therefore, when using time series data, the most recent revisions should be obtained from the online database and not from previous printed editions of this chapter. In the data tables, the column 'Subgroup' includes variables of disaggregation where these are available, including the time period, sex, age group, data series (recurring data sources) and any other categories.

Box 1 presents key new or updated sources of data used in this chapter. Recently released sources which could not be incorporated into the chater are also presented.

Box 1: Key new or updated sources

International	South African
❖ Global Burden of Disease Study 2015 and 2016 papers ❖ Global Tuberculosis Report 2017 ❖ IDF Diabetes Atlas 2017 ❖ Levels and Trends in Child Mortality Report 2017 ❖ Noncommunicable Diseases Progress Monitor 2017 ❖ UNAIDS Data 2017 ❖ WHO Report on the Global Tobacco Epidemic, 2017 ❖ World Health Statistics 2018. ❖ World Malaria Report 2017	❖ Child Gauge 2017 ❖ Community Health Worker Information System (CHW Register) ❖ Council for Medical Schemes Annual Report 2016/17 ❖ District Health Information System (DHIS) ❖ Electronic Drug Resistant TB Register (EDRWeb) ❖ Electronic TB Register ❖ Stats SA General Household Survey 2017 ❖ Labour Force Survey 2017 ❖ Mortality and causes of death in South Africa, 2016 ❖ Personnel Administration System (PERSAL) ❖ Rapid Mortality Surveillance Report 2016 ❖ Recorded live births 2016 ❖ Road Safety Annual Report 2017 ❖ SDG Baseline 2017 ❖ South African Community Epidemiology Network on Drug Use (SACENDU) ❖ South Africa Demographic and Health Survey (SADHS) 2016 ❖ South African National HIV Prevalence, Incidence, Behaviour and Communication Survey, 2017 ❖ South African Nursing Council (SANC) ❖ South African Pharmacy Council (SAPC) ❖ Stats SA General Household Survey 2017 ❖ Stats SA Mid-year population estimates 2017 ❖ Stats SA Perinatal deaths 2016 ❖ Surveillance data, surveillance bulletins and other reports issued by NICD
Recently released sources which could not be incorporated into the chapter content:	
❖ Global Status Report on Alcohol and Health 2018[19] ❖ Global Tuberculosis Report 2018[20] ❖ Human Development Index 2018[21] ❖ Lancet NCD Countdown 2030[22] ❖ UNAIDS Global AIDS Update 2018[23]	❖ Council for Medical Schemes Annual Report 2017/18[24] ❖ Recorded live births 2017[25] ❖ Saving Mothers 2014–2016[26] ❖ Stats SA Mid-year population estimates 2018[27]

DEMOGRAPHIC INDICATORS

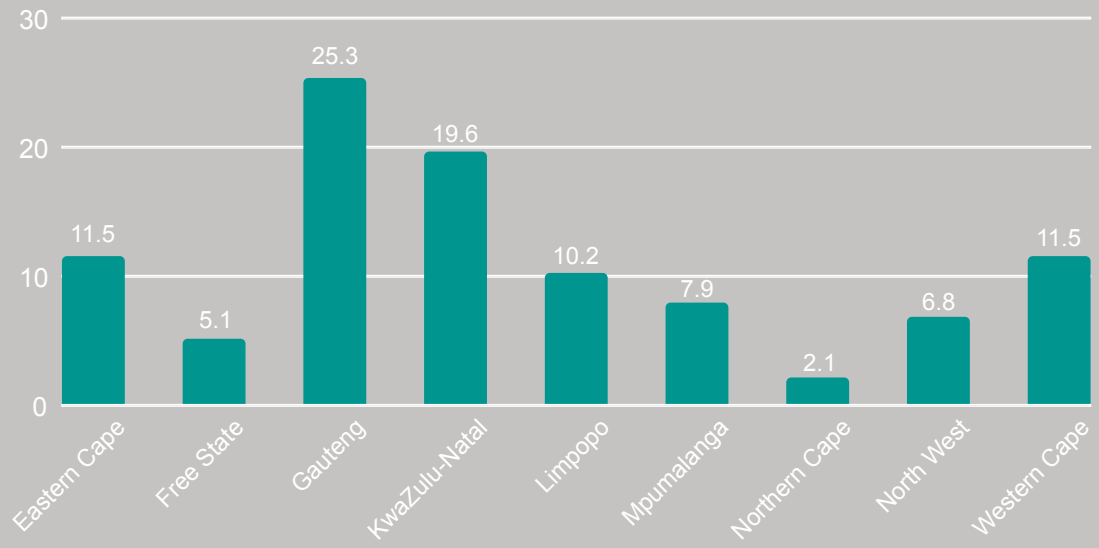
57 MILLION
Total population

29 MILLION
Female

30%
14 years and younger

8.1%
60 years or older

Percentage of total population, 2017



9 DEATHS PER 1 000
The crude death rate has decreased in the past 10 years from a high of 13

POPULATION
51.1% *48.9%*

80.8%
Percentage of population that is Black African

Demographic indicators

The key resource published in the last year was Statistics South Africa's mid-year population estimates for 2017 (Statistical release P0302).[28] The mid-year population estimate was reported as 56 521 900, of which 28 901 400 (51.1%) were female and 45 656 400 (80.8%) were Black African. The largest provincial population was estimated to be in Gauteng (14 278 700; 25.3% of the national population), followed by KwaZulu-Natal (11 074 800; 19.6%). The next most populous provinces each contained 11.5% of the population (Western Cape – 6 510 300; Eastern Cape – 6 498 700). Together those four provinces were estimated to contain more than two-thirds (67.9%) of the South African population.

The crude death rate (CDR) was estimated to be 9 deaths per 1 000 people in 2017, representing a steep decline from a peak of 14.8 estimated for 2005 and 2006. Life expectancy at birth was estimated at 61.2 years for males and 66.7 years for females in 2017. However, life expectancy at birth was estimated to vary considerably between provinces, ranging from 55.7 in the Free State to 66.8 in the Western Cape for males, and from 61.8 to 71.8 years in the same provinces for females. For the period 2016–2021, the total fertility rate (TFR) was estimated to vary from 3.07 in Limpopo to only 2.02 in the Western Cape. Importantly for the design of various denominators, the report provides population estimates in 5-year age bands for each province. Increasingly, births are being registered within 30 days, as was done for 83.6% of live births in 2016 (Statistical release P0305).[29] As before, more than two-thirds of births recorded no details about the father. In 2016, 131 428 of the 969 415 live births (13.6%) occurred to mothers aged 15–19 years and 3 568 (0.4%) to those aged 10–14 years. The median age of mothers has remained constant at about 27 years since at least 1998. The greatest proportion of birth registrations occurred in the most populous provinces (Gauteng, 22.3%; KwaZulu-Natal, 20.1%), but births in Limpopo (13.3%) exceeded those in the Eastern Cape (11.4%) or Western Cape (10.6%).

Migration remains an important driver of population change, especially between provinces. The estimated net changes in the 2016–2021 period were positive for all provinces except the Eastern Cape (-324 213), Free State (-12 860), KwaZulu-Natal (-537 064) and Limpopo (-138 606).[28] The largest net gain was estimated to occur in Gauteng (+1 050 230), followed by the Western Cape (+309 729). The Helen Suzman Foundation published two reports on migration in 2017, drawing on data from the 2011 Census and the 2016 Community Survey, but focused only on residents (as opposed to transient or short-term migrants).[30,31] In terms of immigration and emigration from the country, it was noted that these have been closely matched between 2011 and 2016, with net migration almost zero. The majority of foreign-born residents have come from Zimbabwe, Mozambique and Lesotho.

Statistics South Africa has produced two focused thematic reports in 2017 and 2018. The first focused on selected development indicators for the metropolitan municipalities, based on the General Household Survey 2016.[32] Of direct relevance to health indicators, the report included the proportion of the population who were beneficiaries of medical schemes in 2016; the City of Cape Town (28.0%), Buffalo City (18.7%), Nelson Mandela Bay (21.5%), Mangaung (21.4), eThekwini (20.6), Ekurhuleni (26.2%), City of Johannesburg (26.0%), and the City of Tshwane (33.1%). Overall, 25.9% of metro residents were covered by medical schemes, which exceeded the proportion for the entire population in 2016 (17.4%).[33] The 2017 General Household Survey recorded only 17.1% of the population as covered by a medical scheme.[34] These proportions need to be taken into account when choosing denominators for any indicator that aims to differentiate between the insured and uninsured population.

The second report used data from the last three Censuses (1996, 2001 and 2011), the Community Survey 2016, the Mortality and Causes of Death 2015, and the General Household Survey 2016 to describe the state of the adolescent population (aged 10–19 years) in South Africa.[35] The skewed distribution by age was clearly demonstrated, with the highest proportion of adolescents as a share of the population in the Eastern Cape (22.7%) and the lowest in Gauteng (14.1%). Overall, 22.5% of rural residents were adolescents, compared to 16.2% of urban residents.

Data issued by Statistics South Africa are routinely disaggregated by sex, in a binary fashion (male/female). However, as the Global Health 50/50 Report 2018 makes clear, there is a need for gendered analysis.[36] Gender is a social construct which "interacts with, but is distinct from, the binary categories of biological sex" and also "intersects with, and is shaped by, other axes of inequality – e.g. age, education, economic position and power, race and ethnicity".

The report is focused on organisational policies and practices, but as Helen Clark has identified, the principles also apply to the ways in which health data are gathered and analysed, and how health systems respond.[37]

Table 3: Demographic indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Adolescent fertility rate (per 1 000 girls aged 15–19 years)	2011–2016	female 15–19 years SADHS										71.0	a
	2013	female 15–19 years vital registration										68.3	b
	2014	female 15–19 years vital registration										64.5	b
Ageing index	2016	both sexes CS	15.0	20.0	23.0	14.0	15.0	14.0	24.0	17.0	24.0	18.0	c
		both sexes mid-year	15.0	20.0	21.0	13.0	15.0	14.0	23.0	16.0	25.0	17.0	d
		female mid-year	20.0	25.0	24.0	17.0	22.0	18.0	29.0	20.0	29.0	22.0	d
		male mid-year	10.0	15.0	19.0	9.0	9.0	11.0	19.0	13.0	22.0	13.0	d
	2017	both sexes mid-year	21.0	19.0	19.0	15.0	14.0	14.0	22.0	18.0	23.0	18.0	e
Annual population growth rate	2015–2016	both sexes 0–14 years mid-year										1.3	d
		both sexes 15–34 years mid-year										0.9	d
		both sexes 60+ years mid-year										3.0	d
		both sexes all ages mid-year										1.6	d
	2016–2017	both sexes 0–14 years mid-year										1.6	e
		both sexes 15–34 years mid-year										0.2	e
		both sexes 60+ years mid-year										3.0	e
		both sexes all ages mid-year										1.6	e
Area (square km)	2016	2016 boundaries	168 965	129 825	18 178	94 359	125 754	76 495	372 889	104 882	129 462	1 220 809	f
Area as a % of total area of South Africa	2011	Census	13.8	10.6	1.4	7.7	10.3	6.3	30.5	8.7	10.6	100.0	g
Average household size	2007	CS	4.1	3.5	3.3	4.6	4.3	3.9	4.0	3.7	3.8	3.9	h
	2011	Census	3.7	3.2	3.0	3.9	3.7	3.7	3.7	3.2	3.4	3.4	g
	2016	CS	3.9	3.0	2.7	3.8	3.6	3.5	3.4	3.0	3.2	3.3	c
Crude death rate (deaths per 1 000 population)	2015	mid-year										9.5	e
		vital registration unadjusted										8.4	i
	2016	both sexes all ages vital registration unadjusted	9.4	11.1	7.2	7.6	7.9	7.7	11.6	9.3	7.6	8.2	j
		mid-year										9.7	d
												9.2	e
	2017	mid-year										9.0	e
Live birth occurrences registered	2014	total										1 008 740	k
	2015	total										952 242	k
	2016	0–30 days	85 590	41 848	171 115	126 671	98 525	59 796	20 719	48 118	80 279	732 672	l
		current										876 435	m
		total										893 990	k
Population	2016	both sexes all ages CS	6 996 976	2 834 714	13 399 724	11 065 240	5 799 090	4 335 964	1 193 780	3 748 435	6 279 730	55 653 654	c
		both sexes all ages mid-year	7 061 700	2 861 600	13 498 200	11 079 700	5 803 900	4 328 300	1 191 700	3 790 600	6 293 200	55 908 900	d
	2017	both sexes all ages mid-year	6 498 700	2 866 700	14 278 700	11 074 800	5 788 400	4 444 200	1 214 000	3 856 200	6 510 300	56 521 900	e
Population % by province	2016	both sexes all ages CS	12.6	5.1	24.1	19.9	10.4	7.8	2.1	6.7	11.3	100.0	c
		both sexes all ages mid-year	11.7	5.1	25.0	19.7	10.3	7.9	2.2	6.8	11.5	100.0	e
	2017	both sexes all ages mid-year	11.5	5.1	25.3	19.6	10.2	7.9	2.1	6.8	11.5	100.0	e
Population density	2016	mid-year	41.8	22.0	742.5	117.4	46.2	56.6	3.2	36.1	48.6	45.8	d
	2017	mid-year	38.4	22.0	785.3	117.3	46.0	58.1	3.2	36.6	49.5	46.0	e
	2018	DHIS 2002–2021	42.8	22.4	775.9	121.0	47.5	58.3	3.2	37.4	50.3	47.3	n

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Public sector dependent (uninsured) population	2016	all ages GHS	6 306 098	2 398 021	9 759 199	9 761 216	5 310 569	3 657 414	981 961	3 222 010	4 770 246	46 124 843	o
		all ages non med scheme	6 418 080	2 476 376	10 117 149	9 835 132	5 398 547	3 768 727	1 010 092	3 310 104	4 995 841	47 099 377	p
	2017	all ages GHS	5 874 825	2 387 961	10 337 779	9 756 899	5 267 444	3 808 679	1 027 044	3 262 345	4 902 256	46 687 089	q
		all ages non med scheme	5 860 266	2 478 961	10 798 890	9 821 656	5 375 464	3 898 605	1 034 405	3 394 963	5 201 166	47 643 819	r
	2018	all ages GHS	5 883 357	2 408 410	10 614 379	9 880 607	5 326 918	3 876 582	1 040 406	3 320 734	5 007 647	47 460 152	s
Total fertility rate	2010–2015	female all ages HDR										2.4	t
	2011–2016	female 15–19 years SADHS										2.6	a
		female 15–19 years SADHS non-urban										3.1	a
		female 15–19 years SADHS urban										2.4	a
		mid-year	3.1	2.4	2.3	3.1	2.9	2.5	2.4	2.9	2.2	2.4	d
	2016	Thembisa	2.5	2.5	2.3	2.4	3.0	2.5	2.6	2.6	2.3	2.5	u
	2016–2021	mid-year	2.8	2.6	1.9	2.6	3.1	2.6	2.6	2.6	2.0		e
	2017	mid-year										2.4	e
Urban percentage	1996	Census	36.6	68.6	97.0	43.1	11.0	39.1	70.1	34.9	88.9	53.7	v
	2001		38.8	75.8	97.2	46.0	13.3	41.3	82.7	41.8	90.4	57.5	w
	2015	HDR										64.8	t

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a SADHS 2016.[38]
b SDG Baseline 2017.[6]
c Community Survey 2016.[39]
d Stats SA MYE 2016.[40]
e Stats SA MYE 2017.[28]
f Demarcation Board.[41]
g Census 2011.[42]
h Community Survey 2007.[43]
i Stats SA Causes of death 2015.[44]
j Stats SA Causes of death 2016.[45]
k Stats SA Live Births 2016. [29] As at 1 Jul 2017.
l Stats SA Live Births 2016.[29] Registered within 30 days.
m Stats SA Live Births 2016.[29] Registered in year of birth.
n DHIS.[46]
o Stats SA GHS 2015.[47] Calculated using provincial medical scheme coverage (GHS 2015) and Stats SA mid-year estimates for 2016.
p Medical Schemes 2015–16.[48] Calculated from total number of beneficiaries subtracted from total population (Stats SA 2016 mid-year estimates).
q Stats SA GHS 2016.[33] Calculated using provincial medical scheme coverage (GHS 2016) and Stats SA mid-year estimates for 2017.
r Medical Schemes 2016–17.[49] Calculated from total number of beneficiaries subtracted from total population (Stats SA 2017 mid-year estimates).
s Stats SA GHS 2016.[33] Calculated using provincial medical scheme coverage (GHS 2016) and Stats SA mid-year projections for 2018 published online with the MYE 2017.
t Human Development Report 2016.[50]
u Thembisa v2.5.[51]
v Census 1996.[52]
w Urban and Rural definition.[53]

Table 4: Demographic indicators by population group

Indicator	Period	Sex|Age|Series|Cat	African/ Black	Coloured	Indian/ Asian	White	Ref
Ageing index	2016	both sexes CS	13.0	20.0	37.0	93.0	a
		both sexes mid-year	13.0	17.0	38.0	93.0	b
		female mid-year	16.0	22.0	45.0	110.0	b
		male mid-year	9.0	13.0	30.0	76.0	b
Crude death rate (deaths per 1 000 population)	2016	both sexes all ages vital registration unadjusted	7.0	6.5	6.0	9.2	c
Population	2016	both sexes all ages CS	44 891 603	4 869 526	1 375 834	4 516 691	a
		both sexes all ages mid-year	45 109 900	4 897 200	1 386 000	4 515 800	b
	2017	both sexes all ages mid-year	45 656 400	4 962 900	1 409 100	4 493 500	d
Population % by population group	2016	both sexes all ages CS	80.7	8.7	2.5	8.1	a
		both sexes all ages mid-year	80.7	8.8	2.5	8.1	b
	2017	both sexes all ages mid-year	80.8	8.8	2.5	8.0	d
Public sector dependent (uninsured) population	2016	all ages GHS	40 328 251	3 952 040	769 230	1 205 719	e
	2017	all ages GHS	40 862 478	3 985 209	711 596	1 249 193	f

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a Community Survey 2016.[54]
b Stats SA MYE 2016.[40]
c Stats SA Causes of death 2016.[45]
d Stats SA MYE 2017.[28]
e Stats SA GHS 2015.[47]
f Stats SA GHS 2016.[33]

SOCIO-ECONOMIC & RISK FACTORS

71%

Of global population using safely managed drinking water source

39%

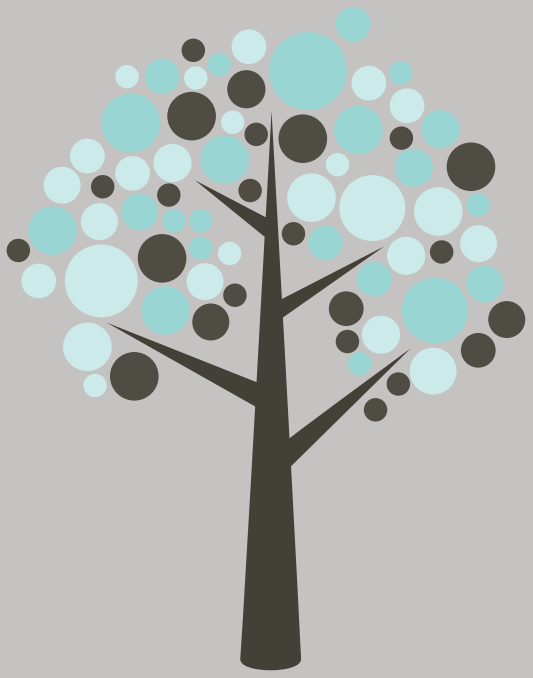
Of global population had access to safely managed sanitation

23%

OF ALL DEATHS GLOBALLY COULD BE PREVENTED THROUGH HEALTHIER ENVIRONMENTS

NCDS

2/3 OF 12.6 MILLION DEATHS CAUSED BY ENVIRONMENT



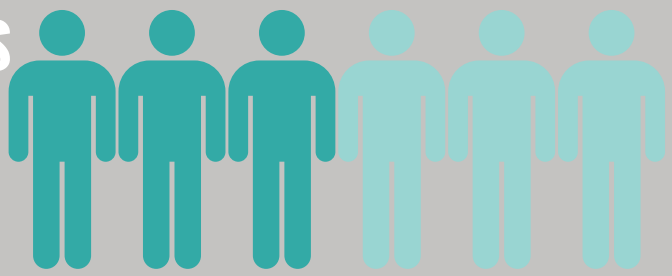
7.6%

CONTRIBUTION OF AMBIENT PM2.5 EXPOSURE TO GLOBAL DEATHS

4.2 M

GLOBAL DEATHS CAUSED BY AIR POLLUTION

THE COUNTRY CONTINUES TO FACE THE CHALLENGE OF HIGH POVERTY, HIGH INEQUALITY AND HIGH UNEMPLOYMENT



56% of South Africans were living in poverty in 2015, which translates into 30.4 million people

Overcoming Poverty and Inequality in South Africa, World Bank, 2018

Socio-economic and risk factor indicators

At a global level, a number of reports have drawn attention to the social determinants of health. A joint WHO and United Nations Children's Fund (UNICEF) report on global progress with regard to drinking water, sanitation and hygiene was published in 2017.[55] It showed that, in 2016, only 71% of the global population used a safely managed drinking water service, 39% a safely managed sanitation service, and that data on access to hand washing with soap and water were available for only 30%. Although the numbers of people practising open defecation declined globally, they increased in sub-Saharan Africa and Oceania. A 2018 World Bank report on access to energy sources noted that about 13% of the world's population live without electricity, of which 87% live in rural areas.[56] Globally, 97% of the urban population and 76% of the rural population had access to electricity in 2016. The World Bank's Global Poverty Working Group Database (GPWG-DB) allows for analysis of data by place of residence (urban/rural), by wealth quintile, and between male- and female-headed households. In 2017, WHO estimated that 23% of all deaths globally could be prevented through healthier environments, with nearly two thirds of the 12.6 million deaths caused by the environment each year due to non-communicable diseases (NCDs).[57] Some reports have specifically addressed the impact of climate change on the health of children.[58,59] Following on the work of the 2015 Lancet Commission on Health and Climate Change, a Lancet Countdown on health and climate change has been established, bringing together 24 academic institutions and intergovernmental organisations.[60] It will report 40 annual indicators across five sections: climate change impacts, exposures, and vulnerability; adaptation planning and resilience for health; mitigation actions and health co-benefits; economics and finance; and public and political engagement. The second of these groups will focus on health-specific planning actions: national adaptation plans for health; city-level climate change risk assessments; detection and early warning of, preparedness for, and response to health emergencies; climate information services for health; national assessment of vulnerability, impacts, and adaptation for health; and climate-resilient health infrastructure. The third will focus on mitigation actions, such as the phase-out of coal-based power generation and steps to address ambient air pollution.

In 2017, the Lancet Commission on pollution and health identified pollution as the single largest environmental cause of disease and premature death.[61] Among the recommendations of the Commission was that "systems to monitor pollution and its effects on health" be established, able to collect data at the national and local levels, identify and apportion appropriate responsibility to each pollution source, evaluate the success of interventions, guide enforcement, inform civil society and the public, and therefore ultimately assess progress. In essence, that describes an appropriate and comprehensive accountability mechanism.

Addressing the social determinants of health often requires intersectoral action, which will require monitoring of indicators that can measure progress in relation to governance, socio-economic and environmental interventions (Box 2).[62] The extent of South Africa's vulnerability to the effects of climate change has been mapped by the Council for Scientific and Industrial Research (CSIR) and the Department of Science and Technology, and has highlighted the need for intersectoral "heat-health" plans, for example, to mitigate the health impacts due to increasing temperatures.[63]

The Global Burden of Disease project has also delivered assessment of the impact of environmental factors on the prevalence of specific conditions. For instance, based on data from 193 countries and territories, it was estimated that ambient $PM_{2.5}$ exposure[a] contributed to about 3.2 million incident cases of diabetes, about 8.2 million disability-adjusted life-years (DALYs) caused by diabetes, and 206 105 deaths from diabetes, with the burden skewed towards LMICs.[64] Overall, ambient $PM_{2.5}$ exposure was estimated to be responsible for 7.6% of global deaths (4.2 million in 2015) and 4.2% of global DALYs (103.1 million), ranking fifth as a global mortality risk factor.[65] The top four global mortality risk factors in 2015 were high systolic blood pressure, smoking, high fasting plasma glucose and high total cholesterol. On the basis of its Environmental Performance Index, South Africa was ranked a lowly 142 out of 180 in 2018, lower than would be expected on the basis of its wealth and population density.[66] The index is based on 24 indicators covering environmental health and ecosystem vitality.

Much of the data shown in the tables is extracted from the routine reports issued by Statistics South Africa, and in particular the annual General Household Surveys (P0318), the Quarterly Labour Force Surveys (P0211), and the Living Conditions Survey 2014/2015, published in 2018.[34,67,68] In addition, Statistics South Africa have published focused reports, drawing on the data from such primary sources, including an in-depth analysis of environmental issues from General Household Surveys 2002–2016,[69] selected development indicators from the General Household Survey 2016,[70] the 9th in a series of Labour Market Dynamics in South Africa reports,[71] Poverty Trends in South Africa 2006–2015,[72] and the third in the Vulnerable Groups series, focused on the social profile of children aged 7–17 years between 2002 and 2016.[73] The last of these showed some progress in the proportion of children with access to adequate housing and basic services by children, with 82% in formal housing in 2016, compared with 74% in 2002.

In March 2018, a joint report from the World Bank, Statistics South Africa and the Department of Planning, Monitoring and Evaluation assessed the "drivers, constraints and opportunities" with regard to overcoming poverty and inequality in South Africa.[74] The report notes that, despite the considerable investments in education, health, housing, social development and other components of the 'social wage', South Africa remains one of the most unequal societies in the world, and that inequality has worsened since 1994. Poverty levels remain high for an upper middle-income country, and are still strongly correlated with the spatial arrangements of apartheid. Although noting the effects of social transfers (including social grants), the report identifies high unemployment and poor economic growth as the key drivers of enduring poverty and inequality.

A key issue in all sub-Saharan countries, where child deaths from diarrhoeal disease are still prevalent, is the quality of potable water and of waste water treatment. In the absence of comprehensive reports from the Department of Water and Sanitation (in the form of the Blue Drop and Green Drop reports), civil society has filled the gap. Afriforum published a report from its Blue and Green Drop Project in 2017.[75] The quality of drinking water was tested in 156 towns, with only 3 municipalities failing to meet quality standards, all of which improved on engagement. Sewage systems were tested in 88 towns, of which 59 did not meet the necessary standards, and showed a deterioration over time.

a $PM_{2.5}$ exposure refers to exposure to particle mass with an aerodynamic diameter less than 2.5 μm, regardless of the chemical or toxic properties of those particles.

Box 2: Proposed social determinants of health action indicator subgroups, definitions and examples of related SDG indicators

Indicators subgroup	Definition	Example from the SDG monitoring system
Indicators for an intersectoral governance intervention	Indicator for an intersectoral political or decision-making structure or process that improves health equity	Indicator 6.b.1 Proportion of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management
Indicator for an intersectoral socioeconomic intervention	Indicator for an intersectoral policy or programme allocating social, financial or economic resources that improves health equity	Indicator 1.3.1 Proportion of the population covered by social protection floors / systems disaggregated by sex and distinguishing children, unemployed, old age, people with disabilities, pregnant women / new-borns, work injury victims, poor and vulnerable
Indicator for an intersectoral environmental intervention	Indicator for an intersectoral policy or programme for the built or natural environment that improves health equity	Indicator 11.6.1 Proportion of urban solid waste regularly collected and with adequate final discharge with regards to the total waste generated by the city

Source: Pega et al.[62]

Table 5: Environmental health indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Age-standardised mortality rate attributed to household and ambient air pollution (per 100 000 population)	2016	both sexes WHO										86.7	a
Air pollution level in cities (particulate matter [PM])	2014	GBD PM2.5										29.0	b
		PM2.5										32.6	c
		SAAQIS PM10 annual avg										37.2	d
		SAAQIS PM10 NAAQS										50.0	e
	2015	GBD PM2.5										36.0	b
		SAAQIS PM10 annual avg										35.2	d
		SAAQIS PM10 NAAQS										40.0	e
	2016	GBD PM2.5										36.0	b
		WHO PM2.5 urban										31.0	f
		WHO PM2.5 urban and rural										27.0	f
Average death rate due to natural disasters (per 100 000 population)	2002–2016	both sexes WHO										0.1	a
Drinking Water System (Blue Drop) Performance Rating	2011		77.3	64.1	95.1	80.5	64.0	56.5	62.1	62.3	94.1	72.9	g
	2012		82.1	73.6	98.1	92.1	79.4	60.9	68.2	78.7	94.2	87.6	h
	2014		72.0	75.0	92.0	86.0	62.0	69.0	68.0	63.0	89.0	79.6	i

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a World Health Statistics 2018.[76]
b State of Global Air 2018.[77]
c Atlas Child Health 2017.[78]
d SDG Baseline 2017.[6] South African Air Quality Information System (SAAQIS). National Annual Average PM10.
e SDG Baseline 2017.[6] National Ambient Air Quality Standards (NAAQS) weighted PM10.
f Air Pollution 2016.[79] Annual median concentration, population weighted and modelled.
g Blue Drop 2011.[80]
h Blue Drop 2012.[81]
i Blue Drop 2014.[82] Where district values were omitted from report, these were calculated from the average of the local municipality scores.

Table 6: Socio-economic indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Education level: percentage of population with no schooling	2015	both sexes 20+ years GHS	6.1	3.4	2.3	6.7	9.8	8.3	8.1	7.2	1.5	5.1	a
	2016	both sexes 20+ years GHS	5.9	4.0	2.1	6.4	9.2	8.0	7.8	6.7	1.5	4.9	b
	2017	both sexes 20+ years GHS	6.0	3.6	2.1	5.4	8.9	7.8	6.7	6.4	2.1	4.7	c
Mortality rate attributed to exposure to unsafe WASH services (per 100 000 population)	2016	both sexes WHO										13.7	d

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Percentage of households by type of housing	2015	GHS formal	64.7	82.0	77.2	74.4	90.5	85.4	86.1	77.5	81.0	78.1	a
		GHS informal	7.3	15.9	20.6	7.8	6.5	9.4	12.4	21.9	17.2	14.1	a
		GHS traditional	27.8	1.8	0.2	17.7	2.9	4.8	1.0	0.6	0.0	6.9	a
	2016	CS formal	65.1	83.6	81.4	72.7	88.9	84.7	83.5	78.3	82.4	79.2	e
		CS informal	7.4	14.0	17.7	8.5	4.8	10.9	12.8	18.4	16.6	13.0	e
		CS traditional	26.6	1.6	0.2	18.1	5.1	3.2	2.3	1.9	4.9	7.0	e
		GHS formal	69.7	81.3	77.9	75.9	91.9	86.5	84.6	78.8	80.0	79.3	b
		GHS informal	7.0	16.5	19.8	8.1	5.2	9.1	13.9	20.8	18.3	13.9	b
		GHS traditional	22.9	1.9	0.2	15.7	2.8	4.4	1.1	0.5	0.1	5.9	b
	2017	GHS formal	70.4	81.7	78.5	78.6	91.7	86.9	86.0	79.9	78.9	80.1	c
		GHS informal	7.0	16.0	19.8	6.8	5.5	9.0	12.6	19.9	19.0	13.6	c
		GHS traditional	22.3	1.9	0.1	14.4	2.7	3.8	1.1	0.2	0.1	5.5	c
Percentage of households using electricity for cooking	2015	GHS										78.1	a
	2016	CS	76.8	90.8	87.8	81.8	63.8	79.8	82.8	84.0	90.1	82.8	e
		GHS	73.7	84.3	79.1	79.4	59.4	75.3	85.6	76.4	80.9	76.8	b
	2017	GHS	74.8	85.6	76.6	78.1	60.2	74.2	84.9	76.4	79.8	75.9	c
Percentage of households with access to piped water	2015	GHS	74.9	96.1	97.7	84.2	78.8	85.5	96.5	86.1	99.2	89.4	a
	2016	CS	75.1	96.2	97.5	85.4	80.0	88.1	94.3	86.1	99.0	89.9	e
		GHS	75.7	93.0	97.5	83.3	75.1	85.3	96.1	86.8	98.7	88.8	b
	2017	GHS	74.2	92.8	97.1	84.5	74.7	85.5	96.0	85.8	98.7	88.6	c
Percentage of households with telephone (telephone in dwelling or cell phone)	2015	GHS	93.0	95.1	98.5	97.0	96.9	98.0	88.9	95.0	95.6	96.5	a
	2016	CS cellphone										93.8	e
		CS landline										11.5	e
		GHS	93.1	95.3	98.5	96.7	96.9	97.7	90.3	95.4	95.8	96.5	b
	2017	GHS	92.9	95.4	98.6	96.6	96.7	98.2	90.0	95.7	95.6	96.5	c
Percentage of people with access to improved sanitation	2015	GHS	81.7	81.1	91.0	77.3	53.8	65.8	80.7	66.4	93.3	79.9	a
	2016	both sexes all ages GHS	84.8	82.8	90.7	76.9	57.1	67.4	82.4	68.7	94.3	80.9	f
	2017	both sexes all ages GHS	85.3	85.1	90.5	80.8	58.9	67.6	87.7	71.3	94.1	82.2	g
Percentage of population with primary reliance on clean fuels	2016	both sexes WHO										85.0	d
Percentage of population with sustainable access to an improved water source	2015	all ages GHS	75.7	99.3	98.6	86.7	89.8	91.4	99.1	93.0	99.4	92.5	h
Poverty prevalence	2009	female LCS food poverty line										35.0	i
		female LCS LBPL										49.6	i
		LCS food poverty line										33.5	i
		LCS LBPL										47.6	i
		LCS UBPL										62.1	i
		male LCS food poverty line										32.0	i
		male LCS LBPL										45.6	i
	2011	female IES food poverty line										22.6	i
		female IES LBPL										38.1	i
		IES food poverty line	31.5	19.7	7.8	30.6	34.1	25.1	21.3	25.2	6.9	21.4	i
		IES LBPL	51.8	33.6	16.3	48.0	52.7	46.1	39.1	41.9	17.0	36.4	i
		IES UBPL										53.2	i
		male IES food poverty line										20.2	i
		male IES LBPL										34.7	i
	2015	18+ years LCS food poverty line										20.6	j
		18+ years LCS LBPL										33.8	j
		18+ years LCS UBPL										49.2	j
		<18 years LCS food poverty line										33.3	j
		<18 years LCS LBPL										51.0	j
		<18 years LCS UBPL										66.8	j
		female LCS food poverty line										26.5	i
		female LCS LBPL										41.7	i
		LCS food poverty line	41.4	21.1	9.2	34.3	40.3	26.4	24.2	28.7	10.0	25.2	i
		LCS LBPL	59.1	36.2	19.0	52.4	57.0	42.6	40.7	46.9	21.3	40.0	i

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
		LCS UBPL										55.5	i
		male LCS food poverty line										23.7	i
		male LCS LBPL										38.2	i
Unemployment rate (official definition)	2016	both sexes 15–34 years LFS youth										37.6	k
	2016	both sexes 15–64 years LFS	28.4	33.7	29.3	23.3	20.0	30.0	29.2	28.1	21.3	26.7	k
	2016	both sexes 35–64 years LFS adults										17.4	k
	2016 Q4	both sexes 15–64 years LFS	28.4	34.7	28.6	23.9	19.3	31.0	32.0	26.5	20.5	26.5	l
	2017 Q1	both sexes 15–64 years LFS	32.2	35.5	29.2	25.8	21.6	31.5	30.7	26.5	21.5	27.7	m
	2017 Q1	female 15–64 years LFS										29.8	m
	2017 Q1	male 15–64 years LFS										26.0	m
	2017 Q4	both sexes 15–64 years LFS	35.1	32.6	29.1	24.1	19.6	28.9	27.1	23.9	19.5	26.7	n

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a Stats SA GHS 2015.[47]
b Stats SA GHS 2016.[33]
c Stats SA GHS 2017.[34]
d World Health Statistics 2018.[76] WASH = Water, Saitation and Hygiene.
e Community Survey 2016.[54]
f Stats SA GHS 2016.[33] These facilities are defined as flush toilets connected to a public sewerage system or a septic tank, and a pit toilet with a ventilation pipe.
g Stats SA GHS 2017.[34] These facilities are defined as flush toilets connected to a public sewerage system or a septic tank, and a pit toilet with a ventilation pipe.
h GHS Series VIII.[83] Given as % of households with access to improved drinking water sources.
i Poverty Trends 2006–2015.[72] IES = Income and Expenditure Survey; LCS = Living Conditions Survey; LBPL = lower bound poverty line; UBPL = upper bound poverty line.
j Stats SA Living Conditions 2014/15 (MWC).[68]
k Labour Market Dynamics 2016.[71]
l Labour Force Survey Q4 2016.[84]
m Labour Force Survey Q1 2017.[85]
n Labour Force Survey Q4 2017.[67]

Table 7: Socio-economic indicators by population group

Indicator	Period	Sex|Age|Series|Cat	African/Black	Coloured	Indian/Asian	White	Ref
Percentage of people with access to improved sanitation	2015	both sexes all ages GHS	75.5	95.8	99.0	99.6	a
Poverty prevalence	2009	LCS food poverty line	40.4	16.1	21.2	0.8	b
		LCS LBPL	56.5	30.4	4.3	1.1	b
	2011	Census food poverty line	37.5	21.7	13.0	10.8	c
		IES food poverty line	26.0	8.0	0.8	0.2	b
		IES LBPL	43.4	20.2	2.9	0.5	b
	2015	LCS food poverty line	29.9	12.4	0.3	0.2	b
		LCS LBPL	47.1	23.3	1.2	0.4	b
Unemployment rate (official definition)	2016	both sexes 15–64 years LFS	30.2	22.9	12.0	6.9	d
	2016 Q4	both sexes 15–64 years LFS	30.0	22.0	11.1	6.6	e
	2017 Q4	both sexes 15–64 years LFS	30.0	23.5	9.2	6.7	f

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a GHS Series VIII.[83]
b Poverty Trends 2006–2015.[72] IES = Income and Expenditure Survey; LCS = Living Conditions Survey; LBPL = lower bound poverty line.
c Census 2011 Poverty.[86]
d Labour Market Dynamics 2016.[71]
e Labour Force Survey Q4 2016.[84]
f Labour Force Survey Q4 2017.[67]

MORTALITY

Percentage of Global Deaths

72.3%
Non-communicable diseases

19.3%
Communicable, maternal, neonatal and nutritional diseases

8.43%
Injuries

Adult Mortality

1997-2012 *Top 10 single causes of death has not changed in South Africa*

MEDICALLY CERTIFIED DEATHS

47.5% **Percentage of deaths that occured in a health facility**

Health status indicators

Mortality

The 2017 *Review* remarked that "the torrent of data issued by the Global Burden of Disease (GBD) collaboration continues unabated".[87] If anything, the flood has strengthened, deepened and widened. In 2017, the Global Burden of Diseases, Injuries, and Risk Factors Study 2016 (GBD 2016) published estimates of age-specific and sex-specific all-cause mortality between 1970 and 2016 for 195 countries and territories.[88] In addition, subnational data were published for five countries with populations of over 200 million in 2016. Over the time period, there was a shift towards higher life expectancy, which was more marked in countries with a higher Socio-demographic Index (SDI). SDI was calculated as the geometric mean of rescaled values of income per person, educational attainment in the population older than age 15 years, and total fertility rate. The highest life expectancies at birth in 2016 were estimated for women in Japan (86.9 years) and men in Singapore (81.3 years). The corresponding estimates for South Africa were 65.5 years and 59.2 years. South Africa was one of five countries (together with Lesotho, Swaziland, the Central African Republic and Fiji) where the largest negative differences between observed life expectancy and that expected in 2016, on the basis of SDI, were noted. Age-standardised death rates for women at the global level decreased from 1 367.4 per 100 000 in 1970 to 1 036.9 per 100 000 (1 026.9 to 1 047.4) in 1990 and then to 690.5 per 100 000 (678.2 to 706.3) in 2016. For men, the estimates at the same time points were 1 724.7, 1 407.5 and 1 002.4 per 100 000. Only the point estimates are provided here, but for each figure the GBD 2016 provided 95% uncertainty intervals. For South Africa, the 2016 estimates of age-standardised mortality rates were 1 597.9 per 100 000 for men and 1 101.0 per 100 000 for women, compared to Southern sub-Saharan African figures of 1 693.6 and 1 163.5 per 100 000.

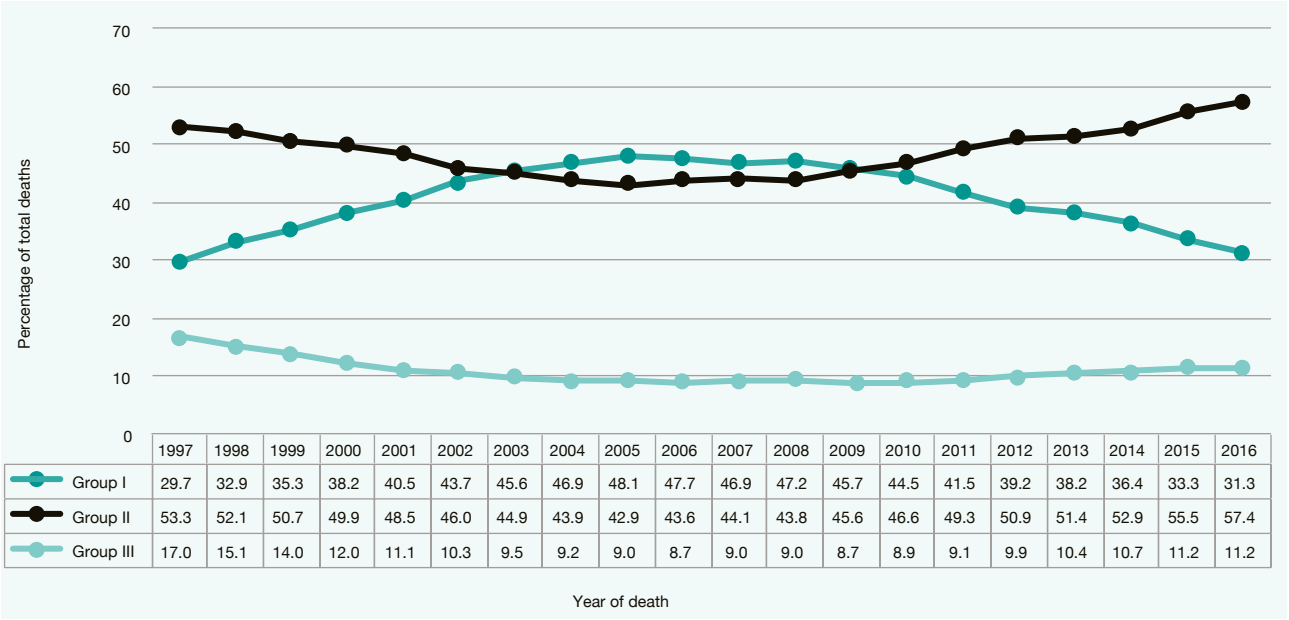
GBD 2016 also published estimates of global, regional, and national age-sex specific mortality for 264 causes of death, for the period 1980–2016.[89] Again, the data were drawn from 195 localities, but varied considerably in quality. Globally, of the main causes of death, 72.3% were caused by non-communicable diseases (NCDs), 19.3% from communicable, maternal, neonatal, and nutritional diseases, and 8.43% from injuries. Globally, the ten leading causes of total years of life lost (YLLs) in 2016 were ischaemic heart disease, cerebrovascular disease, lower respiratory infections, diarrhoeal diseases, road injuries, malaria, neonatal preterm birth complications, HIV/AIDS, chronic obstructive pulmonary disease, and neonatal encephalopathy due to birth asphyxia and trauma. By contrast, at the same time point, the top ten causes in South Africa were HIV, lower respiratory infections, road injuries, violence, tuberculosis, diabetes, ischaemic heart disease, diarrhoea, stroke and neonatal preterm birth complications. For all except ischaemic heart disease and stroke, the YLLs for South Africa were higher than would have been expected on the basis of SDI, in the case of HIV 317.36 times higher.

Also on the basis of the Global Burden of Diseases, Injuries, and Risk Factors Study, global, regional, and national estimates for two other population health measures were reported for the period 1990–2016: disability-adjusted life-years (DALYs) for 333 diseases and injuries, and healthy life expectancy (HALE).[90] The highest HALE at birth was again estimated for Singapore, for both men and women. Lesotho showed the lowest HALE at birth for men (41.5 years). In 2016, HALE at birth was estimated at 56.09 years for women and 51.47 years for men in South Africa. Of note, the report stated that "total global DALYs remained largely unchanged from 1990 to 2016…, with decreases in communicable, maternal, neonatal, and nutritional disease DALYs offset by increased DALYs due to NCDs". However, South Africa was among five countries where the highest age-standardised DALY rates relative to the rates expected on the basis of SDI were recorded, together with Lesotho, Swaziland, Fiji, and Botswana. The leading 10 all-age causes of DALYs in South Africa were HIV, lower respiratory infections, road injuries, violence, TB, diabetes, ischaemic heart disease, diarrhoea, stroke and low back and neck pain. Apart from ischaemic heart disease, stroke and low back and neck pain, all were higher than expected on the basis of SDI.

Finally, the GBD 2016 also reported on global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, also for the period 1990–2016.[91] Globally, the leading causes of years lived with disability (YLDs) were low back pain, migraine, age-related and other hearing loss, iron-deficiency anaemia, and major depressive disorder. The report noted that age-standardised rates of YLDs for all causes combined decreased between 1990 and 2016. However, the absolute number of YLDs from non-communicable diseases is increasing as the global population ages. This has major implications for the demands that will be placed on health systems everywhere. The top ten causes of YLDs in South Africa in 2016 were other diseases caused by HIV, back pain, hearing loss, major depressive disorder, migraine, diabetes, anxiety, iron-deficiency anaemia, asthma and neck pain. In this case, the only cause that was dramatically different from that expected on the basis of SDI was HIV-related diseases.

Statistics South Africa published the 2016 national mortality and causes of death statistics in March 2018.[45] A total of 456 612 death occurrences were recorded in South Africa for 2016, continuing the downward trend from the peak of 614 248 deaths that occurred in 2006. The year-on-year decline in the proportion of deaths among younger adults (aged 20–49 years) also continued. The median age at death in 2016 was 62.0 years for females and 52.7 years for males. In 2016, 31.3% of deaths were attributed to Group I conditions (communicable diseases, maternal and perinatal causes or nutritional conditions), 57.4% to Group II (non-communicable diseases) and 11.2% to Group III (external causes, such as accidents, homicide and suicide). Group I causes previously dominated, from 2003 to 2009 (Figure 2). In 2016, Group III causes dominated in males aged 5 to 29 years. The leading underlying cause of natural deaths among males in 2016 was tuberculosis, responsible for 18 153 deaths (7.6% of male deaths). However, for females, the leading underlying cause of natural deaths was diabetes (15 506 deaths; 7.2%).

Figure 2: Percentage distribution of deaths by group type and year of death, 1997–2016



	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Group I	29.7	32.9	35.3	38.2	40.5	43.7	45.6	46.9	48.1	47.7	46.9	47.2	45.7	44.5	41.5	39.2	38.2	36.4	33.3	31.3
Group II	53.3	52.1	50.7	49.9	48.5	46.0	44.9	43.9	42.9	43.6	44.1	43.8	45.6	46.6	49.3	50.9	51.4	52.9	55.5	57.4
Group III	17.0	15.1	14.0	12.0	11.1	10.3	9.5	9.2	9.0	8.7	9.0	9.0	8.7	8.9	9.1	9.9	10.4	10.7	11.2	11.2

Source: Stats SA Causes of death 2016.[45]

Note: Data for 1997–2015 have been updated with late registrations/delayed death notification forms processed in 2016/17. Ill-defined diseases were redistributed proportionately to causes in Group I and Group II.

Group I – communicable diseases, maternal and perinatal causes or nutritional conditions

Group II – non-communicable diseases

Group III – external causes, such as accidents, homicide and suicide

The 6th report by the Medical Research Council on the Rapid Mortality Surveillance (RMS) system was also published in 2018.[92] The report covers RMS data up to 2016 and cause of death data to 2014, allowing for calculation of life expectancy, adult mortality (45q15), under-5 mortality rate, infant mortality rate, neonatal mortality rate and maternal mortality ratio. As before, the authors cautioned that interpretations of apparent declines in mortality should also consider the possibility of systems failures, in the form of declining completeness of vital registration. Nonetheless, the authors concluded that "empirical data indicates that life expectancy has increased by nearly ten years from 2005, reaching a level of 60.8 years for males and 66.9 years for females in 2016".

The quality of death registration was previously evaluated against nine criteria (coverage, completeness, epidemiological consistency, temporal consistency, content validity, use of ill-defined and nonspecific codes, use of age- and sex-improbable classifications, timeliness, and availability of subnational data).[93] At that time, the extent of use of ill-defined and nonspecific codes and content validity were assessed as unsatisfactory, and would impact negatively on cause of death statistics. Epidemiological consistency could not be assessed conclusively, but all other criteria were assessed as satisfactory. More recently, it has been stated that South Africa's vital statistics are not suitable for monitoring deaths attributed to injury and violence in particular.[94] One of the reasons is that deaths are registered before the completion of an investigation into unnatural death and reported as 'under investigation'. These are coded to natural causes, and the reasons are not updated on completion of the inquest process. In addition, the data reported in police homicide statistics and by the Road Traffic Management Corporation are not considered to be reliable.

Combining data from the 2010 and 2011 Censuses and the 2007 intercensal Community Survey, Haal et al. showed how the "slow response to the HIV/AIDS epidemic has taken a serious toll on average, but a relatively greater one among the poorest segments of the population".[95] In addition to providing impetus for greater attention to the needs of the poorest communities, these data underscore the need to disaggregate indicator data by the key dimensions of inequality. Data from the Agincourt Health and Socio-Demographic Surveillance System (HDSS) have shown that, even within a rural setting, there are demonstrable correlations between socio-economic status and mortality and life expectancy at birth.[96] More importantly, despite the provision of free antiretroviral and tuberculosis care, the poorest showed persistently higher HIV- and TB-related mortality between 2001 and 2013.

Table 8: Mortality indicators for South Africa

Indicator	Sex|Age|Series|Cat	2005	2014	2015	2016	2017	Ref
Adult mortality (45q15 – probability of dying between 15–60 years of age)	both sexes RMS		34.0	34.0	33.0		a
	female IHME				30.0		b
	female RMS		28.0	28.0	27.0		a
	male IHME				41.0		b
	male RMS		40.0	40.0	39.0		a
Healthy life expectancy (HALE)	both sexes WHO				55.7		c
	female GBD	46.2		54.6			d
	male GBD	45.2		51.1			d
Life expectancy at birth	both sexes HDR			57.7			e
	both sexes mid-year			62.8	63.4	64.0	f
	both sexes RMS		62.9	63.4	63.8		a
	both sexes UNPD				63.0		g
	both sexes WHO				63.6		c
	female GBD			64.0			d
					65.5		h
	female HDR			55.5			e
	female mid-year				65.1		i
	female RMS		65.8	66.4	66.9		a
	female WHO				67.0		c
	male GBD			58.6			d
					59.2		h
	male HDR			59.5			e
	male mid-year				59.7		i
	male RMS		60.0	60.3	60.8		a
	male WHO				60.2		c

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a RMS 2016.[92]
b GBD 2016 online.[97]
c World Health Statistics 2018.[76]
d GBD 2015 DALY HALE.[98]
e Human Development Report 2016.[50]
f Stats SA MYE 2017.[28]
g SWChildren 2017.[99]
h GBD 2016 Child Health.[88]
i Stats SA MYE 2016.[40]

DISABILITY

Neurological disorders were the leading cause group of DALYs globally

1

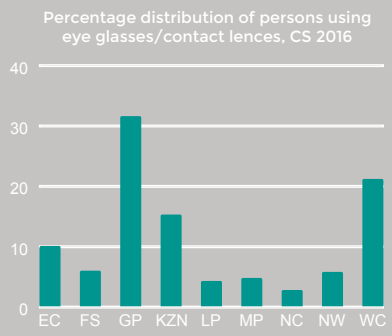
250 MILLION
DALYs

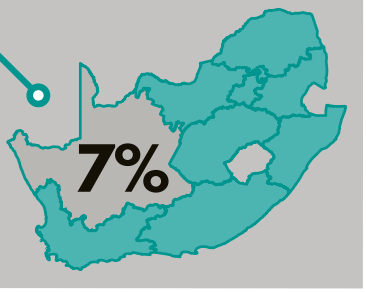
10.2%
of Global DALYs

> *Data from sub-Saharan Africa suggest an increased risk of HIV infection of 1.48 times in men with disabilities and 2.21 times in women with disabilities compared with men without disabilities*
>
> *UNAIDS, 2017*

4.2%
South Africans are classified as being disabled

Northern Cape had the highest disability prevalence in the country yet the lowest percentage of the population using assistive devices





Disability

The Global Burden of Diseases, Injuries, and Risk Factors (GBD) Study has provided global, regional, and national estimates of the burden of neurological disorders over the period 1990–2015.[100] Neurological conditions were the leading cause group of DALYs in 2015, responsible for 10.2% of the global DALYs and 18.6% of deaths. The most prevalent neurological conditions were tension-type headache, medication over-use headache, Alzheimer's disease and other dementias. The last of these has major implications for disability, especially in an ageing population, as do strokes. Not surprisingly, communicable neurological conditions are more important in countries with lower SDI. In Southern sub-Saharan Africa, the top five causes of age-standardised DALYs were stroke, epilepsy, migraine, meningitis, and Alzheimer's disease and other dementias. South Africa was estimated to have seen a decline of 18.2% in age-standardised DALYs over the period.

In 2017, the Joint United Nations Programme on HIV/AIDS (UNAIDS) published a report on HIV and disability, noting that people with disabilities had been excluded and neglected in the HIV response.[101] As access to antiretroviral treatment extends life expectancy for people living with HIV, there is also an increased risk of disability, resulting from HIV infection itself as well as from adverse effects of treatment. Integrated and comprehensive management of such disabilities is rarely accessible to those affected. Data on this issue are also scanty.

A UK-funded study of South Africa's social security system from a disability perspective noted the massive investment in social protection since 1994, and also that, to some extent, the social grant system is able to cover persons with disability across the lifecycle.[102] People with disabilities should be able to access a Care Dependency Grant in childhood, then a Disability Grant between 18 and 59 years, then the Grant-in-Aid programme for those on old age pensions, in order to purchase additional support from carers. Nonetheless, it did identify gaps in the disability assessment process.

The General Household Survey 2017 showed an overall prevalence of disability of 4.2% for South Africans aged 5 years or older.[34] Statistics South Africa has published a focus report on the socio-economic status and living arrangements of persons with disabilities, based on data from the Community Survey 2016.[103] The Community Survey 2016 provided data on disability prevalence based on the degree/level of difficulty in six domains of functioning (seeing, hearing, communicating, walking, remembering and self-care). These were then aggregated as follows:

- broad disability measure – all persons aged 5 years and older who reported 'some difficulty', 'a lot of difficulty' and 'cannot do at all' in any of six domains of functioning;
- UN disability index – all persons aged 5 years and older who reported 'some difficulty' in at least 2 domains of functioning, 'a lot of difficulty' and 'cannot do at all' in any of six domains of functioning;
- severe disability measure – all persons age 5 years and older who reported 'a lot of difficulty' and 'unable to do at all' in any of six domains of functioning.

The broad disability measure is used in the annual General Household Surveys.

As with disability prevalence, access to assistive devices also showed a gradient with regard to socio-economic status. The lack of access to eye care services in the public sector was well illustrated by the statistic that, based on the Community Survey 2016, fewer Black Africans (5.5%) used eyeglasses than the national average (9.2%). Overall, eyeglass usage was far higher in the richer, urban provinces of Gauteng (31.5%) and the Western Cape (20.1%) than in the poorer, rural provinces such as the Northern Cape (2.7%). By place of residence, eyeglass usage was reported by 12.1% of urban residents compared with 3.9% of rural residents.

Table 9: Disability indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Cataract surgery rate	2015/16	both sexes DHIS	828.6	726.7	896.4	471.1	606.1	621.1	829.0	450.6	1 238.0	750.1	a
	2016/17	both sexes DHIS	778.4	721.5	683.3	772.2	633.9	308.0	944.9	605.4	1 279.0	748.1	a
	2017/18	both sexes DHIS	634.1	2 151.0	921.5	913.8	624.4	312.9	669.6	606.3	1 164.0	869.1	a
Prevalence of disability	2015	both sexes 5+ years GHS	6.8	6.3	3.9	5.4	4.4	4.5	7.1	7.4	4.6	5.1	b
		female 5+ years GHS	6.7	7.4	4.2	6.0	4.7	4.9	7.6	7.9	4.5	5.5	b
		male 5+ years GHS	6.9	5.1	3.6	4.7	4.0	4.0	6.7	6.8	4.7	4.7	b
	2016	both sexes 5+ years CS broad measure	17.3	22.7	15.0	15.5	13.7	15.3	22.7	19.0	14.9	16.1	c
		both sexes 5+ years CS broad, non-urban										16.3	c
		both sexes 5+ years CS broad, urban										16.0	c
		both sexes 5+ years CS severe	4.9	6.5	3.7	4.9	3.7	4.2	6.0	4.8	3.7	4.4	d
		both sexes 5+ years CS severe, non-urban										5.0	d
		both sexes 5+ years CS severe, urban										4.1	d
		both sexes 5+ years CS UN measure	8.6	11.0	6.7	8.6	6.4	7.6	10.7	8.8	6.3	7.7	e
		both sexes 5+ years CS UN measure, non-urban										8.7	e
		both sexes 5+ years CS UN measure, urban										7.2	e
		both sexes 5+ years GHS	5.2	6.1	4.2	4.5	4.2	4.3	7.1	6.8	3.8	4.7	f
		both sexes all ages CS	8.5	11.0	6.7	8.6	6.4	7.5	10.7	8.7	6.3	7.7	g
		female 5+ years CS broad measure										18.0	c
		female 5+ years CS severe										4.9	d
		female 5+ years CS UN measure										8.9	e
		female 5+ years GHS										5.2	f
		female all ages CS										8.9	g
		male 5+ years CS broad measure										14.1	c
		male 5+ years CS severe										3.8	d
		male 5+ years CS UN measure										6.5	e
		male 5+ years GHS										4.1	f
		male all ages CS										6.5	g
	2017	both sexes 5+ years GHS	4.9	4.7	3.5	3.9	3.4	4.4	7.0	6.4	4.1	4.2	h
		female 5+ years GHS										4.5	h
		male 5+ years GHS										3.9	h
Prevalence of hearing disability	2012	15+ years SANHANES	10.8	14.3	7.0	13.6	10.5	10.3	4.0	7.2	9.0	9.5	i
	2016	both sexes 5+ years CS broad measure										3.4	j
		both sexes all ages CS										3.8	g
		female 5+ years CS broad measure										4.2	j
		male 5+ years CS broad measure										3.4	j
Prevalence of physical disability	2016	both sexes all ages CS										5.4	g
Prevalence of sight disability	2016	both sexes 5+ years CS broad measure										10.3	j
		both sexes all ages CS										10.3	g
		female 5+ years CS broad measure										12.1	j
		male 5+ years CS broad measure										8.4	j

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a DHIS.[46]

b Stats SA GHS 2015.[47]

c CS 2016 Disability.[103] Broad disability measure includes all persons aged 5 years and older that reported 'some difficulty' in any of the domains of functioning, 'a lot of difficulty' and 'cannot do at all' to any of six domains of functioning.

d CS 2016 Disability.[103] Refers to the severe disability measure which includes all persons age 5 years and older that reported 'a lot of difficulty' and 'unable to do at all' to any of six domains of functioning.

e CS 2016 Disability.[103] Disability prevalence computed is based on UN recommended disability measure.

f Stats SA GHS 2016.[33]

g Community Survey 2016.[54]

h Stats SA GHS 2017.[34]

i SANHANES-1.[104] Self reported prevalence of wearing a hearing aid.

j CS 2016 Disability.[103] Broad disability measure which includes all persons aged 5 years and older that reported 'some difficulty', 'a lot of difficulty' or 'cannot do at all' in the domain of functioning.

Table 10: Disability indicators by population group

Indicator	Period	Sex|Age|Series|Cat	African/Black	Coloured	Indian/Asian	White	Ref
Prevalence of disability	2016	both sexes 5+ years CS broad measure	15.5	16.9	17.5	19.9	a
		both sexes 5+ years CS severe	4.4	4.4	4.3	4.4	b
		both sexes 5+ years CS UN measure	7.6	7.5	8.4	9.2	c
		both sexes all ages CS	7.6	7.5	8.4	9.2	d
Prevalence of hearing disability	2012	15+ years SANHANES	9.2	7.2	13.5	12.7	e
	2016	both sexes 5+ years CS broad measure	3.6	3.3	3.9	5.7	f
Prevalence of sight disability	2016	both sexes 5+ years CS broad measure	9.7	11.8	12.4	13.9	f

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a CS 2016 Disability.[103] Broad disability measure includes all persons aged 5 years and older that reported 'some difficulty' in any of the domains of functioning, 'a lot of difficulty' and 'cannot do at all' to any of six domains of functioning.

b CS 2016 Disability.[103] Refers to the severe disability measure which includes all persons age 5 years and older that reported 'a lot of difficulty' and 'unable to do at all' to any of six domains of functioning.

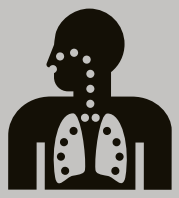
c CS 2016 Disability.[103] Disability prevalence computed is based on UN recommended disability measure.

d Community Survey 2016.[54]

e SANHANES-1.[104]

f CS 2016 Disability.[103] Broad disability measure which includes all persons aged 5 years and older that reported 'some difficulty', 'a lot of difficulty' or 'cannot do at all' in the domain of functioning.

INFECTIOUS DISEASE



1 Lower respiratory tract infections

Global leading infectious cause of death

3 million deaths

57 743
Deaths

35.1%
Occurred in neonates

Deaths due to Tetanus

31/100 000
Neonatal tetanus mortality rate: 1990

2.3/100 000
Neonatal tetanus mortality rate: 2015

Viral Hepatitis caused 1.34 million deaths in 2015, a number comparable to deaths caused by TB and higher than those caused by HIV

257 Million people were living with chronic hepatitis B infection

71 Million people were living with chronic hepatitis C infection

Listeriosis

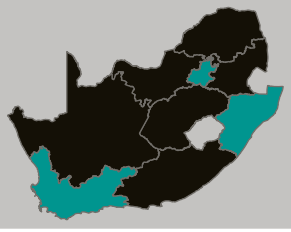
820 laboratory-confirmed cases in South Africa

34% Case-fatality rate

MEASLES OUTBREAKS

201 cases

Outbreaks in Gauteng, KwaZulu-Natal and the Western Cape



Infectious disease

The Global Burden of Diseases, Injuries, and Risk Factors (GBD) Study continues to be an important source of modelled global, regional and national estimates, including with respect to selected infectious diseases. Based on the GBD 2015 dataset, including data from 195 countries, the GBD reported global, regional, and national morbidity, mortality, and aetiologies of lower respiratory tract infections (LRI).[105] In 2015, LRI was estimated to be the leading infectious cause of death, responsible for 2.86 million deaths. Globally pneumococcal pneumonia caused 55.4% of LRI deaths in all ages (1.52 million). The modelled prevalence of LRI deaths in South Africa in 2015 was 35 124.5, of which 3 306.8 were in children younger than 5 years. Between 2005 and 2015, all LRI deaths in South Africa were estimated to have declined by 14.5%, whereas under 5 deaths declined by 63.5%, perhaps reflecting the impact of pneumococcal and *Haemophilus influenzae* type B (HIB) vaccination. Across all of Southern sub-Saharan Africa, these two bacteria were estimated to be responsible for 47.8% and 4.3% of LRI mortality in under 5s, respectively.

Also from GBD 2015, there were estimated to be 56 743 deaths due to tetanus in 2015, of which 19 937 (35.1%) occurred in neonates.[106] Of the neonatal tetanus deaths, 44% occurred in sub-Saharan Africa. Globally, the mortality rate due to neonatal tetanus dropped by 90% between 1990 and 2015. In South Africa, the neonatal tetanus mortality rate declined from 31.04 per 100 000 in 1990 to 2.28 per 100 000 in 2015, so by 92.65%.

The Global Seasonal Influenza-associated Mortality Collaborator Network, which includes South African researchers, has provided estimates of influenza-associated respiratory excess mortality rates (EMR).[107] Globally, between 291 243 and 645 832 of seasonal influenza-associated respiratory deaths were estimated to occur annually, with between 9 243 and 105 690 in children under five years.

As was noted in the last edition of the *Review*, the National Institute of Communicable Diseases (NICD) has been appointed to develop an integrated national Notifiable Medical Conditions (NMC) surveillance system. The NICD web site (http://www.nicd.ac.za/index.php/nmc/#) provides advice on which conditions to report and how this can be done, including via web and mobile apps. However, the NMC page does not provide easy access to consolidated reports on notifiable conditions, for example for the previous calendar or financial year. Data are, nonetheless, reported periodically in NICD publications, such as the Communicable Diseases Communiqué, for specific conditions. The NMCs are in four categories, as shown in Box 3:

- Category 1, which require immediate reporting by the most rapid means available upon diagnosis followed by a written or electronic notification to the Department of Health within 24 hours of diagnosis by health care providers, private health laboratories or public health laboratories;
- Category 2, to be notified through a written or electronic notification to the Department of Health within seven (7) days of clinical or laboratory diagnosis by health care providers, private health laboratories or public health laboratories;
- Category 3, to be notified through a written or electronic notification to the Department of Health within 7 days of diagnosis by private and public health laboratories; and
- Category 4, to be notified through a written or electronic notification to the Department of Health within 1 month of diagnosis by private and public health laboratories.

Box 3: Notifiable Medical Conditions disease list

- Category 1:
  - Acute flaccid paralysis
  - Acute rheumatic fever
  - Anthrax
  - Botulism
  - Cholera
  - Diphtheria
  - Enteric fever (typhoid or paratyphoid fever)
  - Food borne disease outbreak
  - Haemolytic uraemic syndrome (HUS)
  - Listeriosis
  - Malaria
  - Measles
  - Meningococcal disease
  - Pertussis
  - Plague
  - Poliomyelitis
  - Rabies (human)
  - Respiratory disease caused by a novel respiratory pathogen (includes novel influenza A virus and MERS coronavirus)
  - Rift valley fever (human)
  - Smallpox
  - Viral haemorrhagic fever diseases (includes Ebola or Marburg viruses, Lassa virus, Lujo virus, new world arena viruses, Crimean-Congo haemorrhagic fever or other newly identified viruses causing haemorrhagic fever)
  - Yellow fever
- Category 2:
  - Agricultural or stock remedy poisoning
  - Bilharzia (schistosomiasis)
  - Brucellosis
  - Congenital rubella syndrome
  - Congenital syphilis
  - *Haemophilus influenzae* type B
  - Hepatitis A
  - Hepatitis B
  - Hepatitis C
  - Hepatitis E
  - Lead poisoning
  - Legionellosis
  - Leprosy
  - Maternal death (pregnancy, childbirth and puerperium)
  - Mercury poisoning
  - Soil transmitted helminths *(Ascaris lumbricoides, Trichuris trichiuria, Ancylostoma duodenale, Necator americanus)*
  - Tetanus
  - Tuberculosis: pulmonary
  - Tuberculosis: extra-pulmonary
  - Tuberculosis: multidrug-resistant (MDR-TB)
  - Tuberculosis: extensively drug-resistant (XDR-TB)
- Category 3:
  - Ceftriaxone-resistant *Neisseria gonorrhoea*
  - West Nile virus, Sindbis virus, Chikungunya virus
  - Dengue fever virus, other imported arboviruses of medical importance
  - Salmonella spp. other than *S. typhi* and *S. paratyphi*
  - Rubella virus
  - Shiga toxin-producing *Escherichia coli*
  - Shigella spp.

❖ Category 4:
- Healthcare-associated infections or multidrug-resistant organisms of public health importance:
  - Carbapenemase-producing Enterobacteriaceae
  - Vancomycin-resistant enterococci
  - *Staphylococcus aureus*: hGISA and GISA
  - Colistin-resistant Pseudomonas aeruginosa
  - Colistin-resistant Acinetobacter baumanii
  - *Clostridium difficile*

Source: National Institute for Communicable Diseases.[108]

Listeriosis is a category 1 notifiable medical condition. Between January 2017 and January 2018, 820 laboratory-confirmed listeriosis cases were reported to NICD, diagnosed in both public (66%) and private (34%) sectors.[109] Final outcome data were available for 238/820 (29%) of the cases, with a documented case fatality rate of 34% (82/238).

An annual review of measles and rubella surveillance data was reported by NICD in 2017, outlining the three measles outbreaks that occurred in that year (in the Western Cape, Gauteng and KwaZulu-Natal), with 201 laboratory-confirmed cases. There were 2512 laboratory-confirmed rubella cases in 2017. Of concern, of those detected in the 15 to 44 year old age group, 56% were female.

An area of global focus has been the prevention and treatment of viral hepatitis, with particular reference to hepatitis C. The WHO Global Hepatitis Report 2017 noted that "viral hepatitis caused 1.34 million deaths in 2015, a number comparable to deaths caused by tuberculosis and higher than those caused by HIV".[110] In contrast to the gains being made at a global level in reducing mortality from HIV and TB, deaths from viral hepatitis are increasing. In 2015, there were estimated to be 257 million people living with chronic hepatitis B virus (HBV) infection, and 71 million people with chronic hepatitis C virus (HCV) infection. Despite being regarded as essential medicines, access to the new and highly effective direct acting antivirals for chronic HCV is limited in most countries. There is limited data on the extent of HCV infection in South Africa, except on the basis of small studies of key populations.[111,112] New multiplex rapid diagnostic tests may allow for mass screening.[113]

Although a review of data from 2007 to 2014 showed the positive impact of rabies awareness campaigns, canine vaccination and improved access to post-exposure prophylaxis in KwaZulu-Natal,[114] NICD Communicable Diseases Communiqués have continued to document human cases, with 9 laboratory-confirmed and 2 probable human cases by July 2018.[115] There had been 6 laboratory-confirmed human cases and 1 additional probable human case in 2017.

Table 11: Selected infectious disease indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Prevalence of hepatitis B surface antigen	2015	both sexes <5 years WHO										2	a
Reported cases of cholera	2015	NICD lab diagnosed	0	0	0	0	0	0	0	0	0	0	b
	2016	NICD lab diagnosed	0	0	0	0	0	0	0	0	0	0	b
	2017	NICD lab diagnosed	0	0	0	0	0	0	0	0	0	0	b
Reported cases of measles	2015	NICD lab diagnosed	3	0	3	2	1	0	3	1	4	17	b
	2016	NICD lab diagnosed	0	0	8	3	0	2	0	1	3	17	b
	2017	NICD lab diagnosed	6	1	96	53	3	3	12	0	36	210	c
Reported cases of rabies	2015	NICD lab diagnosed	3	1	0	1	3	0	0	0	0	8	b
	2016	NICD lab diagnosed	0	1	0	1	0	0	0	0	0	2	b
	2017	NICD lab diagnosed	2	0	0	1	2	1	0	0	0	6	d
Reported number of people (in thousands) requiring interventions against NTDs	2016	both sexes WHO										6 784	a
Syphilis prevalence rate (antenatal)	2011	Antenatal Survey	1.8	1.9	2.0	0.4	0.7	4.1	3.8	1.7	1.6	1.6	f
	2015	15–49 years Antenatal Survey	1.8	4.6	1.7	2.3	1.1	1.7	3.4	2.2	1.7	2.0	g

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a World Health Statistics 2018.[76]
b NICD surveillance.[116]
c Hong et al. 2018.[117]
d NICD Communiqué Jan 2018.[109]
e World Health Statistics 2018.[76]
f Antenatal Survey 2011.[118]
g Antenatal Survey 2015.[119]

MALARIA

445 000
Deaths globally

Of the incident cases and estimated deaths, 90% were in the WHO African region

30 450
Cases in 2017

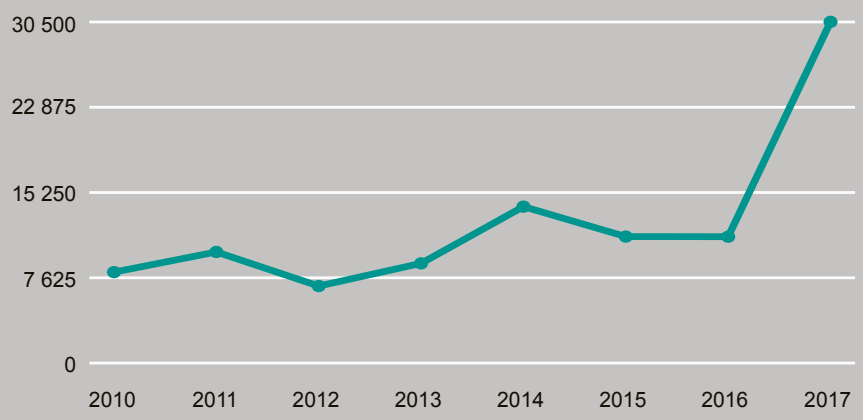
29%
Rate at which malaria deaths decreased globally between 2010 and 2015

331
Deaths

216 M
Cases globally

63
Cases per 1000 population at risk

Reported cases of malaria in South Africa



Although South Africa was among 21 countries identified as potentially being able to eliminate indigenous malaria cases by 2020 (E-2020 countries), it recorded the largest increase in cases between 2016 and 2017

Malaria

The 2017 edition of the World Malaria Report, published by WHO, reported that there were an estimated 216 million cases of malaria worldwide in 2016, close to the 211 million estimated in 2015.[120] As expected, the 95% confidence intervals for these two estimates (2016: 196–263 million; 2015: 192–257 million) overlapped. Of the incident cases, 90% were detected in the WHO African region, where 80% of the global burden affected just 15 African countries. However, progress was noted, in that the global incidence rate decreased by 18% between 2010 and 2016, from 76 to 63 cases per 1 000 population at risk. The number of estimated deaths also did not change, from 446 000 estimated deaths in 2015 to 445 000 in 2016, of which 90% were in the WHO African region. Only two countries were newly certified as malaria-free in 2016 (Kyrgyzstan and Sri Lanka).

Long term trend data on the prevalence of *Plasmodium falciparum* malaria in sub-Saharan Africa between 1900 and 2015 have also been mapped.[121] The main message from this effort gives cause for caution about predictions of success: "Although caution is required in predicting a complex future, if past trends remain consistent we would expect further reductions in the range and intensity of malaria transmission in Africa, punctuated with resurgences. We show the implausibility of simple explanations for temporal trends over the past 115 years, and therefore caution against using similar explanations for the trend of the past 15 years (for example, in ascribing this trend to human intervention alone)." With this in mind, it should be noted that, although South Africa was among 21 countries identified in 2016 as potentially being able to eliminate indigenous malaria cases by 2020 (the so-called E-2020 countries), it recorded the largest increase in cases between 2016 and 2017 (an increase of 3 768 cases) of all E-2020 countries. After years of apparent progress, South Africa is experiencing a resurgence of malaria, at least in Limpopo. A provisional update to the number of notified malaria cases in the first three months of 2018 showed a total of 8 238 cases in just four provinces – Limpopo (4 409), Mpumalanga (2 468), KwaZulu-Natal (583) and Gauteng (778).[122] Notably, the number of notified cases in Gauteng (both imported and Odyssean) exceeded the number in KwaZulu-Natal. There were 10 635 cases notified in the last quarter of 2017, of which 277 were reported in Gauteng.

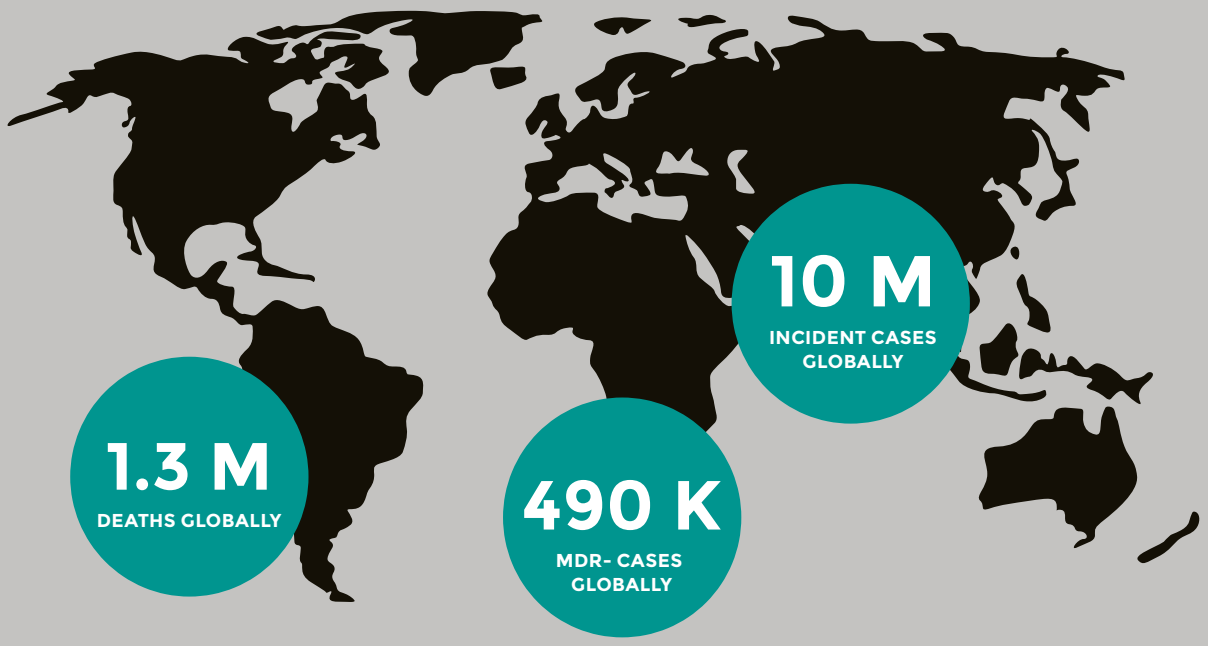
Table 12: Malaria indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Case fatality rate: malaria	2015	DoH surveillance	4.2	2.4	1.7	1.0	1.5	0.5	5.6	1.8	2.4	1.2	a
	2016	DoH surveillance	0.0	7.1	1.4	1.2	1.2	0.4	0.0	0.0	0.8	0.9	a
	2017	DoH surveillance	0.0	3.1	1.6	1.7	1.0	1.0	0.0	6.5	0.5	1.1	a
Malaria mortality rate (per 100 000 population)	2015	DoH surveillance	0.00	0.00	0.20	0.10	1.40	0.40	0.10	0.00	0.00	0.20	b
		vital registration	0.06	0.11	0.55	0.25	2.80	0.82	0.08	0.46	0.10	0.61	c
	2016	DoH surveillance	0.00	0.10	0.20	0.10	3.40	2.10	0.00	0.20	0.00	0.10	b
	2017	DoH surveillance	0.00	0.10	0.20	0.10	3.40	2.00	0.00	0.20	0.00	0.60	b
Reported cases of malaria	2015	DoH surveillance	24	41	1 524	606	5 352	3 494	18	55	124	11 238	a
		WHO										8 976	d
	2016	DoH surveillance	28	28	1 248	489	1 377	2 457	6	92	121	5 846	a
		WHO										4 323	d
	2017	DoH surveillance	36	64	1 519	777	18 991	8 766	11	93	193	30 450	a
		NICD										30 391	e
Reported cases of malaria (per 100 000)	2015	DoH surveillance	0.3	1.5	11.5	5.5	93.5	81.6	1.5	1.5	2.0	20.4	b
	2016	DoH surveillance	0.4	1.0	9.2	4.4	23.7	56.8	0.5	2.4	1.9	10.5	b
		WHO										110.0	f
	2017	DoH surveillance	0.6	2.2	10.6	7.0	328.1	197.2	0.9	2.4	3.0	53.9	b
Reported deaths from malaria	2015	DoH surveillance	1	1	26	6	79	18	1	1	3	136	a
		vital registration	4	3	73	27	160	35	1	17	6	333	c
		WHO										110	d
	2016	DoH surveillance	0	2	17	6	17	11	0	0	1	54	a
		WHO										34	d
	2017	DoH surveillance	0	2	25	13	195	89	0	6	1	331	a
		NICD										322	e

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

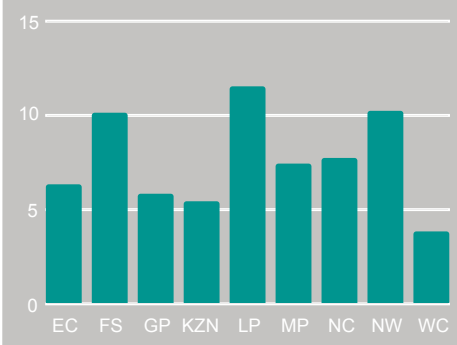
a DoH Malaria Statistics.[123]
b DoH Malaria Statistics.[123] Calculated from NDoH surveillance data and Stats SA mid-year population estimates for the relevant year.
c Stats SA Causes of death 2015.[44]
d World Malaria Report 2017.[120]
e NICD Communiqué Feb 2018.[124]
f World Health Statistics 2018.[76] Converted from 1.1 per 1 000 population at risk.

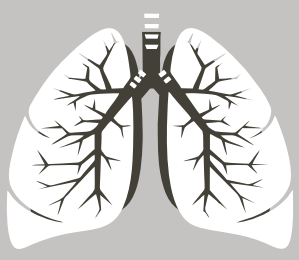
TUBERCULOSIS



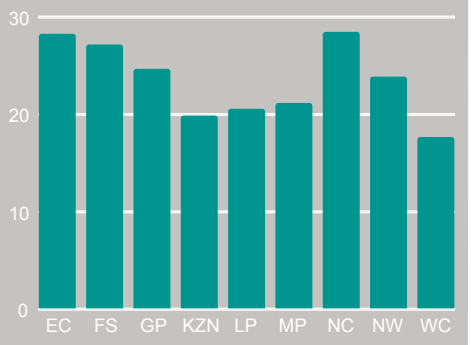
Globally		South Africa	
83%	DS Treatment success rate ✓	82%	DS Treatment success rate ✓
54%	MDR Treatment success rate ✗	52%	MDR Treatment success rate ✗
85%	TB/HIV Co-infected on ART ✓	89%	TB/HIV Co-infected on ART ✓

DS TB Death rate (%), 2016





DR TB Death rate (%), 2015



Tuberculosis

In November 2017, the WHO Global Ministerial Conference held in Moscow issued the "Moscow Declaration to end TB".[125] Of relevance to this chapter, the Ministers of Health committed to "strengthening, as appropriate, surveillance systems, improving data collection and reporting at all levels, utilising innovative approaches and including surveillance in TB research agendas". They committed to a "multisectoral accountability framework", with "well-defined reporting, including sex- and age-disaggregated data, and review processes to monitor progress toward clear goals", and a "multisectoral global progress report on TB, subject to independent review". Global progress is currently reported in WHO's annual Global Tuberculosis Report. The 2017 edition noted that, globally, TB incidence is falling by about 2% per annum and TB mortality by about 3% per annum, but that these declines would be insufficient to meet the 2020 End TB milestones.[126] In 2016, there were an estimated 10.4 million incident cases globally, with 1.3 million deaths. Of the incident cases, 600 000 new cases in 2016 were rifampicin-resistant and 490 000 were multidrug-resistant TB (MDR-TB). Of the MDR-TB cases, 47% occurred in India, China and the Russian Federation. A total of 6.3 million incident cases were reported in 2016 and a treatment success rate of 83% was maintained. Only 48% of the estimated number of TB-HIV co-infected cases were detected and placed on treatment, representing 476 774 cases, but 85% of these were also able to access antiretroviral treatment. Only 22% of the estimated number of MDR-TB cases were treated (129 689 starting treatment in 2016), and a treatment success of only 54% was reported. There are therefore significant gaps in the cascade of care, which aims to identify 90% of people with TB and put them on treatment, reach 90% of key populations, and achieve a 90% treatment success (the 90-(90)-90 targets).[127] Closely co-ordinated with the SDG approach, the three indicators for the End TB strategy (Box 4) are:

- the number of TB deaths per year;
- the TB incidence rate per year; and
- the percentage of TB-affected households that experience catastrophic costs as a result of TB disease.

The WHO has produced three new lists of high-burden countries, one for TB, one for MDR-TB and one for TB/HIV. Each list contains 30 countries, the top 20 in terms of the absolute number of estimated incident cases, plus the additional 10 countries with the most severe burden in terms of incidence rates per capita that are not in the top 20 but still meet a minimum threshold in terms of their absolute numbers of incident cases (10 000 per year for TB, and 1 000 per year for TB/HIV and MDR-TB). South Africa is among 14 countries that appear on all 3 lists (along with Angola, China, the Democratic Republic of Congo, Ethiopia, India, Indonesia, Kenya, Mozambique, Myanmar, Nigeria, Papua New Guinea, Thailand and Zimbabwe).

Figure 3: Global cascade of care for drug-sensitive (DS) and drug-resistant (DR) TB, 2015

Source: Stop TB Partnership 90-(90)-90 progress report 2017.[127]

Corroborating data has also been provided by the modelled estimates from the GBD Study 2015, which estimated 10.2 million incident cases in 2015, 10.1 million prevalent cases, and 1.3 million deaths.[128] For South Africa, a positive trend with a small (0.5%) drop in incidence and a slightly larger (3.6%) drop in mortality between 2005 and 2015 was reported. Nonetheless, the absolute numbers were considerable: 483 516 incident cases, 407 918 prevalent cases, and 25 313 deaths in 2015.

A major review of the science of resistant TB has questioned the traditional view that resistance is mainly acquired as a consequence of poor patient adherence to prescribed treatment and poor health systems performance.[129] Alternative mechanisms that may explain the development of resistance include "pharmacokinetic variability, induction of efflux pumps that transport the drug out of cells, and suboptimal drug penetration into tuberculosis lesions". It is estimated

Box 4: The End TB Strategy milestones and targets

VISION	A WORLD FREE OF TB – zero deaths, disease and suffering due to TB			
GOAL	END THE GLOBAL TB EPIDEMIC			
INDICATORS	MILESTONES		TARGETS	
	2020	2025	SDG 2030	END TB 2035
Percentage reduction in the absolute number of TB deaths (compared with 2015 baseline)	35%	75%	90%	95%
Percentage reduction in the TB incidence rate (compared with 2015 baseline)	20%	50%	80%	90%
Percentage of TB-affected households experiencing catastrophic costs due to TB (level in 2015 unknown)	0%	0%	0%	0%

Source: Global TB Report 2017.[126]

that the majority of DR-TB cases are transmitted rather than acquired. Modelling has predicted that 5.7% of incident TB cases in South Africa will be MDR-TB by 2040, with 8.5% of incident MDR cases being extensively drug-resistant (XDR).[130] This modelling exercise predicted that less than 30% of incident MDR-TB between 2000 and 2040 would be acquired.

A cross-sectional survey of TB drug resistance was conducted across all nine provinces in South Africa in 2012/2015.[131] Based on data from 101 422 adult participants, a national prevalence of MDR-TB of 2.1% was reported among new TB cases and 4.6% among retreatment cases. Of MDR-TB cases, 4.9% met the criteria for XDR-TB. Although the proportion of MDR-TB cases was similar to that reported in 2001–2002, the prevalence of rifampicin-resistance among new cases almost doubled. Isoniazid mono-resistance was also detected in more than 5% of cases, which raised concerns about the durability of isoniazid preventive therapy and isoniazid-reliant continuation regimens.

Paediatric TB remains under-researched and under-recognised, and has been estimated to account for 239 000 deaths in children younger than 15 years in 2015, globally, of which 80% occurred in those under 5 years of age.[132] Most importantly, it was estimated that 96% of TB-related deaths in children occurred in those not receiving TB treatment. A micro-costing of the care provided to a cohort of paediatric drug-sensitive TB patients in South Africa showed high treatment success (89.8%) at a mean provider cost of R1 820 per case successfully treated.[133] However, there were gaps identified, and 33% of treatment regimens did not comply with national guidelines.

TB has a complex relationship to poverty, and a statistical modelling analysis has shown that ending extreme poverty and extending social protection coverage (in line with SDG 1) would, if achieved together, result in an 84.3% reduction in global incidence of TB.[134]

The National TB Control programme data reported here (Table 14 and Table 15) rely on the electronic TB register (ETR.Net, for drug-sensitive (DS) TB) and Electronic Drug Resistant system (EDRWeb, for drug-resistant (DR) TB). The data that are eventually recorded at district level are taken from a paper-based record, the TB Register. The data entered into the paper-based TB Register are in turn extracted from the TB Blue Cards (TBCs), which are opened for each patient enrolled on TB treatment. As with all paper-based record systems, there are concerns about data quality. An assessment of the system in the Eden District, an NHI Pilot district in the Western Cape, showed that data in ETR.Net was less complete (66–100%) than in the TBCs (76–100%), but concordant for most variables except pre-treatment smear results, details about antiretroviral therapy (ART) and treatment outcome.[135] However, this assessment was based on scrutiny of only 97 TBCs, randomly selected from 602 patients on treatment at the time (2014/15).

Table 13: TB programme management and other indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Case detection rate (all forms)	2014	Global TB										68.0	a
	2015	Global TB										64.0	b
	2016	Global TB										69.0	c
HIV prevalence in TB incident cases	2012–2014	18+ years	55.6	70.3	74.6	69.2	63.6	76.8	51.7	68.0	47.4	63.2	d
	2014	Global TB										61.0	a
	2015	Global TB										57.0	b
	2016	Global TB										59.0	c
Tuberculosis death rate per 100 000 (in HIV-positive people)	2014	Global TB										134.0	a
	2015	Global TB										133.0	b
	2016	Global TB										181.0	c
Tuberculosis mortality rate per 100 000	2014	both sexes all ages vital registration	86.5	98.8	49.4	81.2	61.9	80.4	88.2	84.0	39.9	68.9	e
	2015	both sexes all ages vital registration	85.0	75.0	41.0	67.0	54.0	63.0	90.0	74.0	43.0	60.0	f
	2016	both sexes all ages vital registration	73.8	69.7	34.8	57.8	43.4	61.5	78.6	69.0	39.1	52.8	g
Tuberculosis mortality rate per 100 000 (excluding HIV)	2014	Global TB										44.0	a
	2015	Global TB										46.0	b
	2016	Global TB										41.0	c
Tuberculosis prevalence rate per 100 000 population	2012	Global TB										705.0	a
	2013	Global TB										706.0	a
	2014	Global TB										696.0	a

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a Global TB Report 2015.[136]
b Global TB Report 2016.[137]
c Global TB Report 2017.[126]
d MDR Survey 2012–2014.[138]
e Stats SA Causes of death 2014.[139] Includes 779 deaths due to MDR TB and 77 deaths due to XDR TB. Calculated from deaths due to TB (ICD10 A15–A19), plus ICD10 U51 (MDR) and ICD10 U52 (XDR TB) and Stats SA mid-year population estimates.
f Stats SA Causes of death 2015.[44] Including deaths due to MDR-TB (1 115) and XDR-TB (162).
g Stats SA Causes of death 2016.[45] Including deaths due to MDR-TB (1 007) and XDR-TB (114).

Table 14: TB case-finding indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Incidence of TB (all types) (per 100 000)	2014	Global TB										834.0	a
	2015	Global TB										834.0	b
	2016	Global TB										781.0	c
Incidence of TB DS (cases started on treatment) (ETR.net)	2015	ETR	691.7	574.8	329.9	685.2	300.7	401.6	644.6	528.4	681.4	519.8	d
	2016	ETR	583.1	479.5	125.5	605.0	267.7	379.1	633.6	466.2	666.7	425.6	d
	2017	ETR	512.8	429.8	115.4	525.4	241.0	302.2	600.2	426.3	624.5	378.6	d
MDR-TB started on treatment	2012		1 062.0	201.0	417.0	2 571.0	135.0	591.0	243.0	268.0	1 006.0	6 494.0	e
	2015	Global TB										12 527.0	b
	2016	Global TB										11 192.0	c
Number of TB DS cases started on treatment (ETR.net)	2015	ETR	46 294	15 883	43 772	73 240	17 000	17 011	7 621	19 565	42 559	282 945	d
	2016	ETR	41 291	13 746	17 028	67 257	15 587	16 464	7 565	17 738	42 126	238 802	d
	2017	ETR	36 712	12 407	15 972	59 204	14 208	13 305	7 220	16 465	40 079	215 572	d
Prevalence of multidrug resistance among new TB cases	2012–2014	18+ years new cases	1.7	1.8	2.7	1.8	1.4	4.2	1.3	1.9	2.0	2.1	f
	2016	Global TB										3.4	c
Reported cases of MDR-TB	2014	Global TB lab diagnosed										18 734	a
	2015	Global TB lab diagnosed										19 613	b
	2016	Global TB lab diagnosed										19 000	c
Reported cases of TB (all types) (per 100 000)	2012	lab diagnosed	1 095.0	681.0	466.0	1 178.0	413.0	643.0	1 004.0	597.0	885.0	774.0	g
Reported cases of XDR-TB	2012	NICD lab diagnosed	477	31	50	754	3	3	72	10	145	1 545	e
	2015	Global TB lab diagnosed										1 024	b
	2016	Global TB lab diagnosed										967	c
TB Rifampicin resistance confirmed client rate	2015	both sexes NHLS Xpert	5.7	5.5	5.9	7.8	5.2	7.8	5.3	4.8	5.0	6.1	h
	2016	both sexes NHLS Xpert	6.2	5.2	5.7	7.7	5.3	7.8	5.5	5.1	5.0	6.2	i
	2017	both sexes NHLS Xpert	6.3	5.8	6.1	9.5	5.3	10.1	5.8	5.6	5.2	6.9	i
XDR-TB started on treatment	2012		204	9	26	267	3	8	26	14	144	701	e
	2015	Global TB										730	b
	2016	Global TB										628	c

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a Global TB Report 2015.[136]
b Global TB Report 2016.[137]
c Global TB Report 2017.[126]
d Electronic TB Register.[140]
e MDR Overview 2014.[141]
f MDR Survey 2012–2014.[138]
g Nanoo et al. 2015.[142]
h DHB 2015/16.[143]
i NHLS CDW.[144]

Table 15: TB case-holding indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
TB client lost to follow up rate (ETR.net)	2014	ETR	6.1	6.1	5.8	4.4	5.0	4.5	7.6	6.8	9.5	6.0	a
	2015	ETR	6.2	5.6	5.9	4.8	6.1	6.2	8.0	6.3	10.5	6.4	a
	2016	ETR	6.8	5.7	6.2	5.0	4.3	6.0	10.3	7.2	11.0	6.9	a
TB death rate (ETR.net)	2014	ETR	7.6	10.7	6.2	5.4	11.2	6.6	7.8	10.1	3.6	6.7	a
	2015	ETR	6.7	10.5	6.3	5.4	11.9	7.6	7.7	9.0	3.9	6.6	a
	2016	ETR	6.3	10.1	5.8	5.4	11.5	7.4	7.7	10.2	3.8	6.6	a
TB treatment failure (ETR.net)	2012	ETR	1.4	1.2	0.9	0.9	1.5	1.2	1.8	1.2	1.0	1.1	a
	2013	ETR	0.4	0.3	0.2	0.2	0.5	0.3	0.3	0.3	0.3	0.3	a
	2014	ETR	0.5	0.3	0.1	0.1	0.5	0.2	0.3	0.3	0.5	0.3	a
TB treatment success rate (ETR.net)	2014	ETR	76.2	78.0	83.4	73.8	71.8	84.0	71.2	70.2	81.8	77.2	a
	2015	ETR	82.5	80.1	84.9	82.7	76.1	81.4	71.8	69.0	80.4	81.0	a
	2016	ETR	83.2	80.2	84.4	82.9	80.6	82.2	77.0	78.4	80.3	81.7	a
TB DR client death rate (EDRWeb)	2013	EDRWeb	37.1	24.8	22.2	18.3	12.4	30.7	23.5	18.4	17.8	23.2	b
	2014	EDRWeb	33.1	25.3	20.2	19.0	16.4	27.1	33.1	25.3	17.8	23.0	b
	2015	EDRWeb	28.2	27.1	24.6	19.8	20.5	21.1	28.4	23.8	17.6	23.4	b
TB DR client loss to follow up rate (EDRWeb)	2013	EDRWeb	16.5	25.5	26.8	19.3	29.3	17.0	27.8	14.8	30.1	21.6	b
	2014	EDRWeb	12.5	23.5	15.9	17.2	17.8	13.7	20.5	10.9	30.3	17.9	b
	2015	EDRWeb	15.9	18.6	18.9	16.2	11.2	11.3	19.3	16.0	31.1	17.6	b

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
TB DR treatment success rate (EDRWeb)	2013	EDRWeb	33.9	41.7	41.1	57.3	53.0	45.2	39.0	60.2	43.5	47.2	b
	2014	EDRWeb	44.3	45.8	55.6	59.6	58.4	41.9	20.8	58.4	41.5	50.5	b
	2015	EDRWeb	50.9	46.9	52.2	60.0	58.4	56.7	44.4	53.4	43.6	51.8	b

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a Electronic TB Register.[140]
b EDRWeb.[140] DR = drug-resistent.

HIV AND AIDS

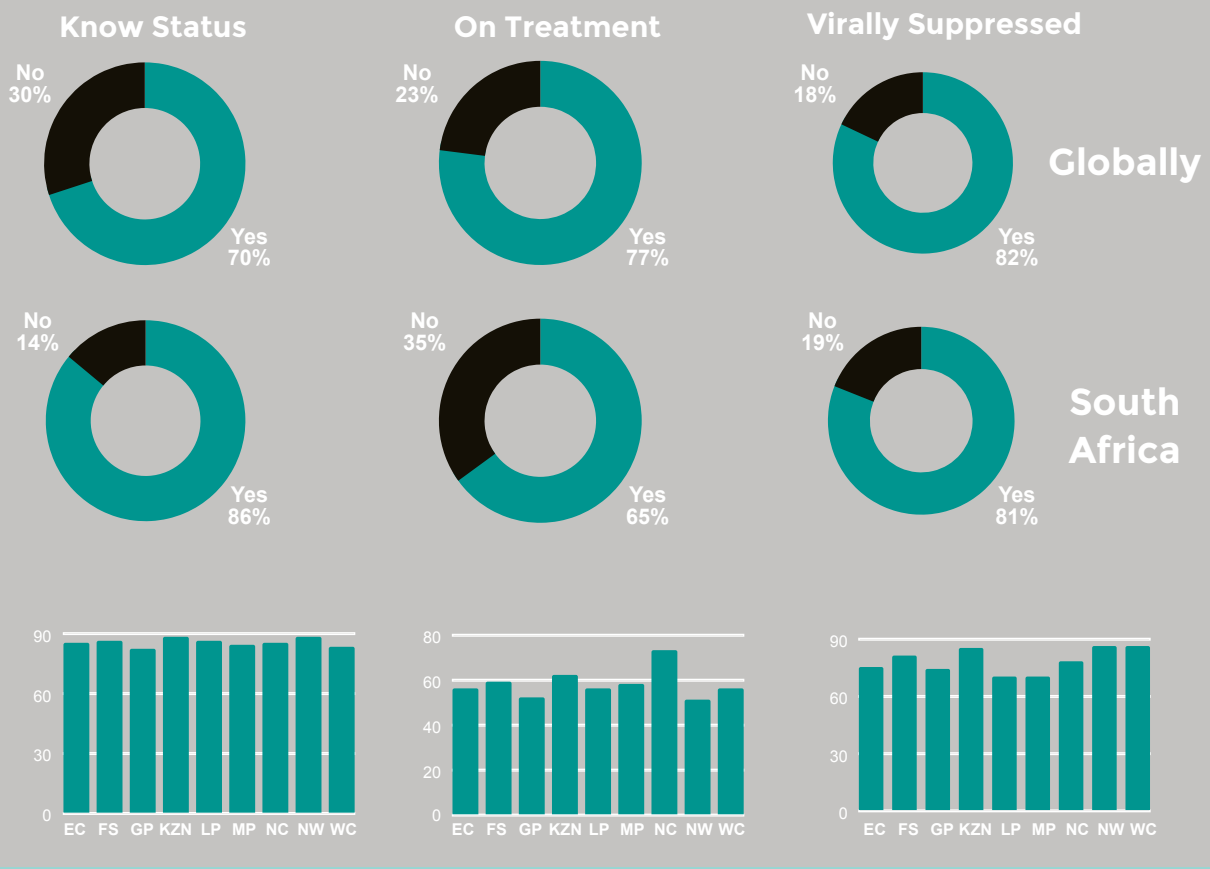
South Africa

UNAIDS

37 M

PEOPLE LIVING WITH HIV IN THE WORLD

- **7.1 M** People living with HIV
- **270 K** New infections
- **110 K** AIDS-related deaths



Mother-to-child Transmission

0.9%

HIV Prevalence among pregnant women

30.8%

HIV and AIDS

The data reported annually by the Joint United Nations Programme on HIV/AIDS (UNAIDS) represents an exemplar accountability mechanism for a priority health issue, with intense engagement between the international structure and country programmes, together with the international donor-funded programmes that have been so key to enabling rapid scale-up of antiretroviral therapy (ART) across many, if not all, countries affected by HIV. The most recent UNAIDS estimates are that there are 36.7 million people living with HIV, of which 34.5 million are adults.[145] There were 1.8 million new HIV infections in 2016, of which only 160 000 were in children aged 15 years or younger. There were 1.0 million AIDS-related deaths in 2016, of which 120 000 were in children. The UNAIDS-reported national figures for South Africa were 7.1 million people living with HIV, 270 000 new infections, and 110 000 AIDS-related deaths in 2016.

The 2017 Global AIDS Update published by UNAIDS reported on progress towards the 90-90-90 targets (which aim to ensure that 90% of people living with HIV know their status; that 90% of those who know their status are on treatment, and that 90% of people on treatment are virally suppressed).[23] Once fully achieved, this would mean that 73% of all people living with HIV in a given locality would be virally suppressed. By 2016, this had been achieved at a national level by Botswana, Cambodia, Denmark, Iceland, Singapore, Sweden and the United Kingdom. Global estimates for 2016 were 70%, 77%, and 82%, with a resultant 44% of all those living with HIV virally suppressed. The corresponding figures for South Africa are 86%, 65%, 81% and 45%. The UNAIDS report noted that a "major milestone was reached in 2016: for the first time, more than half of all people living with HIV (53% [39–65%]) were accessing antiretroviral therapy". In addition, UNAIDS estimated that new adult infections had declined by 11% between 2010 and 2016. However, UNAIDS did caution that estimates each year reflected the varying availability of data. In 2017, it reported that "countries were able to include in their estimates routine HIV prevalence data from all pregnant women who attend antenatal clinics", rather than relying on antenatal clinic sentinel surveillance surveys. Noting that, every year "UNAIDS supports countries to produce a complete time series of all epidemiological indicators using updated modelling software", the report warned that "comparisons over time should always be done using a time series from the same model".

Of particular concern, the UNAIDS report noted that "gaps in the 90–90–90 continuum are greater for men, young people and key populations".[23] In sub-Saharan Africa, 25% of new infections were estimated to be in key populations and their sexual partners. Notably, the UNAIDS datasheet for South Africa has scanty data on sex workers, people who inject drugs, men who have sex with men, transgender people and prisoners. For none of these groups was the estimated size of the population or HIV prevalence reported. Overall, men and young boys have been described by UNAIDS as a "blind spot" in the HIV response.[146] Key populations should be a priority for biobehavioural surveys, to be combined with disaggregated programmatic data to describe the 90-90-90 cascade in such groups.[147]

Overall, four interventions have been identified which have the potential to address the gaps in the 90-90-90 cascade: access to "reliable, easy-to-use, rapid HIV self-tests"; "safer and more effective integrase inhibitor-based antiretroviral treatment", together same-day test-and-treat approaches; "comprehensive, integrated community HIV service delivery models"; and "near real-time information on programme progress", with "more open data and transparency for improved community engagement".[148]

In addition to gains in mortality and in reducing transmission of HIV, improved access to ART has had a measurable impact on the global workforce. The International Labour Organization (ILO) has estimated that the total number of those estimated to be fully unable to work as a result of the complications of HIV is expected to decline to about 40 000 in 2020 from a 2005 level of about 350 000, representing an 85% decline for men and a 93% decline for women.[149] When considering the number partially unable to work, a decline from 655 000 to 95 000 over the same period has been estimated, or 81% for men and 91% for women.

Two major new national sources of South African data were reported in the last year. In October 2017, the National Department of Health published the report of the 2015 National Antenatal Sentinel HIV and Syphilis Survey.[119] The data were based on 36 246 samples collected during October 2015 at 1 595 sites located in all 52 health districts in South Africa. The 2015 national point estimate for HIV prevalence amongst women who attended antenatal care was 30.8% (95%CI: 30.0% – 31.6%). This estimate has not changed significantly for 10 years. The highest prevalence was again recorded in KwaZulu-Natal province (44.4%; 95%CI: 42.5% – 46.3%), and specifically in the Zululand district (48.4%; 95%CI: 40.2% – 56.8%). The report contained an important caveat: in 2015 all antenatal attenders aged 15–49 years were eligible for inclusion, whereas in previous years only women attending their first antenatal care visit of the pregnancy during the survey month were included. The study populations were thus slightly different. It is possible to adjust for the differences in the age of participants between surveys. For example, the report stated that the 2015 age-adjusted HIV prevalence, relative to the age distribution of the 2014 survey, was approximately 1% lower than the unadjusted survey point prevalence estimate.

In July 2018, the Human Sciences Research Council (HSRC) published the report of the Fifth South African National HIV Prevalence, Incidence, Behaviour and Communication Survey (SABSSM V), conducted between January and December 2017.[150] The survey approached 11 743 households, of which 82.2% completed the household interview. High response rates were recorded in adults, in terms of interview, but lower percentages provided samples to allow for HIV testing: 94.3% of 13 669 eligible women (aged 15–64 years) were interviewed, but only 67.7% provided a blood sample; 89.5% of 10 801 eligible men (aged 15–64 years) were interviewed, but only 58.4% provided a blood sample. However, just over half (56.0%) of the 11 845 eligible children (aged 0 to 14 years) provided a blood sample. Based on the survey, 84.9% of people living with HIV (PLHIV) aged 15 to 64 years knew their status; of these, 72.2% were on ART; and of these, 87.5% were virally suppressed. Data from the 2012 survey were used to unpack the determinants of HIV infection among adolescent girls and young women aged 15–24 years, which can help to inform the design of combination prevention strategies.[151]

As always, a plethora of surveys, studies and modelling exercises using routine data have contributed to the understanding of the HIV

epidemic in South Africa. Data from the National Health Laboratory Service were used to identify the national, provincial and district intra-uterine mother-to-child transmission rate.[152] The national figure was 0.9%, the provincial rates varied from 0.6% to 1.3%, and district rates from 0.4% to 1.9%. Provincial data were modelled to assess progress against the 90-90-90 targets by the middle of 2015, identifying differences between the provinces.[153] Although the percentage with known HIV status did not vary much between provinces, the percentage on treatment was lowest in the North West, and the percentage virally suppressed lowest in Limpopo at that point. Cross-sectional household surveys have also been used to track progress towards the 90-90-90 targets in two KwaZulu-Natal districts, confirming the need to focus greater attention on men.[154,155] Disaggregating the HIV burden in specific age groups, as was also done in a cross-sectional community survey in another KwaZulu-Natal district, can be used to better target both prevention and treatment strategies.[156] Modelling was used to determine the impact of the ART programme on mortality, showing that treatment resulted in 1.72 million fewer HIV-related deaths in adults over the period 2000–2014 than would have occurred otherwise.[157] Cohort methods, linked to vital registration data, have been used to assess long-term (12-years) mortality in people on ART in South Africa.[158] Spatial analysis has been used to identify "hotspots", which can also help to target interventions more effectively.[159,160]

Table 16: HIV prevalence and incidence indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
HIV incidence	2016	both sexes 15–24 years										1.2	a
		both sexes 15–49 years										1.3	a
		both sexes all ages Global Report										0.6	b
	2017	both sexes 2+ years SABSSM										0.5	c
		both sexes 15–24 years SABSSM										1.0	c
		both sexes 15–49 years SABSSM										0.8	c
		female 2+ years SABSSM										0.5	c
		female 15–24 years SABSSM										1.5	c
		female 15–49 years SABSSM										0.9	c
		male 2+ years SABSSM										0.5	c
		male 15–24 years SABSSM										0.5	c
		male 15–49 years SABSSM										0.7	c
HIV prevalence (age 15–49)	2015	both sexes 15–49 years mid-year										18.2	d
	2016	both sexes 15–49 years mid-year										18.1	d
	2017	both sexes 15–49 years mid-year										18.0	d
HIV prevalence (total population)	2015	both sexes mid-year										12.5	d
		both sexes ILO in labour force										22.7	e
		female ILO in labour force										28.0	e
		male ILO in labour force										18.8	e
	2016	both sexes mid-year										12.6	d
		both sexes all ages Global Report Sex workers										57.7	f
		male all ages Global Report MSM										26.8	f
	2017	both sexes mid-year										12.6	d
		both sexes all ages SABSSM	15.3	17.0	12.5	18.1	10.9	17.3	8.3	14.5	8.9	14.0	c
		female all ages SABSSM										17.3	c
		male all ages SABSSM										10.6	c
HIV prevalence among antenatal clients	2013	15–19 years										12.7	g
		15–24 years										19.9	g
		20–24 years										24.0	g
		25–29 years										34.9	g
		30–34 years										42.5	g
		35–39 years										42.5	g
		40–44 years										35.3	g
		45–49 years										24.4	g
	2014	15–19 years										12.1	h
		15–24 years										19.3	h
		20–24 years										23.2	h
		25–29 years										34.4	h
		30–34 years										43.3	h
		35–39 years										44.7	h
		40–44 years										41.0	h
		45–49 years										39.1	h

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
	2015	15–19 years										11.8	h
		15–24 years										19.2	h
		15–49 years										30.8	h
		20–24 years										23.2	h
		25–29 years										34.7	h
		30–34 years										43.9	h
		35–39 years										46.7	h
		40–44 years										43.5	h
		45–49 years										40.0	h
HIV prevalence among antenatal clients (15–49 years)	2013	15–49 years	31.4	29.8	28.6	40.1	20.3	37.5	17.5	28.2	18.7	29.7	g
	2014	15–49 years	31.3	34.4	27.6	42.4	20.9	35.8	16.1	28.7	18.7	30.0	h
	2015	15–49 years	30.2	29.8	30.2	44.4	21.7	34.9	19.0	29.2	18.9	30.8	h

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a SANAC NSP Report 2016.[161]
b UNAIDS Data 2017.[145] Converted from 5.58 per 1 000 uninfected population.
c HIV Household Survey 2017 Pres.[150]
d Stats SA MYE 2017.[28]
e HIV and work 2018.[149] Individuals in the Labour Force.
f UNAIDS Data 2017.[145]
g 2013.[162]
h 2015.[119]

Table 17: Other HIV and AIDS indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Adult Remaining in care (RIC) after 12 months	2016	both sexes 15+ years DHIS	60.4	66.1	66.4	68.5	64.1	67.6	58.8	60.3	60.1	65.4	a
Adult remaining on ART at end of the month – total	Mar 2016	both sexes 15+ years DHIS	341 570	183 784	742 369	900 921	247 606	306 782	45 051	193 045	195 661	3 156 789	a
	Mar 2017	both sexes 15+ years DHIS	394 410	205 190	806 993	1 135 364	290 929	360 059	51 419	211 258	222 876	3 678 498	a
	Mar 2018	both sexes 15+ years DHIS	432 133	236 160	898 561	1 221 515	314 212	394 836	53 603	225 209	248 754	4 024 983	a
Adult with viral load completion rate at 12 months	2016	both sexes 15+ years DHIS	70.3	67.3	78.2	70.0	78.8	77.7	45.2	71.7	54.5	72.2	a
Adult with viral load suppressed rate 12 months	2016	both sexes 15+ years DHIS	85.7	92.8	81.3	93.5	83.3	89.5	85.6	88.5	92.2	87.9	a
Antiretroviral coverage (2nd 90)	2014	both sexes 0–14 years Global Report										49.0	b
	2015	both sexes 0–14 years Global Report										74.0	c
		both sexes 15+ years Global Report										48.0	c
		both sexes 15+ years THEMBISA	56.0	59.0	52.0	62.0	56.0	58.0	73.0	51.0	56.0	57.0	d
		both sexes all ages GBD										51.0	e
		female 15+ years Global Report										53.0	c
		male 15+ years Global Report										40.0	c
	2016	both sexes 0–14 years Global Report										55.0	f
		both sexes all ages Global Report cascade (of all PLHIV)								56.0	f		
		both sexes all ages Global Report target (know status)								65.0	f		
		female all ages Global Report										95.0	g

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Antiretroviral treatment exposure	2012	0–14 years SABSSM										45.1	h
		15–24 years SABSSM										14.3	h
		15–49 years SABSSM										28.9	h
		25–49 years SABSSM										32.2	h
		50+ years SABSSM										42.7	h
		all ages SABSSM										31.2	h
		female all ages SABSSM										34.7	h
		male all ages SABSSM										25.7	h
	2017	both sexes 0–14 years SABSSM										50.0	i
		both sexes 15–24 years SABSSM										39.9	i
		both sexes 15–49 years SABSSM										60.4	i
		both sexes 15–64 years SABSSM										70.6	i
		both sexes 25–49 years SABSSM										63.1	i
		both sexes 50+ years SABSSM										76.7	i
		both sexes SABSSM										62.3	i
		female 15–64 years SABSSM										72.2	i
		female SABSSM										65.5	i
		male 15–64 years SABSSM										67.4	i
		male SABSSM										56.3	i
Child Remaining in care (RIC) after 12 months	2016	both sexes 0–14 years DHIS	74.0	72.3	69.1	74.1	70.4	72.6	71.6	68.7	64.3	71.7	a
Child under 15 years remaining on ART at end of the month – total	Mar 2016	both sexes 0–14 years DHIS	19 605	9 544	28 466	35 806	13 884	16 279	3 279	11 139	7 904	145 906	a
	Mar 2017	both sexes 0–14 years DHIS	20 323	10 164	28 312	52 635	14 492	17 251	3 762	11 598	8 055	166 592	a
	Mar 2018	both sexes 0–14 years DHIS	19 939	9 842	29 264	49 601	14 832	17 069	3 826	11 647	8 067	164 087	a
Child with viral load completion rate at 12 months	2016	both sexes 0–14 years DHIS	63.5	60.2	75.9	67.1	73.4	72.9	42.5	67.1	51.3	67.9	a
Child with viral load suppressed rate 12 months	2016	both sexes 0–14 years DHIS	60.7	72.6	58.8	72.2	56.1	67.4	71.0	64.1	67.0	65.5	a
Clients remaining on ART rate	2016/17	both sexes all ages DHIS	53.8	58.6	45.6	61.3	68.6	56.7	69.3	46.9	54.8	55.0	j
	2017/18	both sexes all ages DHIS	57.6	66.7	50.1	64.6	72.6	60.3	71.1	49.1	58.8	58.9	j
HIV testing coverage	2011–2016	female 15–49 years SADHS										83.5	k
		male 15–49 years SADHS										71.6	k
	2017	both sexes SABSSM ever tested										75.2	i
		female SABSSM ever tested										70.9	i
		male SABSSM ever tested										79.3	i
HIV testing coverage (excluding ANC)	2014/15	DHIS	32.8	23.6	20.5	35.6	36.8	26.6	25.8	32.2	29.4	29.0	a
	2015/16	DHIS	33.5	29.2	31.7	33.1	35.3	29.0	26.6	26.2	33.3	31.9	a
	2016/17	DHIS	36.2	24.3	28.6	40.3	46.7	31.0	30.5	29.6	29.1	33.7	a
HIV testing coverage age 19 months and older	2017/18	both sexes 19 months+ DHIS	22.8	14.7	21.0	26.2	27.0	27.2	22.0	18.8	21.5	23.0	a

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
HIV viral load suppression (3rd 90)	2015	both sexes 15+ years THEMBISA	75.0	81.0	74.0	85.0	70.0	70.0	78.0	86.0	86.0	78.0	d
	2016	both sexes all ages Global Report cascade (of all PLHIV)								45.0	f		
		both sexes all ages Global Report target (on treatment)								81.0	l		
	2017	both sexes all ages SABSSM										62.3	m
		both sexes all ages SABSSM on ART										87.3	n
		female 0–14 years SABSSM										48.2	m
		female 15–64 years SABSSM										89.9	m
		male 0–14 years SABSSM										-	m
		male 15–64 years SABSSM										82.1	m
Male circumcision (% of men who are circumcised)	2009	male NCS	73.0	34.0	46.0	18.0	77.0	36.0	17.0	33.0	42.0	42.0	o
	2012	male 15+ years SABSSM	74.0	36.0	48.2	23.2	72.6	49.9	20.3	36.7	41.0	46.4	p
		male NCS										48.1	q
		male SABSSM Medical										18.6	i
		male SABSSM Traditional										26.1	i
	2017	male SABSSM										61.6	i
		male SABSSM Medical										30.8	i
		male SABSSM Traditional										27.6	i
Medical male circumcision 10 years and older	2017/18	male 10+ years DHIS	8 782	35 274	112 608	200 301	53 930	79 187	5 248	28 018	16 544	539 892	a
Medical male circumcision rate	2017/18	male 10+ years DHIS	3.4	31.3	19.6	49.6	25.4	46.0	10.7	18.0	6.3	24.5	a
Number of patients receiving ART	2016											3 700 000	r
		both sexes all ages Global Report										3 900 000	f
		med schemes										248 142	s
	2017	both sexes 0–14 years SABSSM										131 052	i
		both sexes 15–24 years SABSSM										273 981	i
		both sexes 15–49 years SABSSM										3 517 800	i
		both sexes 25–49 years SABSSM										3 243 819	i
		both sexes 50+ years SABSSM										753 020	i
		both sexes SABSSM										4 401 872	i
		female SABSSM										2 998 170	i
		male SABSSM										1 403 702	i
	Mar 2016	both sexes all ages DHIS	361 175	193 328	770 835	936 727	261 490	323 061	48 330	204 184	203 565	3 302 695	a
	Mar 2017	both sexes all ages DHIS	414 733	215 354	835 305	1 187 999	305 421	377 310	55 181	222 856	230 931	3 845 090	a
	Mar 2018	both sexes all ages DHIS	452 072	246 002	927 825	1 271 116	329 044	411 905	57 429	236 856	256 821	4 189 070	a
People living with HIV	2015	0–14 years										240 000	c
		15+ years										6 700 000	c
		all ages										7 000 000	c
		all ages GBD										8 409 550	e
		both sexes ILO in labour force										4 384 766	t
		female ILO in labour force										2 296 828	t

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
		male ILO in labour force										2 087 937	t
		female Pregnant women										250 000	c
		mid-year										6 800 000	u
	2016	both sexes all ages Global Report										7 100 000	f
		mid-year										6 930 000	u
	2017	both sexes SABSSM										7 900 000	i
		mid-year										7 060 000	u
People with HIV receiving antiretroviral therapy and virally suppressed	2015	15+ years THEMBISA	35.0	42.0	32.0	47.0	34.0	34.0	48.0	38.0	40.0	38.0	v
Percentage of deaths due to AIDS	2015	mid-year										27.6	u
	2016	both sexes all ages Global Report										24.1	w
		mid-year										26.4	u
	2017	mid-year										25.0	u
Percentage of people living with HIV (PLHIV) who know their status (1st 90)	2015	both sexes 15+ years THEMBISA	85.0	86.0	82.0	88.0	86.0	84.0	85.0	88.0	83.0	85.0	d
	2016	both sexes all ages Global Report										86.0	x
	2017	both sexes 15–64 years SABSSM										84.9	i
		female 15–24 years SABSSM										64.8	i
		female 15–64 years SABSSM										88.9	i
		male 15–24 years SABSSM										24.1	i
		male 15–64 years SABSSM										78.0	i
Percentage of TB cases with known HIV status (ETR.net)	2015	both sexes ETR	95.3	93.0	95.9	94.2	95.4	93.6	93.2	93.7	96.1	94.8	y
	2016	both sexes ETR	96.0	95.9	96.8	95.6	97.0	94.5	93.7	94.8	96.4	95.9	y
	2017	both sexes ETR	94.4	92.7	91.3	94.9	94.2	95.6	98.3	98.5	98.6	95.5	y
TB/HIV co-infected client on ART rate (ETR.Net)	2015	both sexes ETR	97.5	89.2	93.3	87.4	90.7	93.7	93.0	85.7	89.6	90.8	y
	2016	both sexes ETR	97.1	89.7	90.3	85.7	90.6	94.4	90.4	82.9	74.6	88.3	y
	2017	both sexes ETR	96.8	90.8	87.7	87.3	93.4	97.3	96.3	87.6	77.4	89.1	y

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a DHIS.[46]
b Global Plan 2015 Progress.[163]
c UNAIDS Prevention Gap 2016.[164]
d Johnson et al. 2017.[153] National values added and some provincial values updated since 2016 publication.
e GBD 2015 HIV.[165]
f UNAIDS Data 2017.[145]
g UNAIDS Data 2017.[145] Pregnant women living with HIV. Value greater than 95.
h HIV Household Survey 2012.[166]
i HIV Household Survey 2017 Pres.[150]
j DHIS.[46] Uses modelled estimate of number of people living with HIV (PLHIV) in the denominator.
k SADHS 2016.[38] Percentage ever tested.
l UNAIDS Data 2017.[145] PLHIV who are on treatment.
m HIV Household Survey 2017 Pres.[150] Among all PLHIV irrespective of treatment.
n HIV Household Survey 2017 Pres.[150] Among PLHIV on treatment.
o NCS 2009.[167]
p HIV Household Survey 2012.[166] Self-reported circumcision.
q NCS 2012.[168]
r SANAC NSP Report 2016.[161]
s Medical Schemes 2016–17.[49] Calculated from given number of beneficiaries diagnosed and treated (27.95 per 1 000).
t HIV and work 2018.[149] Individuals in the Labour Force.
u Stats SA MYE 2017.[28]
v Johnson et al. 2017.[153]
w UNAIDS Data 2017.[145] Calculated from source using 110 000 deaths due to AIDS (88 000 to 140 000) and number of death registrations reported by Stats SA.
x UNAIDS Data 2017.[145] People living with HIV who know their HIV status.
y Electronic TB Register.[140]

Table 18: Indicators related to prevention-of-mother-to-child transmission (PMTCT) by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Antenatal client HIV 1st test positive rate	2015/16	female DHIS	14.4	16.6	16.5	18.9	11.1	20.7	8.8	14.5	6.2	15.1	a
	2016/17	female DHIS	14.2	15.2	14.8	17.8	9.7	18.7	7.8	13.3	5.6	13.7	a
	2017/18	female DHIS	13.1	13.0	13.0	15.6	8.4	16.0	6.8	12.0	4.6	12.1	a
Antenatal client initiated on ART rate	2015/16	female DHIS	93.9	86.8	92.4	97.6	92.8	95.9	92.2	86.9	77.5	93.0	a
	2016/17	female DHIS	93.3	94.1	94.8	97.2	95.2	94.9	95.1	95.9	90.8	95.1	a
	2017/18	female DHIS	86.6	82.5	94.7	97.2	95.4	99.0	88.9	92.3	92.1	93.9	a
HIV PCR birth testing coverage	2015/16	NHLS	48.9	56.7	71.3	82.7	61.1	60.6	61.6	69.1	51.6	67.5	b
	2016/17	NHLS	84.8	110.7	91.0	96.4	96.8	94.6	109.7	94.2	87.9	93.5	c
HIV test around 18 months uptake rate	2015/16	both sexes DHIS	85.3	124.2	71.2	110.7	69.5	174.8	76.9	69.0	36.1	94.7	a
	2016/17	both sexes DHIS	78.4	125.5	58.5	114.1	71.2	153.1	0.0	71.9	19.5	87.6	a
	2017/18	both sexes DHIS	64.0	101.6	54.7	96.2	62.4	147.0	103.9	58.5	21.8	78.9	a
Infant PCR test positive around 10 weeks rate	2016/17	both sexes DHIS	1.6	1.3	1.7	1.0	1.2	1.7	1.7	1.5	0.8	1.3	a
	2017/18	both sexes DHIS	1.2	1.1	1.0	0.7	0.8	1.1	1.4	1.1	0.5	0.9	a
Percentage PCR tests positive within 6 days	2015/16	NHLS	1.4	1.1	1.1	0.7	1.7	1.1	1.3	1.2	2.4	1.1	b
	2016/17	NHLS	1.0	0.7	0.9	0.6	1.3	0.9	1.1	1.0	1.0	0.9	c

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a DHIS.[46]
b DHB 2015/16.[143]
c Goga et al. 2018.[152]

Table 19: HIV indicators by population group

Indicator	Period	Sex|Age|Series|Cat	African/Black	Coloured	Indian/Asian	White	Ref
Antiretroviral treatment exposure	2012	all ages SABSSM	30.9				a
HIV prevalence (total population)	2017	both sexes all ages SABSSM	16.6	5.3	0.8	1.1	b
HIV prevalence among antenatal clients	2013	15–49 years	32.0	6.8	8.9	2.2	c
	2015	15–49 years	33.2	7.3	5.5	1.2	d
Male circumcision (% of men who are circumcised)	2012	male 15+ years SABSSM	52.4	26.4	33.5	23.3	e

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a HIV Household Survey 2012.[166]
b HIV Household Survey 2017 Pres.[150]
c 2013. [162]
d 2015.[119]
e HIV Household Survey 2012.[166]

REPRODUCTIVE HEALTH

MOST DEVELOPING COUNTRIES HAVE RESTRICTIVE ABORTION LAWS

Lancet Commission

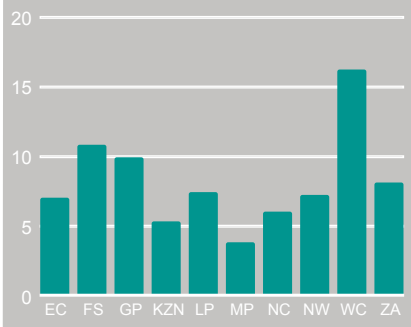
56 million abortions worldwide

45% were considered UNSAFE

97% of unsafe in developing countries

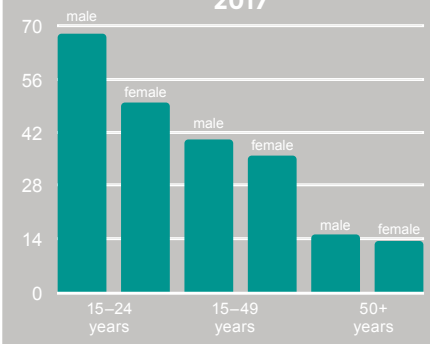
South Africa is 1 of 3 countries in Africa with broadly legal access to abortion

Termination of Pregnancy Rate, 2016/17

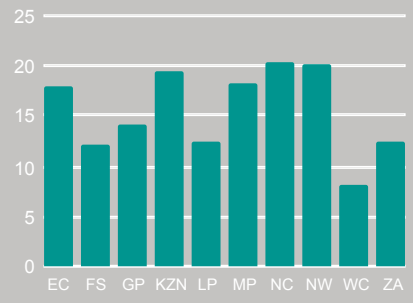


Cervical cancer screening coverage, 2017/18

Condom use at last sex, 2017



Teenage pregnancy, 2011–2016



Reproductive health

Contraception, sexual behaviour, sexually transmitted infections and termination of pregnancy

Within the broader RMNCH focus area, reproductive health remains a global priority. Access to family planning is one of the components of the composite coverage index (CCI), a weighted mean of the coverage of eight interventions along the RMNCH continuum of care that is being used to track progress by the Countdown to 2030, and also to explore inequalities within the 81 Countdown countries.[10] It is also the focus of renewed attention to areas of poor quality or poor coverage, such as in relation to adolescent girls' reproductive health. The WHO Working Group for Operationalizing Sexual Health has developed an operational framework to show how interventions in this area are interlocking and mutually supportive.[169] The framework focuses on eight areas, four each for sexual health (comprehensive education and information; gender-based violence prevention, support and care; prevention and control of HIV and other sexually transmissible infections; sexual function and psychosexual counselling) and reproductive health (antenatal, intrapartum and postnatal care; contraception counselling and provision; fertility care; safe abortion care).[170] Each element requires close monitoring. Based at least on the four tracer indicators included in the UHC service coverage index, RMNCH is the area in which South Africa's coverage is most complete, both nationally and provincially (Table 2).

In May 2018, the report of the Guttmacher–Lancet Commission on Sexual and Reproductive Health and Rights (SRHR) was published.[171] The Commission's comment on the adequacy of the existing SDG indicators, which they felt "fall short of addressing the full scope of people's" sexual and reproductive health and rights, is common to all such efforts. There will always be a compromise between the depth and breadth of coverage by indicators and the feasibility of gathering, analysing and responding to such data. Nonetheless, the need to maintain a keen focus on gender inequality as a barrier to the attainment of full SRHR demands reporting on indicators that are sensitive to this issue. Using data from 105 countries, a global estimate of the extent of unintended pregnancy has been produced for the period 1990–2014.[172] Globally, it was estimated that 44% of pregnancies were unintended. Although a 30% decline in the proportion of unintended pregnancies was shown in developed countries (from 64% to 45%) over the period, the decline was lower in developing countries (16%, from 77% to 65%). Expressed as an unintended pregnancy rate per 1 000 women aged 15–44 years, the global figure dropped 17%, from 74 to 62. The modelled figures reported for Southern Africa showed a decline in the rate of 11%, from 106 to 94.

The Guttmacher-Lancet Commission noted that "most developing countries have restrictive abortion laws; thus, abortions in developing regions are far more likely to be illegal and unsafe than in developed regions".[171] Modelled global, regional, and subregional classifications of abortions by their degree of safety, have been reported for the period 2010–2014.[173] This showed that, of the 55.7 million abortions estimated to occur each year between 2010 and 2014, 30.6 million (54.9%) were safe and 25.1 million (45.1%) were unsafe. Almost all unsafe abortions (24.3 million; 97%) occurred in developing countries. As expected, "the proportion of unsafe abortions was significantly higher in countries with highly restrictive abortion laws than in those with less restrictive laws". Across Southern Africa, 135 000 of the estimated 510 000 abortions per year (26.5%) were considered unsafe, more than double the proportion in developed countries (12.5%). The Guttmacher Institute lists only three countries in Africa (South Africa, Cabo Verde and Tunisia) as having 'broadly legal' access to abortion.[174] However, that South Africa has less restrictive abortion laws on paper should not be cause for complacency. Apart from the well-documented barriers to access, particularly in public sector health facilities, women who do access terminations of pregnancy also face a range of costs, for example for transportation, a pregnancy test, sanitary pads or pain medication.[175]

South Africa has been attempting to address its skewed contraceptive method mix and introduced a wider range of long-acting reversible contraceptive (LARC) options since 2014. Based on data from a national household survey conducted in 2012, a high incidence of unintended pregnancy was demonstrated, as well as a limited range of methods.[176] Data from two districts showed significant gaps in the monitoring of the introduction of new sub-dermal implants, not only in relation to programmatic indicators of uptake, but also in relation to pharmacovigilance.[177] An attempt to draw lessons from this experience identified two recommendations with regard to monitoring:[178]

- "Address data gaps in recording of uptake, removals and pharmacovigilance, including use of the implant in women with medical conditions such as epilepsy, HIV and TB."
- "Disaggregate implant data by age (especially to identify use among adolescents and young women) and by specific groups of women, such as postpartum and post-abortion patients. This can then be used to identify gaps in provision, training, quality of care, and factors influencing uptake and continuation."

In 2015, the national antenatal sentinel survey included syphilis testing again for the first time since 2011.[119] The 2015 national point estimate for syphilis prevalence among antenatal presenters was 2.0% (95%CI: 1.8% – 2.2%), which represented an increase to levels last seen in 2008 and 2009, although the provincial picture is more mixed, as shown in Table 11.

Table 20: Contraception and sexual behaviour indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Age of first sex under 15 years (% having first had sex at age 14 or younger)	2012	both sexes 15–24 years SABSSM	16.8	10.3	9.5	7.6	11.8	7.7	10.1	9.8	14.2	10.7	a
		female 15–24 years SABSSM										5.0	a
		male 15–24 years SABSSM										16.7	a
	2017	both sexes 15–24 years SABSSM										13.6	b
		female 15–24 years SABSSM										7.6	b
		male 15–24 years SABSSM										19.5	b
Cervical cancer screening coverage	2015/16	30+ years DHIS	61.6	60.2	47.2	77.6	52.7	69.0	35.5	67.6	55.4	59.3	c
	2016/17	30+ years DHIS	65.1	55.8	52.8	91.5	58.4	68.6	43.3	71.9	56.1	64.5	c
	2017/18	30+ years DHIS	64.0	50.9	47.7	79.9	56.6	78.7	40.3	68.9	58.2	61.2	c
Condom use at last sex	2016	both sexes all ages Global Report Sex workers										86.1	d
		male all ages Global Report MSM										80.7	d
	2017	female 15–24 years SABSSM										49.8	b
		female 25–49 years SABSSM										36.0	b
		female 50+ years SABSSM										13.8	b
		male 15–24 years SABSSM										67.7	b
		male 25–49 years SABSSM										40.2	b
		male 50+ years SABSSM										15.5	b
Condom use at the last high-risk sex	2008	15–49 years SABSSM										75.2	e
	2011–2016	female 15–49 years SADHS										58.0	f
		male 15–49 years SADHS										65.0	f
Condom use rate of the contraceptive prevalence rate	2003	SADHS currently married										7.7	g
		SADHS sexually active										12.1	g
	2011–2016	both sexes 15+ years SADHS										15.0	f
		female SADHS married & sexually active	10.1	11.2	14.6	20.2	9.9	18.5	10.9	16.5	11.7	14.5	h
Contraceptive prevalence rate (any method)	2010	female Alkema et al.										63.7	i
	2011–2016	female 15–49 years SADHS currently married women	53.9	46.2	55.6	51.3	49.2	59.0	52.0	54.5	59.3	54.6	f
		female 15–49 years SADHS married & sexually active	59.8	50.8	57.2	61.2	50.7	61.1	54.4	58.4	62.7	58.3	f
		female 15–49 years SADHS sexually active unmarried	67.6	59.7	60.5	69.5	52.9	64.4	59.8	64.1	72.0	64.2	f
Couple year protection rate	2015/16	DHIS	72.2	79.2	61.6	73.2	68.9	51.9	46.5	45.8	80.1	66.9	c
	2016/17	DHIS	74.7	66.1	60.3	74.9	85.5	71.4	47.6	60.1	78.9	70.6	c
	2017/18	DHIS	48.9	66.7	59.3	46.5	70.5	62.4	59.8	56.9	81.4	59.8	c
Demand for family planning satisfied with modern methods	2011–2016	female 15–49 years SADHS	75.0	72.7	74.6	75.0	66.5	78.6	73.3	77.5	84.4	75.7	f
HIV knowledge: correct knowledge about prevention and rejection of major misconceptions	2012	15+ years SABSSM	25.6	34.7	31.7	24.4	19.3	21.9	28.0	20.8	29.5	26.8	a
		female 15+ years SABSSM										27.3	a
		male 15+ years SABSSM										26.2	a
	2016	both sexes 15–24 years Global Report										45.8	d
Male condom distribution coverage	2015/16	DHIS	52.9	53.8	39.8	55.9	51.4	33.5	20.3	24.3	50.3	45.4	c
	2016/17	DHIS	55.9	42.2	38.7	55.3	68.8	52.9	21.2	37.5	49.2	48.6	c
	2017/18	DHIS	28.3	41.0	36.8	22.2	49.9	41.9	30.8	32.9	48.6	36.1	c
Male condoms distributed (thousands)	2015/16	DHIS	111 718	52 756	197 852	184 746	90 590	48 240	8 513	32 185	114 146	840 748	c
	2016	Global Report Prisoners										1 967	d
	2016/17	DHIS	119 499	41 693	196 063	185 574	123 437	77 703	9 036	50 461	113 788	917 253	c
	2017/18	DHIS	61 256	40 868	190 350	75 558	90 930	62 704	13 313	45 032	114 396	694 407	c

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Teenage pregnancy	2011–2016	female 15 years SADHS ever pregnant										3.8	f
		female 15–19 years SADHS ever pregnant	17.9	12.1	14.1	19.4	12.4	18.2	20.3	20.1	8.1	15.6	f
		female 16 years SADHS ever pregnant										7.3	f
		female 17 years SADHS ever pregnant										14.8	f
		female 18 years SADHS ever pregnant										22.6	f
		female 19 years SADHS ever pregnant										27.8	f
	2014–2015	female 15–19 years NiDS	15.8	9.4	11.6	21.5	11.7	14.7	17.5	12.4	5.5	14.4	j
	2016	female 14 years GHS										0.7	k
		female 15 years GHS										1.7	k
		female 16 years GHS										3.3	k
		female 17 years GHS										6.5	k
		female 18 years GHS										7.1	k
		female 19 years GHS										10.7	k
		female 14–19 years GHS										5.1	k
		female 15–19 years CS	5.3	2.8	1.7	4.2	4.1	3.8	3.7	3.3	2.3	3.3	l
	2017	female 14 years GHS										0.6	m
		female 15 years GHS										1.2	m
		female 16 years GHS										3.8	m
		female 17 years GHS										5.9	m
		female 18 years GHS										7.7	m
		female 19 years GHS										10.7	m
		female 14–19 years GHS										5.1	m
Unmet need for family planning	1990	Alkema et al.										20.2	i
	2010	Alkema et al.										12.7	i
	2011–2016	female 15–49 years SADHS	20.0	19.1	18.6	20.1	24.4	16.0	19.5	16.7	11.3	18.2	f

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a HIV Household Survey 2012.[166]
b HIV Household Survey 2017 Pres.[150]
c DHIS.[46]
d UNAIDS Data 2017.[145]
e HIV Household Survey 2008.[179] Among people who reported having more than one partner in the past 12 months.
f SADHS 2016.[38]
g SADHS 2003.[180]
h SADHS 2016.[38] Currently married and sexually active unmarried women
i Alkema et al. 2013.[181] Modelled estimates.
j NiDS Wave 4 v1.1.[182]
k Stats SA GHS 2016.[33] The questionnaire asked whether any females between the ages of 12 and 50 years were pregnant during the 12 months before the survey.
l Community Survey 2016.[54]
m Stats SA GHS 2017.[34] The questionnaire asked whether any females between the ages of 12 and 50 years were pregnant during the 12 months before the survey.

Table 21: Termination of pregnancy indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
ToP rate as percentage of pregnant women	2014/15	DHIS	8.7	10.8	7.8	3.6	5.5	2.3	6.4	9.8	16.8	7.4	a
	2015/16	DHIS	7.0	9.0	5.4	4.1	6.3	1.8	5.8	7.3	15.4	6.4	a
	2016/17	DHIS	7.0	10.8	9.9	5.3	7.4	3.8	6.0	7.2	16.2	8.1	a
ToPs (Terminations of Pregnancy)	2015/16	DHIS	12 782	5 632	14 741	12 300	9 565	1 806	1 362	6 531	18 988	83 707	a
	2016/17	DHIS	12 977	6 441	28 491	15 714	10 845	3 724	1 380	6 235	19 551	105 358	a
	2017/18	DHIS	10 912	7 323	18 942	24 480	9 758	4 331	1 628	6 615	20 671	104 660	a

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a DHIS.[46]

MATERNAL & NEONATAL HEALTH

REGISTERED PERINATAL DEATHS IN SOUTH AFRICA, 2016

18 683

DECREASE FROM 22 341 IN 2015

Number of Maternal Deaths, 2015, NCCEMD

Total of 1 168

BLEEDING DURING AND AFTER CAESAREAN SECTION

Maswine and Buchmann, 2017

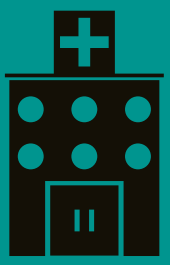
A rising Caesarean section rate and substandard peri-operative care are believed to be the main reasons for recent increases in maternal deaths from bleeding during and after Caesarean section in South Africa.

30%

Institutional maternal mortality ratio (iMMR) dropped 30% from peak incidence in 2009 (NCCEMD)

27%

Delivery by Caesarean section rate in South Africa



26%

Only 7.9% of babies were delivered in Provincial Tertiary hospitals yet 26% of maternal deaths occurred there

Maternal and neonatal health

In order to advance accountability, WHO launched the Mother and Newborn Information for Tracking Outcomes and Results (MoNITOR) in 2015, "to facilitate measurement, align initiatives, and provide technical guidance".[183] Among the priorities for the group are to address the "lack of consistent definitions for key indicators across varying data collection platforms". As with every other set of measures, attention to disaggregated measures and the extent to which they identify persistent inequities is essential. For instance, data on Caesarean section rates in 72 LMICs between 2010 and 2014 showed a persistent gradient between the poorest and richest quintiles within countries.[184] However, where access is particularly poor, as in Africa, inequalities may be less apparent. High levels of Caesarean section delivery amongst the richest quintiles may also indicate over-utilisation, without medical indications. South African data were not included in this study.

Within South Africa, one of the ways in which quality of care is being addressed, including the care of mothers and children, has been through District Clinical Specialist Teams.[185] The impact of interventions such as the Essential Steps in Managing Obstetric Emergencies (ESMOE) have been measured in terms of maternal mortality gains.[186] There has been a sustained improvement in this measure of care over time in South Africa, as documented by the reports of the National Confidential Enquiry into Maternal Deaths Committee (NCCEMD).[187] Noting the differences between globally reported maternal mortality figures and the institutional maternal mortality rates reported by the NCCEMD, the latter is looking at three possible sources of information about maternal deaths that occur outside of health facilities: demographic health surveillance systems (such as those in Agincourt and Hlabisa); Statistics South Africa data from death certificates; and deaths reported by traditional leaders in tribal areas. Potentially, verbal autopsy methods could also be introduced, involving community health workers and ward-based outreach teams. An example of spatially-disaggregated data from the Africa Centre Demographic Information System (ACDIS) in rural KwaZulu-Natal (Hlabisa, uMkhanyakude district) has been published.[187] Using a multivariable logistic regression model, the following significant predictors of maternal mortality were identified: HIV positive status, primary education or less, and parity.

The 2016 Saving Mothers report from the NCCEMD documented maternal deaths in 2015.[188] A total of 1 168 maternal deaths was reported by NCCEMD in 2015 (including deaths occurring in private health facilities), compared with 1 102 reported via the District Health Information System (DHIS). Importantly, the report stated that the "pattern of maternal deaths in private hospitals is the same as public hospitals". It noted that the Caesarean delivery (CD) rate rose by 1%, but the case fatality rate for CD declined by 8.5%. A cross-sectional study conducted in greater Johannesburg identified 7 maternal deaths and 93 "near misses" from bleeding during and after Caesarean section (BDACS) among 20 527 CDs at 13 Gauteng provincial hospitals in a 6-month period in 2014.[189] The survey identified structural deficiencies in district hospitals (availability of human resources, on-site facilities and availability of essential medicines), but also serious delays in ambulance transfer, even within this highly urbanised and densely-populated environment.

Estimates of the neonatal mortality rate (NMR; derived from DHIS data), and the maternal mortality ratio (derived from Statistics South Africa cause-of-death data) for 2016 are reported in the most recent Rapid Mortality Surveillance (RMS) system report.[92] As of April 2017, the indicator included in the National Indicator Data Set (NIDS) is the neonatal death in facility rate, which uses the number of live births in facilities as the denominator rather than the estimated number of live births in the population (Table 23).

Table 22: Maternal health indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Antenatal 1st visit before 20 weeks rate	2015/16	female DHIS	59.7	62.9	55.0	64.8	60.7	65.9	62.4	60.6	67.7	61.2	a
	2016/17	female DHIS	63.8	65.8	58.4	70.2	65.7	71.7	64.7	63.7	69.6	65.2	a
	2017/18	female DHIS	64.8	65.6	61.4	72.1	63.2	73.8	64.0	66.4	69.7	66.6	a
Antenatal care coverage	2011–2016	female 15–49 years SADHS 4+ visits	81.5	77.8	62.0	77.0	82.4	72.6	74.8	89.0	88.7	75.5	b
	2015/16	female DHIS	59.5	69.1	88.8	70.3	77.1	80.7	90.0	72.3	72.5	74.9	a
	2016/17	female DHIS	56.7	72.0	88.4	68.2	81.6	77.9	97.1	76.0	76.1	75.2	a
	2017/18	female DHIS	58.7	74.4	86.2	70.6	83.6	90.2	98.1	78.5	79.6	77.4	a
Births attended by skilled health personnel	2008	SABSSM doctor or nurse/midwife									94.3	c	
	2011–2016	15–49 years SADHS	92.7	96.3	97.6	96.4	97.8	96.4	97.6	96.0	99.2	96.7	b
Delivery by Caesarean section rate	2015	female med schemes										61.4	d
	2015/16	female DHIS	28.7	25.0	27.5	29.5	19.6	19.7	21.6	21.5	29.7	26.0	a
	2016	female med schemes										62.9	d
	2016/17	female DHIS	30.0	25.0	28.6	30.7	20.6	19.9	21.9	21.5	29.7	26.7	a
	2017/18	female DHIS	29.2	30.1	29.0	30.4	20.6	22.4	21.7	23.9	29.9	27.3	a
Delivery by Caesarean section rate (district hospitals)	2015/16	female DHIS	22.7	16.1	25.6	28.5	22.3	19.3	16.3	27.8	28.1	24.0	a
	2016/17	female DHIS	22.8	17.5	26.3	28.6	22.4	20.5	15.2	25.6	27.4	24.1	a
	2017/18	female DHIS	23.7	15.5	26.7	28.5	22.3	21.2	15.0	26.3	29.3	24.4	a
Delivery in 10 to 19 years in facility rate	2017/18	female DHIS	15.4	10.5	8.1	17.6	13.5	12.9	17.1	10.7	10.9	12.7	a
Delivery in facility – total	2017/18	DHIS	100 759	47 181	219 179	184 816	120 250	77 395	20 883	57 780	95 820	924 063	a

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Delivery in facility rate	2015/16	female DHIS	62.4	73.0	79.6	67.5	83.9	78.5	98.3	67.1	82.2	74.2	a
	2016/17	female DHIS	56.0	73.6	77.0	65.3	85.9	79.7	96.0	69.8	81.3	72.7	a
	2017/18	female DHIS	58.0	85.9	79.1	67.7	88.5	84.4	98.4	73.2	84.9	75.8	a
Delivery in facility under 18 years rate	2014/15	DHIS	9.6	7.1	4.8	8.9	7.5	9.1	9.6	6.9	6.1	7.4	a
	2015/16	DHIS	9.0	6.5	5.0	8.7	7.1	8.6	9.3	6.3	5.5	7.1	a
	2016/17	DHIS	8.8	5.9	4.7	8.5	6.3	7.7	9.5	6.5	5.7	6.8	a
Live birth in facility	2017/18	both sexes DHIS	100 803	46 297	217 264	182 529	119 544	77 369	20 785	56 820	96 051	917 462	a
Maternal mortality in facility ratio	2015/16	female DHIS	128.0	122.1	103.8	121.9	139.4	119.1	103.8	141.7	66.9	115.6	a
	2016/17	female DHIS	127.6	148.4	114.7	100.2	125.9	123.0	87.5	130.1	57.7	111.5	a
	2017/18	female DHIS	128.3	132.9	108.5	101.9	109.2	120.0	65.9	117.5	55.1	105.7	a
Maternal mortality ratio (MMR)	2013	female IHME										174.1	e
		female RMS										154.0	f
		female vital registration										141.0	g
		female WHO										140.0	h
	2014	female RMS										164.0	f
		female vital registration										151.0	g
	2015	female GBD										157.9	i
		female RMS										152.0	f
		female vital registration										133.0	j
		female WHO										138.0	k
Maternal mortality ratio institutional (confidential enquiries)	2013	NCCEMD	172.7	185.1	115.0	146.5	201.2	150.3	158.3	168.5	83.9	147.7	l
	2014	NCCEMD	172.4	192.2	132.9	135.8	167.4	188.3	107.3	199.1	61.4	140.7	m
	2015	NCCEMD	131.6	160.5	120.0	118.8	160.0	133.8	133.0	154.0	63.3	126.8	m
	2014–2016	NCCEMD										134.3	n
Mother postnatal visit within 6 days rate	2015/16	female DHIS	58.2	71.2	76.8	69.6	68.2	62.4	53.0	70.1	67.8	68.6	a
	2016/17	female DHIS	61.4	71.4	85.9	66.9	70.9	60.2	58.9	74.4	60.0	70.5	a
	2017/18	female DHIS	63.3	64.0	70.8	76.8	85.8	63.4	62.0	75.4	58.0	70.9	a
Number of maternal deaths	2015	GBD										1 754	i
		NCCEMD	146	70	245	233	197	99	29	88	61	1 168	m
		WHO										1 500	k
	2015/16	DHIS	145	56	218	223	169	91	24	83	66	1 075	a
	2016/17	DHIS	137	65	243	187	153	92	19	77	55	1 028	a
	2017/18	DHIS	138	66	244	197	135	98	15	71	55	1 019	a
PM (proportion of deaths among women of reproductive age that are due to maternal causes)	2010	WHO										1.5	k
	2015	WHO										1.7	k

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a DHIS.[46]
b SADHS 2016.[38]
c HIV Children 2008.[179]
d Medical Schemes 2016–17.[49] Converted to % from number of Caesarean sections per 1 000 birth admissions.
e Kassebaum et al. 2014.[190]
f RMS 2016.[92]
g SDG Baseline 2017.[6]
h Maternal Mortality 1990–2013.[191]
i GBD 2015 Maternal Mortality.[192]
j SDG Baseline 2017.[6] Calculated using direct methods with the numerator adjusted for incompleteness. The maternal deaths from the 2015 Mortality and causes of death data and the total live births from the 2015 Mid-year population estimates.
k Maternal Mortality 1990–2015.[193]
l Saving Mothers 2011–2013.[194]
m Saving Mothers 2015.[195]
n Moodley et al. 2018.[187] Average value for 2014–2016. Institutional (facility) MMR based only on maternal deaths in facilities, captured into the database for confidential enquiries into maternal deaths.

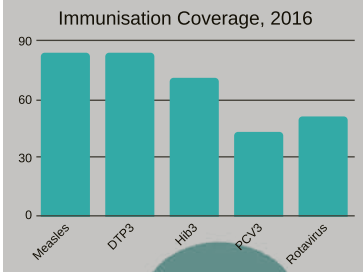
Table 23: Neonatal health indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Early neonatal death in facility rate	2015/16	both sexes DHIS	12.8	10.7	9.5	11.4	12.9	9.3	14.3	10.0	7.3	10.7	a
	2016/17	both sexes DHIS	10.8	11.4	10.0	9.7	10.6	9.5	13.4	10.0	7.1	9.9	a
	2017/18	both sexes DHIS	11.8	12.0	10.2	10.3	11.0	10.4	10.0	7.9	7.2	10.2	a
Live birth under 2500g in facility rate	2015/16	both sexes DHIS	14.0	12.4	13.9	12.6	10.5	12.2	19.4	14.3	14.5	13.2	a
	2016/17	both sexes DHIS	13.6	12.8	14.4	12.1	10.9	12.1	21.0	13.4	14.3	13.2	a
	2017/18	both sexes DHIS	13.9	13.2	15.3	12.3	10.9	12.8	19.0	14.3	14.4	13.6	a
Neonatal death in facility rate	2015/16	both sexes DHIS	15.8	14.1	12.9	14.6	14.6	10.9	16.2	12.1	8.8	13.3	a
	2016/17	both sexes DHIS	13.2	14.3	13.6	12.4	12.2	10.9	15.8	12.1	8.5	12.4	a
	2017/18	both sexes DHIS	13.8	14.1	13.6	12.4	12.4	11.5	11.6	9.4	9.0	12.3	a
Neonatal mortality rate (NNMR) (deaths <28 days old per 1 000 live births)	2011–2016	both sexes SADHS										21.0	b
	2014	both sexes RMS										12.0	c
	2015	both sexes RMS										12.0	c
	2016	both sexes GBD										15.2	d
		both sexes Inter-agency group										12.0	e
		both sexes RMS										12.0	c
Perinatal mortality rate (stillbirths plus deaths <8 days old per 1 000 total births)	2015	both sexes P0309.4 registered										23.1	f
	2015/16	both sexes DHIS	22.8	29.2	24.2	23.3	29.2	25.6	37.9	22.9	21.6	24.6	a
	2016	both sexes P0309.4 registered										21.0	f
	2016/17	both sexes DHIS	18.1	29.6	23.2	21.1	27.3	24.9	35.4	24.6	21.0	23.0	a
	2017/18	both sexes DHIS	19.1	34.1	24.4	23.7	30.0	28.3	32.6	22.8	23.2	24.8	a
Stillbirth in facility rate	2015/16	both sexes DHIS	21.6	27.2	19.5	23.7	20.6	21.8	22.6	22.7	17.5	21.3	a
	2016/17	both sexes DHIS	18.6	26.9	19.0	21.2	19.6	20.9	22.4	23.6	17.3	20.2	a
	2017/18	both sexes DHIS	19.6	26.2	19.3	23.3	21.4	21.4	21.6	22.1	18.7	21.1	a
Stillbirth rate (per 1 000 total births)	2014	both sexes P0309.4 registered										14.8	f
	2015	both sexes P0309.4 registered										14.8	f
	2016	both sexes GBD										9.8	d
		both sexes P0309.4 registered										13.5	f

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a DHIS.[46]
b SADHS 2016.[38]
c RMS 2016.[92]
d GBD 2016 Child Health.[88]
e Child Mortality 2017 IGME.[196]
f Perinatal deaths 2016.[197]

CHILD HEALTH



1.3 MILLION
Deaths due to diarrhoeal disease

20.8%
Reduction since 2005

MOST COMMON CAUSES OF DEATH

- *Neonatal preterm birth complications*
- *Lower respiratory infections*

41 PER 1 000
Under 5 mortality

5 600 000
Under 5 deaths

Globally

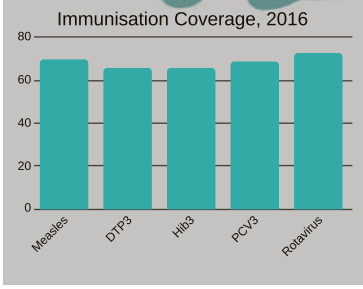
1 in 189
Children die before 5th birthday in high income countries

60 MILLION CHILDREN

If current trends continue with more than 50 countries falling short of the Sustainable Development Goal target on child survival, some 60 million children under the age of 5 will die between 2017 and 2030 – half of them newborns

UN IGME

1 in 13
Children die before 5th birthday in sub-Saharan countries



3 026
Deaths due to diarrhoeal disease

70%
Decline from 2005

MOST COMMON CAUSES OF DEATH

- *HIV*
- *Diarrhoeal diseases*

43 PER 1 000
Under 5 mortality

51 000
Under 5 deaths

South Africa

Child health

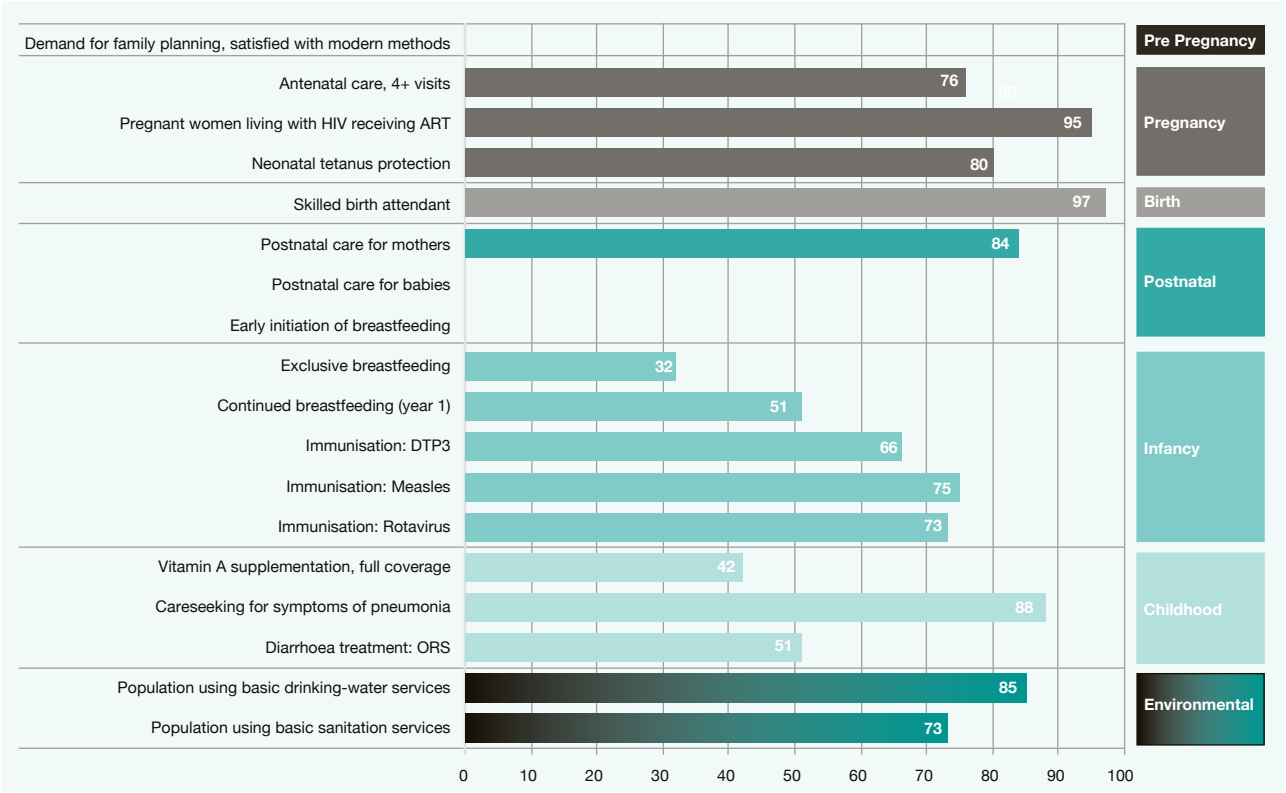
The Global Burden of Diseases, Injuries, and Risk Factors (GBD) 2015 Study has reported on mortality and non-fatal health outcomes in children and adolescents from 195 countries and territories for the period 1990 to 2015.[198] Globally, child and adolescent mortality declined over the period, from 14.18 million deaths to 7.26 million, but with few gains in countries with lower SDI. Globally, the most common causes of death were neonatal preterm birth complications, lower respiratory tract infections, neonatal encephalopathy owing to birth asphyxia and trauma, diarrhoeal diseases, congenital anomalies, malaria, neonatal sepsis, other neonatal disorders, meningitis, and HIV. In Southern sub-Saharan Africa, the leading cause was HIV, followed in rank by diarrhoeal diseases, in both females and males. The GBD 2015 Study has also reported in detail on morbidity, mortality and the aetiologies of diarrhoeal disease on the global, regional and national level.[199] In 2015, diarrhoeal disease was estimated to be responsible for 1.31 million deaths, globally. However, there was evidence of a 20.8% reduction in global deaths due to this cause between 2005 and 2015. The leading cause of diarrhoeal death remained rotavirus infection. In South Africa, diarrhoeal disease was estimated to be responsible for 3 026.2 under-5 deaths in 2015 (a rate of 56.8 deaths per 100 000 children under 5 years), representing a 70.1% decline from 2005. For all ages, there were estimated to be 13 447.1 deaths (25.0 per 100 000) and a 41.3% decline from 2005. Rotavirus was identified as the second most important cause of diarrhoeal deaths, after *Campylobacter* species. The continued importance of rotavirus justifies the emphasis on vaccination coverage. Building on data from the GBD 2016, Troeger et al. have shown that rotavirus vaccination has averted more than 28 000 under-5 deaths globally.[199]

Global, regional and even national estimates can obscure many inequalities at lower levels, such as districts. A comprehensive geospatial mapping (at a 5x5km resolution) of neonatal and under-5 mortality in Africa between 2000 and 2015 has been prepared, and has revealed many areas where progress has been less than stellar.[200]

The joint UNICEF-WHO 2017 report on progress towards universal coverage for women's, children's and adolescents' health provides country-specific data on the elements of the composite coverage index (CCI).[201] The South African page shows how the percentage of those in need receiving essential interventions declines, for many interventions, from the pre-pregnancy, pregnancy and birth stages to the post-natal period, infancy and childhood (Figure 4).

It is worth noting that 2018 represents the last lap in the Global Vaccine Action Plan 2011–2020 (GVAP), approved by the World Health Assembly in 2012 in order to achieve universal coverage of vaccination.[202] By 2016, the global indicators were positive – 91% of the global population of surviving infants (123 million children) received at least one dose of diphtheria and tetanus toxoids and pertussis-containing (DTP) vaccine, and 86% (117 million) completed the DTP series.[203] As always, global figures hide serious inequalities. WHO has published an extensive exploration of these inequalities and the ways in which immunisation indicators can be disaggregated by child's sex, birth order, mother's age at birth, mother's education, mother's ethnicity, sex of household head, household economic status, place of residence and subnational regions, and then analysed using concentration curves, concentration indices and logistic regression models.[204] In South Africa, an impact of pneumococcal vaccination on all-cause pneumonia hospitalisations was demonstrated using

Figure 4: Percentage of those in need receiving coverage of key interventions across the continuum of care (South Africa)



Source: UNICEF-WHO Countdown 2030.[201]

data from Chris Hani Baragwanath Hospital for 2006–2014, with such admissions reduced by 33% in those living with HIV and 39% in those uninfected.[205] The National Department of Health Annual Performance Plan 2017/18[206] indicated that the EPI coverage survey to be conducted in all nine provinces would be reported in 2018/19. The following year's APP[207] indicated that completion of the report would be expected in 2019/20. Given the uncertainty surrounding global and DHIS estimates of coverage, these data will be crucial to providing a solid basis for future planning and strengthening of the EPI programme.

In 2017, the United Nations Inter-agency Group for Child Mortality Estimation published estimates of "Levels and Trends in Child Mortality", also pointing to disparities between regions.[196] Despite global progress, with a reduction from 12.6 to 5.6 million child deaths between 1990 and 2016, there are still important disparities. For example, in sub-Saharan Africa, approximately 1 child in 13 dies before his or her fifth birthday, compared with a ratio of 1 in 189 in high-income countries. For South Africa, the Inter-Agency Group reported a modest 1.1% per annum decline in under-5 mortality rate (U5MR), from 57 to 43 per 1 000 live births between 1990 and 2016. Over the same period the South African infant mortality rate was estimated to have dropped from 45 to 34 per 1 000 live births, and the neonatal mortality rate from 20 to 12 per 1 000 live births. Locally, attention has been drawn to the need to improve the accuracy of data at subnational levels.[208] The authors pointed out that the Inter-Agency figures and those from the Rapid Mortality Surveillance (RMS) system provide only national estimates, whereas the accuracy of data from the South African National Demographic and Health Survey has been questionable. Censuses are conducted only every 10 years, while vital registration may be incomplete. Finally, data from the DHIS largely exclude the private sector, are probably incomplete for large hospitals, and do not capture cause of death details for child deaths, except in the case of deaths from diarrhoea, pneumonia and severe acute malnutrition.

Not only should systems be strengthened, but greater attention paid to reconciliation and triangulation of data sources. For the three causes recorded by DHIS, considerable improvements in inpatient case fatality rates (CFR) have been shown for the period 2011/12 to 2016/17.[209] For pneumonia the CFR declined from 4.1 to 2.0%; for diarrhoea from 4.5 to 2.0%, and for severe acute malnutrition from 13.1 to 8.0%. For all three conditions, inter-provincial differences also narrowed over time, although the markedly lower CFR in the Western Cape remained the outlier.

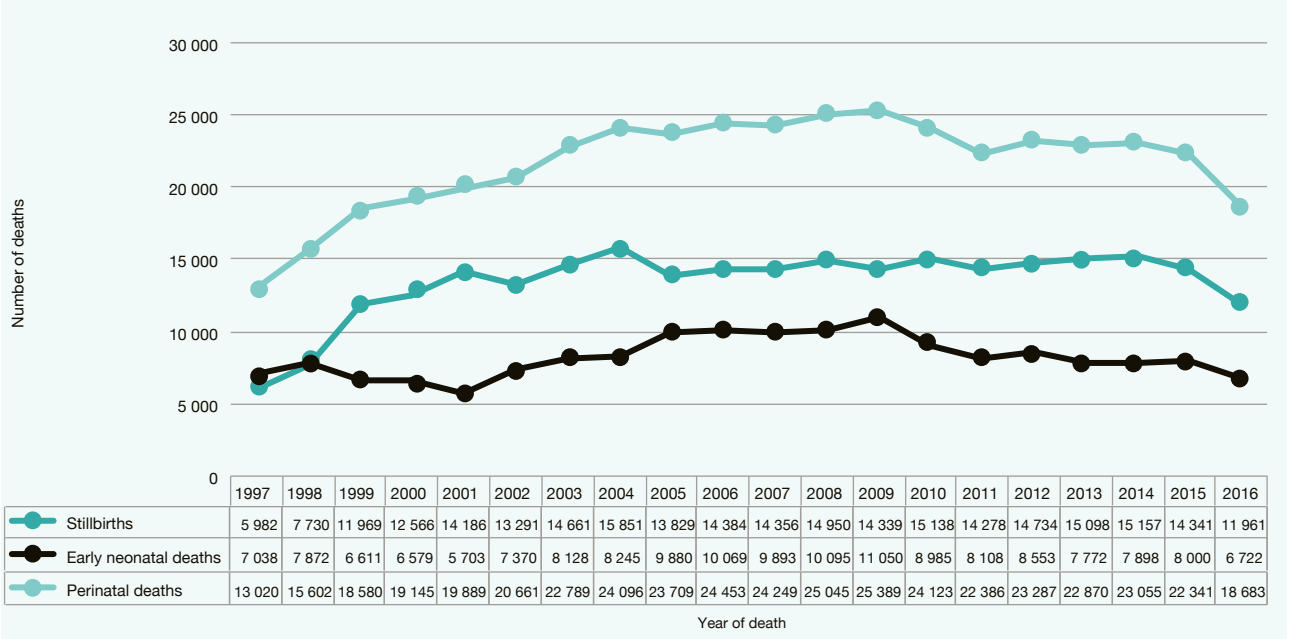
Two issues of the Statistics South Africa report "Perinatal deaths in South Africa" (P0309) have been published since the previous *Review*, covering vital registration data for 2015 and 2016.[197,210] The data reported are for registered stillbirths, early neonatal deaths and perinatal deaths. Updated trend data for all three measures for the period 1997 to 2016 were published.

The 8th edition of the Saving Children report from the Child Healthcare Problem Identification Programme (Child PIP), covering the period 2012 – 2013 was published in 2016.[211] Data were available from 205/336 public sector hospitals (61%), but varying from all hospitals in Mpumalanga to only 20% in the Eastern Cape. For 2012–2013, 11 194 deaths were recorded in the national Child PIP database and subjected to audit. Based on these audits, the main causes of child deaths were pneumonia (19.4%), acute diarrhoea with hypovolaemic shock (17.2%), and sepsis (17.2%). For children older than 5 years, the leading cause of death was TB.

In terms of neonatal mortality, a recent review pointed out that "plans are afoot by the NDoH to synchronise and align PPIP and Child PIP with the DHIS", and thus improve not only the quality of data but also the effectiveness of systems interventions.[212]

As in previous years, a comprehensive overview of child health data was published in the form of the South African Child Gauge 2017, by the Children's Institute.[213] Other elements covered include children and law reform, and the 2030 Global Agenda.

Figure 5: Number of perinatal deaths by year of death, 1997-2016



	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Stillbirths	5 982	7 730	11 969	12 566	14 186	13 291	14 661	15 851	13 829	14 384	14 356	14 950	14 339	15 138	14 278	14 734	15 098	15 157	14 341	11 961
Early neonatal deaths	7 038	7 872	6 611	6 579	5 703	7 370	8 128	8 245	9 880	10 069	9 893	10 095	11 050	8 985	8 108	8 553	7 772	7 898	8 000	6 722
Perinatal deaths	13 020	15 602	18 580	19 145	19 889	20 661	22 789	24 096	23 709	24 453	24 249	25 045	25 389	24 123	22 386	23 287	22 870	23 055	22 341	18 683

Source: Stats SA Perinatal deaths 2016.[197]

Table 24: Child health indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Child under 5 years diarrhoea with dehydration incidence per 1 000 children	2015/16	both sexes DHIS	8.9	13.1	6.9	8.8	10.3	7.6	9.0	5.6	18.1	9.3	a
	2016/17	both sexes DHIS	7.6	4.5	7.9	10.6	9.5	6.4	7.4	5.8	13.8	8.8	a
	2017/18	both sexes DHIS	4.6	6.4	6.3	8.0	5.7	2.6	10.2	3.7	15.1	6.8	a
Child under 5 years pneumonia incidence per 1 000 children	2015/16	both sexes DHIS	21.6	52.6	21.7	63.0	21.8	13.2	28.2	12.1	97.9	38.6	a
	2016/17	both sexes DHIS	19.4	39.9	23.1	48.6	19.6	13.5	20.1	11.3	99.4	34.3	a
	2017/18	both sexes DHIS	13.2	29.8	19.8	43.2	15.8	7.1	20.6	9.6	86.9	28.8	a
Child under 5 years severe acute malnutrition incidence per 1 000 children	2015/16	both sexes DHIS	3.9	7.6	2.5	4.5	5.1	2.6	4.3	5.0	2.5	3.9	a
	2016/17	both sexes DHIS	3.1	4.8	1.9	3.8	4.7	2.3	4.7	6.4	2.2	3.4	a
	2017/18	both sexes DHIS	0.7	4.2	1.5	2.4	3.1	1.5	5.1	4.0	2.0	2.2	a
Children living far from their usual health facility	2013	both sexes <18 years GHS	36.6	21.8	9.4	32.9	23.5	23.1	18.5	29.4	8.0	23.4	b
	2014	both sexes <18 years GHS	36.3	20.1	7.9	27.3	23.7	22.4	20.2	25.5	8.4	21.5	c
	2014/15	both sexes <18 years LCS <2km clinic										50.1	d
		both sexes <18 years LCS <10km hospital										57.4	e
	2015	both sexes <18 years GHS	34.2	17.9	8.4	30.8	23.5	23.1	21.7	28.7	8.8	22.2	f
Children with diarrhoea receiving oral rehydration solution (ORS) (%)	2016	<5 years SADHS homemade fluids										72.5	g
		<5 years SADHS ORS										51.4	h
Percentage of children under 5 years of age with suspected pneumonia taken to a health facility	2016											65.0	i
		<5 years SADHS										87.6	j
School Grade 1 screening coverage	2015/16	both sexes DHIS	20.5	24.7	37.6	22.1	29.4	13.3	12.9	53.2	51.9	29.1	a
	2016/17	both sexes DHIS	17.2	33.3	49.5	26.2	31.9	21.3	14.5	53.1	52.9	33.0	a
	2017/18	both sexes DHIS	25.5	26.0	34.9	24.8	49.9	23.2	10.8	50.0	45.7	33.2	a
School Grade 8 screening coverage	2015/16	both sexes DHIS	9.2	22.1	17.4	10.2	11.1	4.8	7.5	33.1	10.2	12.8	a
	2016/17	both sexes DHIS	13.8	30.3	35.4	16.4	16.5	6.9	8.5	38.7	12.5	19.8	a
	2017/18	both sexes DHIS	20.3	15.5	26.4	15.8	32.4	14.6	6.6	39.6	14.0	21.8	a

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a DHIS.[46]
b Stats SA GHS 2013.[214]
c Stats SA GHS 2014.[215]
d Stats SA Living Conditions 2014/15 (MWC).[216] Children that had access to a clinic within 2km of their place of residence.
e Stats SA Living Conditions 2014/15 (MWC).[216] Children that lived within 10 km of the nearest hospital.
f SA Child Gauge 2017.[213]
g SADHS 2016.[38] Percentage given recommended homemade fluids (RHF).
h SADHS 2016.[38] Percentage given fluid from ORS packet.
i Hogan et al. 2018.[2]
j SADHS 2016.[38] Percentage of children with symptoms of ARI for whom advice or treatment was sought.

Table 25: Orphanhood indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Number of orphans	2014	GHS double	121 604	54 496	77 435	197 273	55 253	69 928	14 665	49 702	13 348	653 704	a
		GHS maternal	97 102	28 458	88 314	157 631	56 521	46 364	12 792	41 041	30 459	558 681	a
		GHS paternal	313 938	102 633	254 479	491 085	205 561	182 531	39 182	138 842	92 036	1 820 287	a
	2016	both sexes 7–17 years GHS double										442 000	b
		both sexes 7–17 years GHS maternal										461 000	b
		both sexes 7–17 years GHS paternal										1 342 000	b
		both sexes 7–17 years GHS total	417 000	116 000	301 000	679 000	225 000	202 000	50 000	134 000	120 000	2 245 000	b
		female 7–17 years GHS total										1 138 000	b
		male 7–17 years GHS total										1 107 000	b
Orphanhood	2014	both sexes <18 years GHS double	4.6	6.0	2.2	4.8	2.5	4.6	3.6	3.9	0.7	3.5	a
		both sexes <18 years GHS maternal	3.7	3.1	2.5	3.9	2.6	3.0	3.1	3.2	1.6	3.0	a
		both sexes <18 years GHS paternal	11.9	11.3	7.2	12.1	9.4	12.0	9.6	11.0	4.9	9.9	a
		both sexes <18 years GHS total	20.2	20.4	11.9	20.8	14.5	19.6	16.3	18.1	7.2	16.4	a
	2015	both sexes <18 years GHS double	4.8	3.4	2.3	4.2	3.7	4.1	2.6	3.7	0.9	3.4	c
		both sexes <18 years GHS maternal	4.1	3.6	2.9	3.9	2.3	3.5	3.5	2.6	1.7	3.2	c
		both sexes <18 years GHS paternal	11.7	12.1	7.8	13.9	10.0	10.0	9.1	9.8	4.0	10.1	c
	2016	both sexes 7–17 years GHS total	26.1	22.2	13.9	27.3	17.6	22.7	20.7	18.6	10.3	20.3	b
		both sexes <18 years CS maternal										5.4	d
		both sexes <18 years CS paternal										8.3	d

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a Stats SA GHS 2014.[215]
b Vulnerable Groups III.[73]
c SA Child Gauge 2017.[213]
d Community Survey 2016.[54]

Table 26: Child mortality and related indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Child mortality (deaths between 1–4 years per 1 000 live births)	2011–2016	both sexes 1–4 years SADHS										7.0	a
	2013	both sexes 1–4 years GBD										8.2	b
	2016	both sexes 1–4 years GBD										9.2	c
Infant mortality rate (deaths under 1 year per 1 000 live births)	2011–2016	both sexes <1 year SADHS										35.0	a
	2015	both sexes <1 year mid-year										34.0	e
		both sexes <1 year RMS										27.0	f
		both sexes <1 year vital registration										22.3	g
	2016	both sexes <1 year Inter-agency group										34.0	h
		both sexes <1 year mid-year										33.5	e
		both sexes <1 year RMS										25.0	f
	2017	both sexes <1 year mid-year										32.8	e
Number of under-5 deaths	2014	both sexes 0–4 years vital registration	3 614	2 671	7 699	5 813	4 555	2 769	1 299	3 532	2 209	34 262	i
												35 557	j
	2015	both sexes 0–4 years DHIS	3 185	867	3 577	4 351	2 809	1 545	570	1 104	1 227	19 235	i
		both sexes 0–4 years vital registration	3 240	2 356	7 348	5 372	4 426	2 597	1 068	3 171	2 319	31 938	i
												31 938	k
												32 918	l
		both sexes 0–4 years vital registration in facility	1 411	1 190	3 839	3 165	2 021	1 328	723	1 532	1 054	16 272	i

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
	2016	both sexes 0–4 years Inter-agency group										51 000	h
		both sexes 0–4 years vital registration										27 657	l
		both sexes GBD										46 300	c
		female 0–4 years vital registration										12 565	m
		male 0–4 years vital registration										14 649	m
Post-neonatal mortality rate (deaths 28–365 days age per 1 000 live births)	2011–2016	both sexes SADHS										21.0	a
	2013	both sexes GBD										14.7	b
	2016	both sexes GBD										19.6	c
Under 5 mortality rate (deaths under 5 years per 1 000 live births)	2011–2016	both sexes <5 years SADHS										42.0	a
	2015	both sexes <5 years mid-year										44.7	e
		both sexes <5 years RMS										37.0	f
		both sexes <5 years vital registration										30.2	g
	2016	both sexes <5 years GBD										43.4	c
		both sexes <5 years Inter-agency group										43.0	h
		both sexes <5 years mid-year										43.6	e
		both sexes <5 years RMS										34.0	f
		female <5 years Inter-agency group										39.0	n
		male <5 years Inter-agency group										48.0	n
	2017	both sexes <5 years mid-year										42.4	e

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a SADHS 2016.[38]
b Wang et al. 2014.[217]
c GBD 2016 Child Health. [88]
d SADHS 2016.[38]
e Stats SA MYE 2017.[28]
f RMS 2016.[92]
g SDG Baseline 2017.[6]
h Child Mortality 2017 IGME.[196]
i Bamford et al. 2018.[208]
j Stats SA Causes of death 2015.[44] Updated with late registrations/delayed death notification forms processed in 2015/16.
k Stats SA Causes of death 2015.[44]
l Stats SA Causes of death 2016.[45] Includes unspecified.
m Stats SA Causes of death 2016.[45]
n SWChildren 2017.[99]

Table 27: Immunisation indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
BCG coverage	2011–2016	both sexes 12–23 months SADHS	96.2	97.8	92.6	91.3	92.9	85.7	95.8	94.5	91.4	92.5	a
		female 12–23 months SADHS										90.9	a
		male 12–23 months SADHS										93.9	a
	2015	both sexes UNICEF/WHO										69.0	b
	2015/16	both sexes DHIS	64.0	76.1	95.2	51.3	78.3	76.2	95.2	54.1	78.4	72.1	c
	2016	both sexes UNICEF/WHO										74.0	d
	2016/17	both sexes DHIS	63.6	81.1	92.0	67.7	89.2	82.8	101.3	70.1	84.7	79.0	c
	2017/18	both sexes DHIS	60.2	79.4	82.7	63.4	70.7	72.5	102.3	65.5	79.0	71.8	c
DTaP-IPV-Hib-HBV 4th dose coverage	2015/16	both sexes DHIS	65.6	70.7	68.8	66.7	58.4	64.0	67.4	65.5	70.9	66.3	c
	2016/17	both sexes DHIS	55.6	66.1	60.0	60.7	57.1	58.6	79.1	56.6	54.2	59.0	c
	2017/18	both sexes DHIS	54.3	59.3	63.1	66.9	65.7	67.2	74.2	57.4	72.8	63.8	c
DTaP-IPV-Hib-HBV (Hexavalent) 3rd dose	2017/18	both sexes DHIS	109 004	40 422	219 577	199 781	124 422	78 153	19 346	57 694	98 593	946 992	c
DTP3 coverage	2011–2016	SADHS	74.3	84.8	53.6	65.3	71.1	62.9	80.6	65.0	70.0	65.0	a
	2015	UNICEF/WHO										69.0	b
	2015/16	DHIS										40.7	e
	2016	UNICEF/WHO										66.0	d
	2017/18	DHIS	67.2	78.7	84.8	78.4	98.0	91.2	97.5	78.2	93.5	83.1	f
Immunisation coverage of children 12–23 months	1998	both sexes 12–23 months SADHS	52.6	67.8	72.4	49.5	74.9	67.2	80.8	60.6	64.2	63.4	g
	2003	both sexes 12–23 months SADHS										54.7	h

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
	2011–2016	both sexes 12–23 months SADHS	57.3	71.3	45.7	60.1	54.9	50.5	64.9	43.7	49.0	52.7	a
		female 12–23 months SADHS										52.3	a
		male 12–23 months SADHS										53.2	a
Immunisation under 1 year coverage	2015/16	both sexes DHIS	74.3	72.0	88.9	74.3	74.7	85.4	94.4	75.6	83.9	79.5	c
	2016/17	both sexes DHIS	64.0	68.5	75.5	74.1	59.7	75.8	90.9	68.3	75.0	71.2	c
	2017/18	both sexes DHIS	68.5	71.3	77.3	81.7	70.7	90.4	84.5	69.4	81.4	77.0	c
Immunised fully under 1 year new	2017/18	both sexes DHIS	111 191	36 616	200 139	208 294	89 801	77 515	16 754	51 192	85 822	877 324	c
Measles 1st dose under 1 year coverage	2011–2016	both sexes SADHS	88.6	90.7	87.7	89.4	67.7	75.0	84.9	85.0	77.6	86.1	a
		female SADHS										84.1	a
		male SADHS										88.0	a
	2015	both sexes UNICEF/WHO										76.0	b
	2015/16	both sexes DHIS	80.1	88.1	94.6	79.3	96.4	92.4	101.9	78.5	102.8	88.6	c
	2016	both sexes UNICEF/WHO										75.0	d
	2016/17	both sexes DHIS	76.9	84.8	83.0	86.4	91.7	90.5	113.7	85.6	90.0	85.9	c
	2017/18	both sexes DHIS	67.3	78.8	81.0	77.8	94.0	89.5	99.0	78.3	92.5	81.5	c
Measles 2nd dose coverage	2015/16	both sexes DHIS	68.6	76.6	77.7	70.3	81.9	76.1	82.7	67.7	81.8	74.8	c
	2016/17	both sexes DHIS	75.3	86.2	85.9	84.6	87.1	82.5	105.0	74.9	86.3	83.6	c
	2017/18	both sexes DHIS	65.6	69.1	74.7	77.4	84.7	89.2	87.8	72.4	78.3	76.4	c
OPV 1st dose coverage	2011–2016	both sexes SADHS	91.0	95.8	68.5	71.6	79.5	79.7	84.0	74.4	91.4	77.6	a
		female SADHS										76.4	a
		male SADHS										78.7	a
	2014/15	DHIS	83.1	101.3	110.4	93.8	97.6	84.4	104.5	88.3	108.2	96.9	c
	2015/16	DHIS	67.8	80.6	93.4	77.7	88.2	84.7	107.5	76.5	91.5	83.3	c
	2016	both sexes UNICEF/WHO										66.0	d
	2016/17	DHIS	65.9	79.4	91.2	79.5	97.0	84.7	102.1	80.9	88.0	83.8	c
PCV 3rd dose coverage	2011–2016	both sexes SADHS	68.7	77.2	57.4	63.8	66.9	58.8	75.7	51.7	60.4	61.9	a
		female SADHS										60.6	a
		male SADHS										63.1	a
	2015	both sexes UNICEF/WHO										69.0	b
	2015/16	both sexes DHIS	77.0	79.5	89.8	77.2	84.7	86.4	97.4	77.0	87.3	82.8	c
	2016	both sexes UNICEF/WHO										69.0	d
	2016/17	both sexes DHIS	67.5	75.0	76.8	73.0	80.6	80.4	97.1	72.8	80.6	75.7	c
	2017/18	both sexes DHIS	70.2	73.4	79.3	79.2	92.2	93.8	93.7	74.3	86.8	80.9	c
RV 2nd dose coverage	2011–2016	both sexes SADHS	83.7	89.3	67.1	68.6	67.7	65.6	77.0	65.4	66.6	70.1	a
		female SADHS										68.8	a
		male SADHS										71.3	a
	2015	both sexes UNICEF/WHO										72.0	b
	2015/16	both sexes DHIS	71.3	83.0	90.2	77.4	87.7	86.3	100.7	77.9	90.3	83.0	c
	2016	both sexes UNICEF/WHO										73.0	d
	2016/17	both sexes DHIS	65.5	80.0	82.3	76.3	92.4	85.7	100.4	78.5	85.4	80.2	c
	2017/18	both sexes DHIS	66.7	75.1	83.1	76.3	100.9	89.5	96.1	75.3	89.8	81.7	c

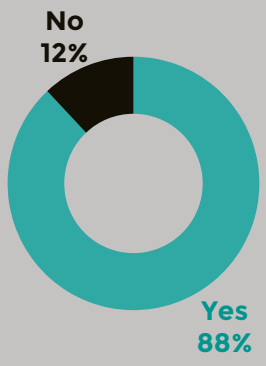
Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a SADHS 2016.[38]
b Immunization 2016.[218]
c DHIS.[46]
d SWChildren 2017.[99]
e DHIS.[46] Based on the DHIS indicator "DTaP-IPV/Hib 3rd dose coverage (annualised)". Data clearly incomplete from October due to change in combined antigen administered, which affects collection of the underlying data elements.
f DHIS.[46] Calculated from 946 992 DTaP-IPV-Hib_HBV (hexavalent) 3rd dose and DHIS denominator for immunisation <1 indicators
g SADHS 1998.[219] Percentage with health cards seen by interviewer and percentage who have received each vaccine by the time of the survey.
h SADHS 2003.[180] Estimates for several provinces are unreliable due to small sample sizes at this level.

NUTRITION

The probability of meeting the internationally agreed targets to halt the rise in obesity and diabetes by 2025 is less than 1%

2017 GLOBAL NUTRITION REPORT



Percentage of countries that face a serious burden of either two or three forms of malnutrition

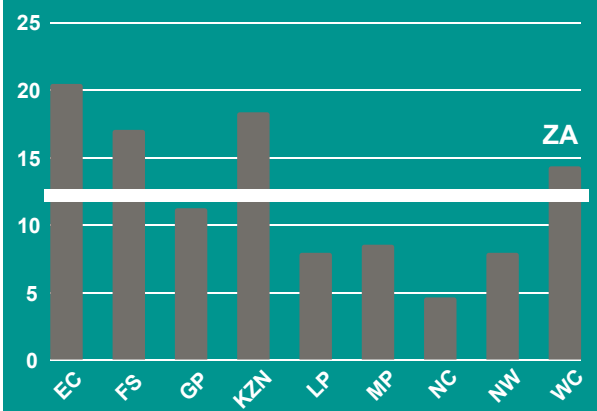
Health Promotion levy (sugar tax) was implemented in 2018

2 Billion

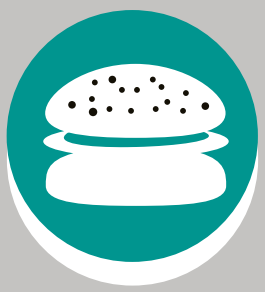
The amount of money in tax revenue that the sugar tax is expected to generate

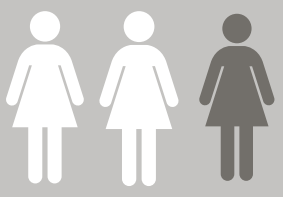
PREVALENCE OF OVERWEIGHT CHILDREN IN SOUTH AFRICA IS MORE THAN TWICE THE GLOBAL AVERAGE OF 6.1%

Percentage of Overweight Children under 5

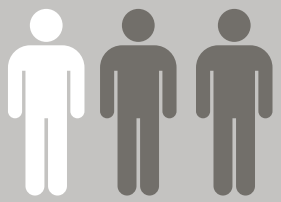


TWO THIRDS OF SOUTH AFRICAN WOMEN ARE EITHER OVERWEIGHT OR OBESE COMPARED TO JUST UNDER ONE THIRD OF MEN





68%



31%

Nutrition

Even though nutrition is considered as one of the key determinants of health, well-being and human development[220,221] the probability of reaching the nutrition-related internationally agreed targets by 2025 is less than 1% due to slow progress.[222] The 2017 Global Nutrition Report shows how most (88%) countries around the world are struggling with multiple burdens of malnutrition that range from childhood stunting, to anaemia in women of reproductive age and/or overweight in adult women. The authors emphasised the need for a multi-sectoral approach in combating malnutrition, stating that "action on nutrition is needed to achieve goals across the SDGs, and in turn, action throughout the SDGs is needed to address the causes of malnutrition".[222] USAID published a report on a Multi-sectoral Nutrition Strategy 2014–2025 that also acknowledged the need for an investment in nutrition to improve global health with a specific focus on the critical 1 000 days' window from pregnancy to a child's second birthday.[221]

The prevalence of obesity and excessive adiposity continues to increase globally, especially in LMICs, with prevalence being highest in South Africa among the sub-Saharan African countries.[223,224] The 2015 Global Burden of Disease (GBD) Obesity Collaborators examined the health effects of overweight and obesity by analysing data from 68.5 million people from 195 countries over a 35 year period from 1980 to 2015 and found that the prevalence of obesity had either doubled or increased continuously around the world. The study further highlighted how the rate of increase in obesity was higher in children than in adults over this period.[225] The 2016 South African Demographic and Health Survey (SADHS) reported an obesity rate (BMI > 30 kg/m^2) of 11% for men and 41% for women, while the prevalence of overweight children was 13%, which is more than twice the global average of 6.1%.[38]

The report on Nutrition in the WHO African Region explored the current nutritional status of countries in the region in relation to the six primary outcomes achievable by 2025 and the other global nutrition monitoring framework indicators. One of the key findings of this report was that under nutrition was still a persistent public health issue in the WHO African Region, particularly among the most poor and vulnerable groups. Of the 47 countries in the WHO African Region, 25 either have high (> 30%) or very high (> 40%) rates of stunting.[221] In South African children the prevalence of stunting was very high (>40%) between the ages of 18 and 27 months and generally increased between the ages of 8 and 23 months before declining around three years of age.[38] This report also concluded that most of the currently available data on nutrition status for most countries was more than five years old and that the use of routine data for monitoring nutrition was extremely inadequate.[221] The 2017 edition of *The State of Food Security and Nutrition in the World* also marked the start of regular monitoring of progress towards achieving the nutrition and food security goals that were set by the 2030 Agenda for Sustainable Development.[226] A Global Nutrient Database was developed in an effort towards monitoring the performance of national food systems. The database provides information on the availability of 156 nutrients across 195 countries and territories from 1980 to 2013. Although the database revealed that high-income countries (HICs) had more energy available per person per day, energy availability and the contributions of protein and fats to energy had increased globally across all countries including LMICs.[227]

South Africa won an important battle against non-communicable diseases (NCDs) with the implementation of an 11% tax on sugar-sweetened beverages (known as the Health Promotion Levy). The introduction of this tax was based on the premise that the high sugar content of drinks in South Africa has been linked to increased risk of type 2 diabetes mellitus, obesity and heart disease.[228]

Globally, vitamin A distribution levels have reached a 6-year low, even though vitamin A deficiency is known to affect almost 50% of children under the age of 5 years living in south Asia and sub-Saharan Africa. Approximately 62 million children in low-income, high under-5 mortality countries are not receiving this supplement yet they require it for their overall nutrition levels. UNICEF has therefore called for a clear strategy to be developed in order to address the delivery of vitamin A.[229]

Infant exclusive breastfeeding has steadily increased across all provinces with the highest rate observed in the North West Province. This province also had the highest increase of 22.5% between 2015/16 and 2017/18.[46]

Table 28: Breastfeeding and nutrient-related nutrition indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Exclusive breastfeeding rate	2011–2016	both sexes 12–17 months SADHS										47.0	a
		both sexes 18–23 months SADHS										19.0	a
		both sexes <6 months SADHS										32.0	a
Infant exclusively breastfed at DTaP-IPV-Hib-HBV 3rd dose rate	2015/16	both sexes DHIS	29.4	38.2	29.3	41.7	30.0	37.3	44.6	34.4	27.2	33.6	b
	2016/17	both sexes DHIS	32.8	46.1	44.0	53.9	28.9	35.3	55.0	45.5	31.8	41.6	b
	2017/18	both sexes DHIS	46.7	53.8	47.4	56.0	39.2	48.5	56.0	56.9	34.4	47.8	b
Vitamin A dose 12–59 months coverage	2015/16	both sexes DHIS	53.8	49.0	50.3	46.6	46.3	49.0	48.0	45.0	45.8	48.5	b
	2016/17	both sexes DHIS	51.7	47.0	52.1	51.9	50.3	53.8	52.0	43.4	48.8	50.8	b
	2017/18	both sexes DHIS	53.1	47.8	50.5	68.5	47.2	58.3	50.3	41.7	48.9	54.3	b

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a SADHS 2016.
b DHIS.[46]

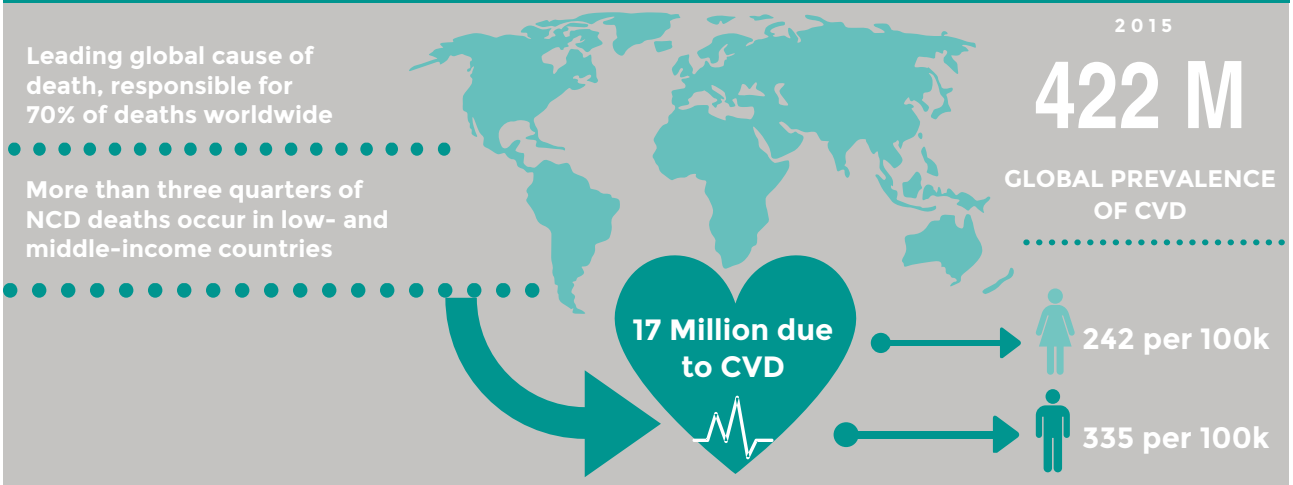
Table 29: Nutrient-related risk factor indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Obesity	2011–2016	female 15+ years SADHS										41.0	a
		male 15+ years SADHS										11.0	a
	2014	female 18+ years NCD-RisC										38.1	b
		male 18+ years NCD-RisC										14.5	b
	2014–2015	both sexes 0–14 years NiDS	12.0	9.4	8.8	11.1	5.4	8.9	6.1	5.1	10.2	9.3	c
		both sexes 15+ years NiDS	25.8	29.2	26.7	27.8	23.3	22.3	24.8	22.0	34.5	26.9	c
		female 0–14 years NiDS	13.1	7.5	11.0	12.6	6.6	9.1	4.6	4.0	9.6	10.1	c
		female 15+ years NiDS	38.9	44.1	40.0	41.7	31.9	34.5	37.2	33.9	45.4	39.5	c
		male 0–14 years NiDS	13.1	7.5	11.0	12.6	6.6	9.1	4.6	4.0	9.6	10.1	c
		male 15+ years NiDS	9.9	12.8	13.2	10.3	11.6	8.9	10.9	10.0	21.8	12.5	c
	2016	both sexes 18+ years NCD-RisC										25.6	d
		female 18+ years NCD-RisC										36.0	d
		male 18+ years NCD-RisC										14.6	d
Overweight	2011–2016	both sexes <5 years SADHS	20.4	17.0	11.2	18.3	7.9	8.5	4.6	7.9	14.3	13.3	a
		female 15+ years SADHS										26.6	a
		male 15+ years SADHS										20.3	a
	2014	female 18+ years NCD-RisC										64.1	b
		male 18+ years NCD-RisC										40.2	b
	2014–2015	both sexes 0–14 years NiDS	18.8	14.7	15.9	22.8	13.7	12.5	12.2	12.8	16.5	17.0	c
		both sexes 15+ years NiDS	21.2	21.8	22.6	23.3	23.0	25.6	22.1	22.9	22.7	22.8	c
		female 0–14 years NiDS	17.8	10.7	15.4	21.8	13.2	12.3	12.7	11.3	14.5	15.9	c
		female 15+ years NiDS	25.0	26.2	24.1	26.3	26.3	27.9	19.7	28.9	23.9	25.4	c
		male 0–14 years NiDS	17.8	10.7	15.4	21.8	13.2	12.3	12.7	11.3	14.5	15.9	c
		male 15+ years NiDS	16.7	17.0	21.2	19.6	18.5	23.0	24.7	16.9	21.4	19.9	c
	2016	both sexes 18+ years NCD-RisC										51.9	d
		female 18+ years NCD-RisC										62.2	d
		male 18+ years NCD-RisC										41.0	d
Stunting	2011–2016	both sexes <5 years SADHS	24.8	33.5	34.2	28.5	21.9	21.5	21.4	27.4	22.9	27.4	a
		female <5 years SADHS										25.0	a
		male <5 years SADHS										29.8	a
	2014–2015	both sexes 0–14 years NiDS	16.4	18.2	10.7	14.3	14.6	10.6	18.6	17.4	8.0	13.3	c
		female 0–14 years NiDS	14.4	14.4	8.5	12.7	12.6	9.9	16.6	15.1	7.4	11.6	c
		male 0–14 years NiDS	18.8	21.9	12.7	15.9	16.8	11.1	20.8	19.6	8.7	15.1	c
Underweight	2011–2016	both sexes <5 years SADHS	3.4	8.0	5.8	3.8	4.9	4.7	8.4	12.6	11.9	5.9	a
	2014	female 18+ years NCD-RisC										3.2	b
		male 18+ years NCD-RisC										6.7	b
	2014–2015	both sexes 0–14 years NiDS	4.7	6.4	4.6	3.8	9.8	5.5	12.1	11.7	2.4	5.5	c
		both sexes 15+ years NiDS	4.1	6.6	2.8	3.8	7.1	4.9	12.5	7.8	5.0	4.7	c
		female 0–14 years NiDS	4.5	4.6	4.8	3.9	8.6	5.4	11.1	9.5	1.9	5.2	c
		female 15+ years NiDS	2.0	3.3	1.8	1.8	4.2	3.5	9.3	4.1	2.6	2.7	c
		male 0–14 years NiDS	4.8	8.0	4.4	3.7	11.1	5.7	13.3	13.6	2.8	5.8	c
		male 15+ years NiDS	6.7	10.3	3.8	6.4	10.9	6.4	16.1	11.6	7.8	7.0	c
Wasting	2011–2016	both sexes under 5 years SADHS	1.5	4.6	1.3	2.5	4.1	0.5	2.1	5.9	1.7	2.5	a
	2014–2015	both sexes 0–14 years NiDS	0.6	3.1	6.2	1.7	3.8	1.7	6.5	4.8	4.6	3.4	c
		female 0–14 years NiDS	0.8	1.1	4.2	2.3	3.5	1.0	6.3	4.0	6.0	3.0	c
		male 0–14 years NiDS	0.4	5.0	7.8	1.1	4.2	2.4	6.7	5.5	2.7	3.9	c

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

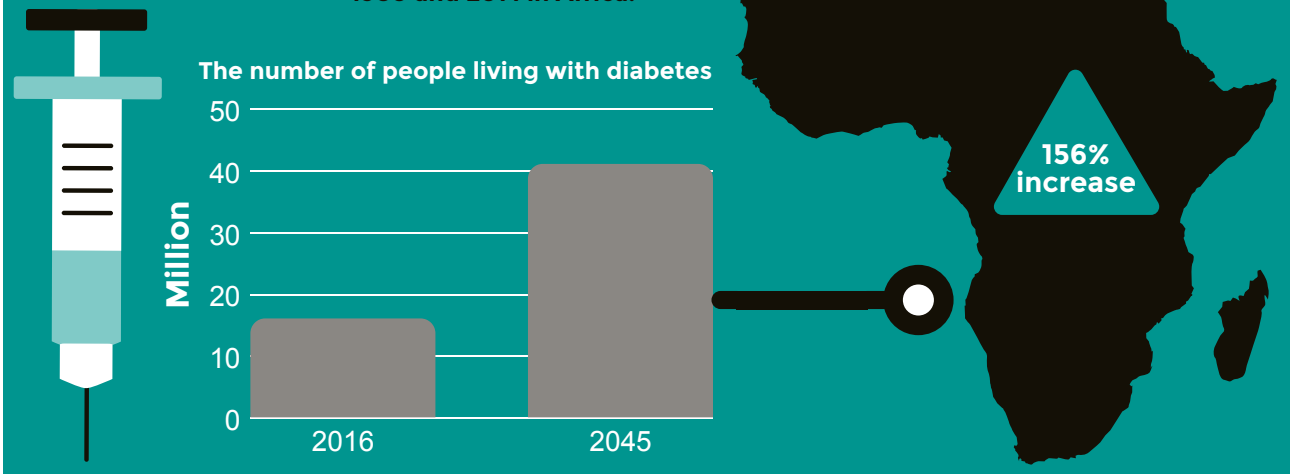
a SADHS 2016.[38]
b NCD-RisC.[230]
c NiDS Wave 4 v1.1.[182]
d Global Diabetes 2016.[231]

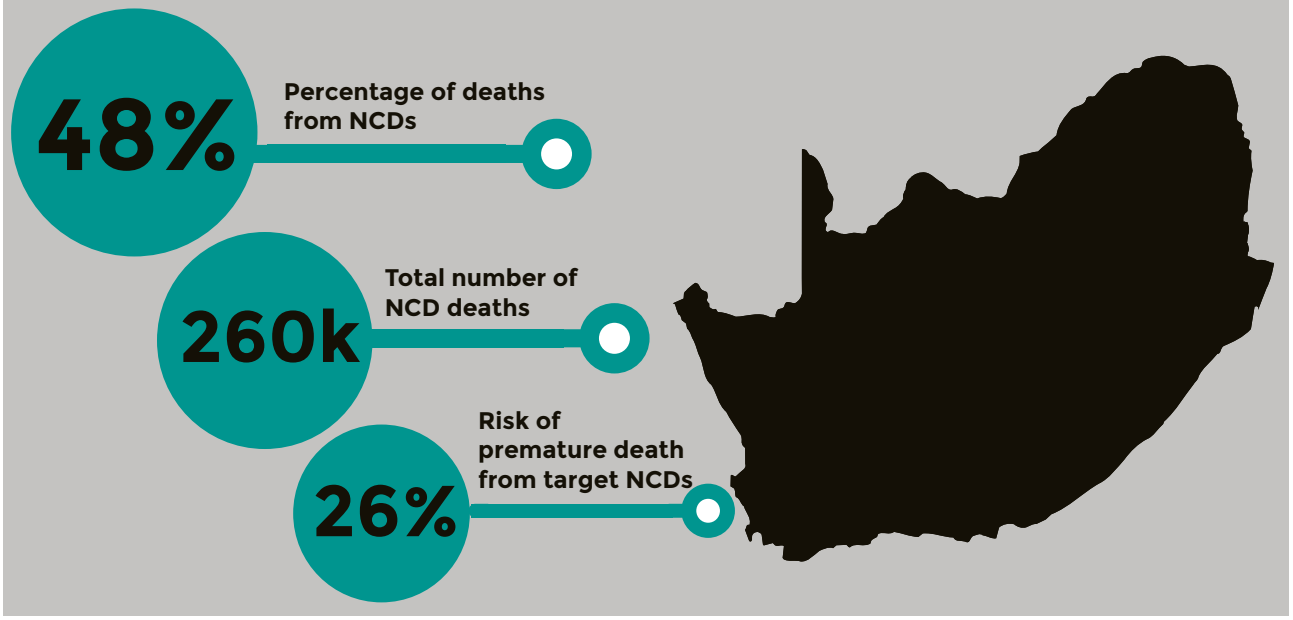
NON-COMMUNICABLE DISEASES



DIABETES PREVALENCE

Has increased from 3.4% to 8.5% in men, and from 4.1% to 8.9% in women between 1980 and 2014 in Africa.





Non-communicable diseases

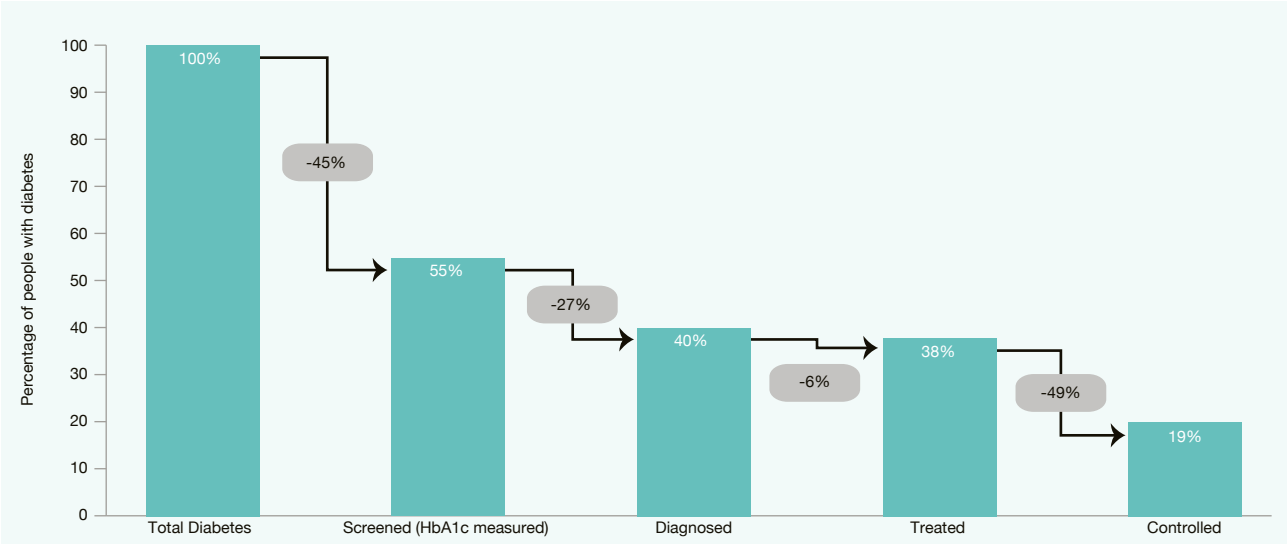
Non-communicable diseases (NCDs) cover a wide range of conditions, even though the global attention is focused predominantly on cardiovascular diseases, respiratory diseases, diabetes, mental health conditions and cancer. The UHC service coverage indicator focuses on proxy measures for hypertension and diabetes, on cervical cancer screening, and finally on the extent to which tobacco control measures are implemented (see Table 1). Unlike many of the other elements in the service coverage index, there are few donor-funded programmes that address country-level interventions for NCDs. Whether framing NCDs as globally inter-connected health threats would trigger donor interest remains to be seen.[232] In mid-2018, the report of the WHO Independent High-level Commission on Noncommunicable Diseases was published, which warned that, without major new investments, attainment of SDG 3.4 (a one-third reduction of premature NCD mortality by 2030 through prevention and treatment of NCDs and the promotion of mental health and well-being) would not be achieved.[233]

There is, nonetheless, interest in monitoring progress, in the form of the WHO NCD Progress Monitor.[234] The data were obtained, in part, from the 2017 NCD Country Capacity Survey (NCD CCS). For each country, the percentage of deaths from NCDs and total number of NCD deaths were reported, together with the risk of premature death from target NCDs (the probability of dying between ages 30 and 70 years from the four main NCDs, cardiovascular diseases, diabetes, cancer or chronic respiratory disease). The reported figures for South Africa were 48% of deaths, 260 000 deaths, and a 26% probability of premature death. The Global Burden of Disease (GBD) Study 2015 has reported on the global, regional, and national burden of cardiovascular diseases (CVD) over the period 1990 to 2015, for 10 selected causes (ischaemic heart disease, ischaemic stroke, haemorrhagic and other stroke, atrial fibrillation, peripheral arterial disease, aortic aneurysm, cardiomyopathy and myocarditis, hypertensive heart disease, endocarditis, rheumatic heart disease, and a catch-all category of 'other CVD conditions').[235] Globally, 17 921 047 deaths were attributed to CVD in 2015, with an age-standardised death rate of 286 per 100 000 (242 for females, 335 for males). A global prevalence estimate of 422 738 396 people living with CVD was issued, of whom 3 451 145 were in Southern sub-Saharan Africa. Locally, data from the South African National Health and Nutrition Examination Survey (SANHANES; 2011–2012) showed a disturbing cascade of care: "among those with hypertension, 48.7% were unscreened and undiagnosed, 23.1% were screened but undiagnosed, 5.8% were diagnosed but untreated, 13.5% were treated but uncontrolled and 8.9% were controlled".[236] Within the medical scheme environment, the prevalence of chronic claims for a range of NCDs have been reported by the Council for Medical Schemes.[237] Using a relaxed definition (at least one claim for the condition in a year), the prevalence of hypertension in 2016 was 156.92 per 1 000 beneficiaries.

The Lancet Diabetes & Endocrinology Commission on Diabetes in sub-Saharan Africa has noted that "the true burden of diabetes, other cardiovascular risk factors, and macrovascular and microvascular complications in sub-Saharan Africa is unknown".[238] A diabetes cascade of care was constructed based on data from 12 countries (including South Africa), and showed that only 11% of those with diabetes were likely to receive medication for the condition. Data from SANHANES 2011–2012 showed a similarly distressing picture: "Among individuals with diabetes, a total of 45.4% were unscreened, 14.7% were screened but undiagnosed, 2.3% were diagnosed but untreated, 18.1% were treated but uncontrolled, and 19.4% were treated and controlled" (Figure 6).[239]

Diabetes poses a considerable economic burden in Africa, as it does globally. In 2015, the global cost was estimated at US$1.31 trillion or 1.8% of global gross domestic product (GDP).[240] Each year, the International Diabetes Federation issues the IDF Diabetes Atlas. The 2017 edition estimated a global burden of 425 million people living with diabetes, and predicted a 48% increase to 629 million by 2045.[241] In Africa, a 156% increase, from 16 to 41 million

Figure 6: Cascade of care for diabetes based on SANHANES survey, South Africa, 2012



Source: Stokes et al. 2017.[239]

was predicted. The 2017 prevalence estimate for South Africa was 1 826 100 (95% CI: 1 071 300 – 3 638 500). In Africa, obesity and diabetes prevalence are increasing in lock-step.[242]

The high political profile accorded to mental health issues is not, yet, matched by the availability of data. A review in the Western Cape confirmed that there are currently limited reliable data on the burden of mental illness in that province.[243] The main source of local data remained the 2004 South African Stress and Health Survey (SASH).[244] Globally the Mental Health Atlas 2017 showed low levels of public health expenditure on mental health in LMICs.[245] The median number of mental health workers per 100 000 population varied widely from less than 1 in low-income countries to 72 in high-income countries. Few of these mental health cadres are specifically identifiable in South African HRH data sources.

Data from the Global Burden of Disease (GBD) Study 2016 have been used to determine estimates of global, regional, and national cancer incidence, mortality, and morbidity for 29 cancer groups, for the period 1990 to 2016.[246] It was estimated that, globally, there were 17.2 million cancer cases and 8.9 million deaths in 2016. The most common incident cancers by sex were prostate cancer in men and breast cancer in women. In South Africa, the most common cancer for both sexes was non-melanoma skin cancer. Most cancer deaths were caused by tracheal, bronchus, and lung cancer.

Table 35 shows cancer incidence based on histological confirmations recorded in the South African Cancer Registry. Given the focus on hepatitis, there has also been interest in the burden of liver cancers. Data from the GBD 2015 showed that, globally, there were 854 000 incident cases of liver cancer and 810 000 deaths in 2015.[247] Of the deaths, hepatitis B accounted for 33%, alcohol for 30%, and hepatitis C for 21%.

Table 30: Other chronic disease indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Asthma prevalence (per 1 000)	2015	both sexes private sector beneficiaries – relaxed										49.1	a
		both sexes private sector beneficiaries – verified										17.1	a
		female private sector beneficiaries – relaxed										50.8	a
		male private sector beneficiaries – relaxed										47.2	a
	2016	both sexes private sector beneficiaries – relaxed										49.0	a
		both sexes private sector beneficiaries – verified										16.0	a
		female private sector beneficiaries – relaxed										50.7	a
		male private sector beneficiaries – relaxed										49.1	a
Hyperlipidaemia prevalence (per 1 000)	2014	both sexes all ages med schemes all beneficiaries										66.5	b
	2015	both sexes all ages med schemes all beneficiaries										92.1	c
		both sexes private sector beneficiaries – verified										35.4	a
		both sexes private sector beneficiaries – relaxed										72.0	a
		female private sector beneficiaries – relaxed										63.8	a
		male private sector beneficiaries – relaxed										81.1	a
	2016	both sexes all ages med schemes all beneficiaries										96.4	c
		both sexes private sector beneficiaries – relaxed										75.9	a
		both sexes private sector beneficiaries – verified										41.2	a
		female private sector beneficiaries – relaxed										68.0	a
		female private sector beneficiaries – verified										35.5	a
		male private sector beneficiaries – relaxed										84.7	a
		male private sector beneficiaries – verified										47.6	a
Mortality between 30–70 years from cardiovascular, cancer, diabetes or chronic respiratory disease	2012	both sexes 30–70 years WHO										26.8	d
	2015	both sexes 30–70 years WHO										26.0	e
	2016	both sexes WHO										26.2	f
Prevalence of abnormal lipid profiles	2012	female SANHANES serum chol >5 mmol/L	30.8	29.0	27.1	22.9	15.9	22.9	32.4	38.2	39.3	28.1	g
		male SANHANES serum chol >5 mmol/L	20.8	20.3	14.7	18.7	10.9	14.6	15.4	17.5	34.8	18.9	g

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a Med Scheme Chronic 2016.[237]
b Medical Schemes 2015–16.[48] Diagnosed and treated.
c Medical Schemes 2016–17.[49] Diagnosed and treated.
d Global NCD 2014.[248]
e NCD Progress 2017.[234]
f World Health Statistics 2018.[76]
g SANHANES-1.[104]

Table 31: Diabetes indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Diabetes client 40 years and older new	2017/18	both sexes 40+ years DHIS	26 664	10 182	77 845	26 764	29 223	28 434	2 621	8 753	12 134	222 620	a
Diabetes incidence	2014/15	DHIS	1.6	1.1	0.9	1.6	2.6	1.4	3.9	1.0	1.1	1.4	a
	2015/16	DHIS	1.8	1.1	1.5	2.2	2.5	1.7	1.4	1.6	1.0	1.7	a
	2016/17	DHIS	2.4	2.4	3.3	2.7	2.0	3.1	0.0	1.4	1.2	2.4	a
Diabetes prevalence	2012	15+ years SANHANES	8.5	10.1	7.9	10.0	4.6	5.6	21.7	12.5	11.2	9.5	b
		both sexes 15–34 years SANHANES										5.0	c
		both sexes 15+ years SANHANES age-standardised										10.1	c
		both sexes 15+ years SANHANES crude										10.7	c
		both sexes 35–54 years SANHANES										10.8	c
		both sexes 55–74 years SANHANES										24.1	c
		both sexes 75+ years SANHANES										32.9	c
	2014	20–79 years Diabetes Atlas										8.4	d
		20–79 years Diabetes Atlas age-standardised										9.4	d
		both sexes 18+ years NCD-RisC										9.8	e
		female 18+ years NCD-RisC age-standardised										12.6	f
		female 18+ years NCD-RisC crude										11.8	f
		male 18+ years NCD-RisC age-standardised										9.7	f
		male 18+ years NCD-RisC crude										7.7	f
	2015	both sexes 20–79 years Diabetes Atlas										7.0	g
		both sexes 20–79 years Diabetes Atlas age-standardised										7.6	g
	2017	both sexes 20–79 years Diabetes Atlas										5.4	h
		both sexes 20–79 years Diabetes Atlas age-adjusted										5.5	h
Diabetes prevalence (per 1 000)	2014	both sexes all ages med schemes all beneficiaries										45.3	i
	2015	both sexes all ages med schemes all beneficiaries										51.2	j
		both sexes private sector beneficiaries – relaxed										49.1	j
		both sexes private sector beneficiaries – verified										30.5	k
		female private sector beneficiaries – relaxed										45.5	k
		male private sector beneficiaries – relaxed										53.1	k
	2016	both sexes all ages med schemes all beneficiaries										52.8	j
		both sexes private sector beneficiaries – relaxed										50.1	k
		both sexes private sector beneficiaries – verified										31.5	k
		female private sector beneficiaries – relaxed										46.5	k
		male private sector beneficiaries – relaxed										54.2	k
		male private sector beneficiaries – verified										35.2	k
Percentage of diabetics treated and controlled	2012	both sexes 15+ years SANHANES age-standardised										37.5	c
Percentage of people with diabetes receiving treatment	2012	both sexes 15+ years SANHANES age-standardised										19.4	c

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a DHIS.[46]

b SANHANES-1.[104]

c Stokes et al. 2017.[239]

d Diabetes Atlas 2014.[249] Modelled estimates based on best published studies. Estimated number of cases of diabetes = 2 713 380 of which 1 248 160 estimated to be undiagnosed.

e Global Diabetes 2016.[231] Estimated by the NCD Risk Factor Collaboration (NCD-RisC) – a worldwide network/consortium of public health and medical researchers and practitioners who together work with the World Health Organization to document NCD risk factors and their health effects around the world.

f NCD-RisC.[230]
g Diabetes Atlas 2015.[250] Estimated number of cases of diabetes = 2 286 000 of which 1 396 800 estimated to be undiagnosed.
h Diabetes Atlas 2017.[241]
i Medical Schemes 2015–16.[48] Diagnosed and treated – Diabetes mellitus type 2.
j Medical Schemes 2016–17.[49] Diagnosed and treated – Diabetes mellitus type 2.
k Med Scheme Chronic 2016.[237]

Table 32: Hypertension indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Hypertension incidence	2014/15	DHIS	15.7	12.8	13.1	19.1	14.3	12.9	17.7	13.9	7.4	13.9	a
	2015/16	DHIS	21.2	17.5	20.0	20.0	19.1	18.2	16.3	16.7	7.0	17.7	a
	2016/17	DHIS	23.7	27.1	21.0	23.6	17.6	27.5	0.2	17.0	7.8	19.6	a
Hypertension prevalence	2011–2016	female 15+ years SADHS	49.8	54.4	42.3	48.1	34.1	45.8	52.9	40.0	51.6	45.5	b
		male 15+ years SADHS	47.3	48.2	39.5	47.5	28.8	46.1	52.3	37.0	58.7	43.7	b
	2012	both sexes 15+ years NiDS	36.3	33.0	31.3	31.1	22.8	23.9	38.6	35.6	38.6	31.8	c
		female 15+ years NiDS										33.5	c
		male 15+ years NiDS										29.8	c
	2014–2015	both sexes 15+ years NiDS	30.3	28.4	27.7	26.2	21.4	22.6	40.1	30.8	35.6	28.2	d
		female 15+ years NiDS	31.3	31.9	29.4	27.7	19.8	23.3	38.1	33.2	37.9	29.4	d
		male 15+ years NiDS	29.3	24.4	26.1	24.3	23.4	21.9	42.3	28.3	32.9	26.8	d
Hypertension prevalence (per 1 000)	2014	both sexes all ages med schemes all beneficiaries										148.3	e
	2015	both sexes all ages med schemes all beneficiaries										165.0	f
		both sexes private sector beneficiaries – relaxed										155.7	g
		both sexes private sector beneficiaries – verified										96.0	g
		female private sector beneficiaries – relaxed										161.8	g
		male private sector beneficiaries – relaxed										155.7	g
	2016	both sexes all ages med schemes all beneficiaries										168.9	f
		both sexes private sector beneficiaries – relaxed										156.9	g
		both sexes private sector beneficiaries – verified										91.3	g
		female private sector beneficiaries – relaxed										163.0	g
		male private sector beneficiaries – relaxed										156.9	g
Hypertension prevalence rate 15+ years (crude)	2010	both sexes 15+ years NiDS	32.7	36.3	29.8	28.9	22.4	19.9	40.3	27.5	42.3	30.0	h
	2012	both sexes 15+ years NiDS	36.1	32.6	31.1	31.6	23.6	25.3	37.4	35.7	39.9	32.1	i
	2014–2015	both sexes 15+ years NiDS	30.3	28.4	27.7	26.2	21.4	22.6	40.1	30.8	35.6	28.2	d
Hypertension prevalence rate (age-standardised)	2014–2015	both sexes 15+ years NiDS	29.2	28.7	27.8	26.7	20.9	24.0	36.6	27.7	31.4	27.7	d
Hypertension treatment coverage	2010	both sexes 15+ years NiDS	38.2	37.0	34.5	31.7	18.6	25.9	44.6	40.1	43.0	34.7	h
	2012	both sexes 15+ years NiDS	36.7	44.8	37.8	38.3	28.0	37.8	45.8	39.5	41.0	38.3	i
	2014–2015	both sexes 15+ years NiDS	46.6	49.6	48.2	46.7	37.7	39.5	45.8	55.2	53.6	47.6	d
Hypertensives controlled on treatment	2010	both sexes 15+ years NiDS	39.0	34.5	36.6	32.9	35.8	49.4	28.9	44.9	43.9	37.9	h
	2012	both sexes 15+ years NiDS	43.5	44.3	49.3	46.6	43.4	56.1	34.2	30.9	35.8	44.4	i
	2014–2015	both sexes 15+ years NiDS	46.3	57.7	60.0	49.6	63.2	56.8	51.0	42.0	43.2	51.8	d
Prevalence of nonraised blood pressure regardless of treatment status	2014–2015	both sexes 15+ years NiDS	76.2	79.8	80.4	79.9	83.7	82.5	69.6	76.4	72.8	78.9	j
	2016	both sexes 15+ years SADHS	57.6	58.1	67.2	59.0	75.4	57.9	54.4	71.2	54.5	62.8	k
		female 15+ years SADHS	57.5	57.7	68.7	59.9	74.6	58.7	54.5	71.6	59.8	63.7	b
		male 15+ years SADHS	57.6	58.4	65.6	58.0	76.2	57.1	54.2	70.7	49.2	61.8	b

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Prevalence of raised blood pressure	2011–2016	female 15+ years SADHS mild										21.8	m
		female 15+ years SADHS moderate										8.4	n
		female 15+ years SADHS severe										6.1	o
		male 15+ years SADHS mild										24.1	m
		male 15+ years SADHS moderate										9.0	n
		male 15+ years SADHS severe										5.1	o
	2012	both sexes 15+ years NiDS										26.3	p
		female 15+ years NiDS										26.1	p
		male 15+ years NiDS										26.5	p
		SANHANES raised SYS and DIA	10.4	17.3	11.4	8.4	6.6	9.1	10.8	13.0	9.4	10.2	q
		SANHANES raised SYS or DIA or both	27.1	30.5	27.3	26.4	20.7	20.9	23.5	29.9	30.7	26.6	r
	2015	female 18+ years NCD-RisC age-standardised										26.1	s
		female 18+ years NCD-RisC crude										24.4	s
		male 18+ years NCD-RisC age-standardised										27.4	s
		male 18+ years NCD-RisC crude										23.5	s
	2016	female 15+ years SADHS any										36.3	b
		male 15+ years SADHS any										38.2	b
Prevalence of raised blood pressure 15+ years	2010	both sexes 15+ years NiDS	27.5	30.9	25.8	25.8	20.7	17.2	34.2	21.9	33.8	25.7	h
	2012	both sexes 15+ years NiDS	30.2	25.9	25.3	25.9	20.6	19.9	31.5	31.1	33.5	26.5	i
	2014–2015	both sexes 15+ years NiDS	23.8	20.2	19.6	20.1	16.3	17.5	30.4	23.6	27.2	21.1	d

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a DHIS.[46]
b SADHS 2016.[38]
c NCD Trends 2015.[251] National Income Dynamics Study (NiDS). The measured prevalence of hypertension was defined as those with BP equal or above 140/90 mmHg and/or taking anti-hypertensive medication.
d NiDS Wave 4 v1.1.[182]
e Medical Schemes 2015–16.[48] Diagnosed and treated.
f Medical Schemes 2016–17.[49] Diagnosed and treated.
g Med Scheme Chronic 2016.[237]
h NiDS Wave 2 v2.2.[252]
i NiDS Wave 3 v1.2.[253]
j NiDS Wave 4 v1.1.[182] Calculated as 100 minus percentage with raised BP.
k SADHS 2016.[38] Calculated as a simple average of the male and female prevalence.
l SADHS 2016.[38]
m SADHS 2016.[38] Mildly elevated (Grade 1) 140–159/90–99 mmHg
n SADHS 2016.[38] Moderately elevated (Grade 2) 160–179/100–109 mmHg
o SADHS 2016.[38] Severely elevated (Grade 3) 180+/110+ mmHg
p NCD Trends 2015.[251]
q SANHANES-1.[104] Restrictive definition of both parameters raised. Of participants 15 years and older (Age 15+).
r SANHANES-1.[104] Calculated from (raised SYS) + (raised DIA) – (both SYS and DIA raised). Age 15+.
s NCD-RisC.[230]

Table 33: Mental health indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Prevalence of mental disorders	2004	12-month prevalence										16.5	a
		lifetime prevalence	25.7	37.5	29.8	28.0	30.8	29.2	28.7	34.0	39.4	30.8	b
	2015	both sexes anxiety disorders										3.4	c
		both sexes depressive disorders										4.6	d
Suicide mortality rate (per 100 000 population)	2014	both sexes vital registration										2.6	e
	2015	both sexes vital registration										1.3	e
	2016	both sexes WHO										11.6	f

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a SASH 2002–4.[254] 12-month prevalence.
b SAMJ 99(339–44).[244] Lifetime prevalence estimates (%) of any disorder.
c Mental disorders 2017.[255] Estimate 1 768 851 cases.
d Mental disorders 2017.[255] Estimated 2 402 230 cases.
e SDG Baseline 2017.[6]
f World Health Statistics 2018.[76]

Table 34: Hypertension indicators by population group

Indicator	Period	Sex|Age|Series|Cat	African/Black	Coloured	Indian/Asian	White	Ref
Hypertension prevalence	2011–2016	female 15+ years SADHS	43.8	57.4	46.4	60.4	a
		male 15+ years SADHS	40.9	57.8	52.6	65.9	a
	2012	female 15+ years NiDS	31.7	40.3	41.2	40.0	b
		male 15+ years NiDS	28.0	37.3	42.6	36.2	b
Prevalence of abnormal lipid profiles	2012	female SANHANES serum chol >5 mmol/L	24.9	40.6	45.3		c
		male SANHANES serum chol >5 mmol/L	15.3	27.2	41.2		c
Prevalence of raised blood pressure	2012	female 15+ years NiDS	24.8	33.6	38.5	27.3	b
		male 15+ years NiDS	25.6	32.6	31.8	26.5	b
		SANHANES raised SYS and DIA	9.9	11.8	7.3	12.2	c
		SANHANES raised SYS or DIA or both	25.6	33.2	25.9	29.3	c

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a SADHS 2016.[38]
b NCD Trends 2015.[251]
c SANHANES-1.[104]

Table 35: Age-standardised incidence for leading types of cancer (per 100 000 population) for South Africa, 2013 and 2014

2013			
Female		Male	
Breast	32.6	Prostate	44.3
Cervix	22.06	Colorectal	11.47
Primary Unknown	7.06	Lung	10.43
Colorectal	6.23	Primary Unknown	9.64
Uterus	4.81	Bladder	6.22

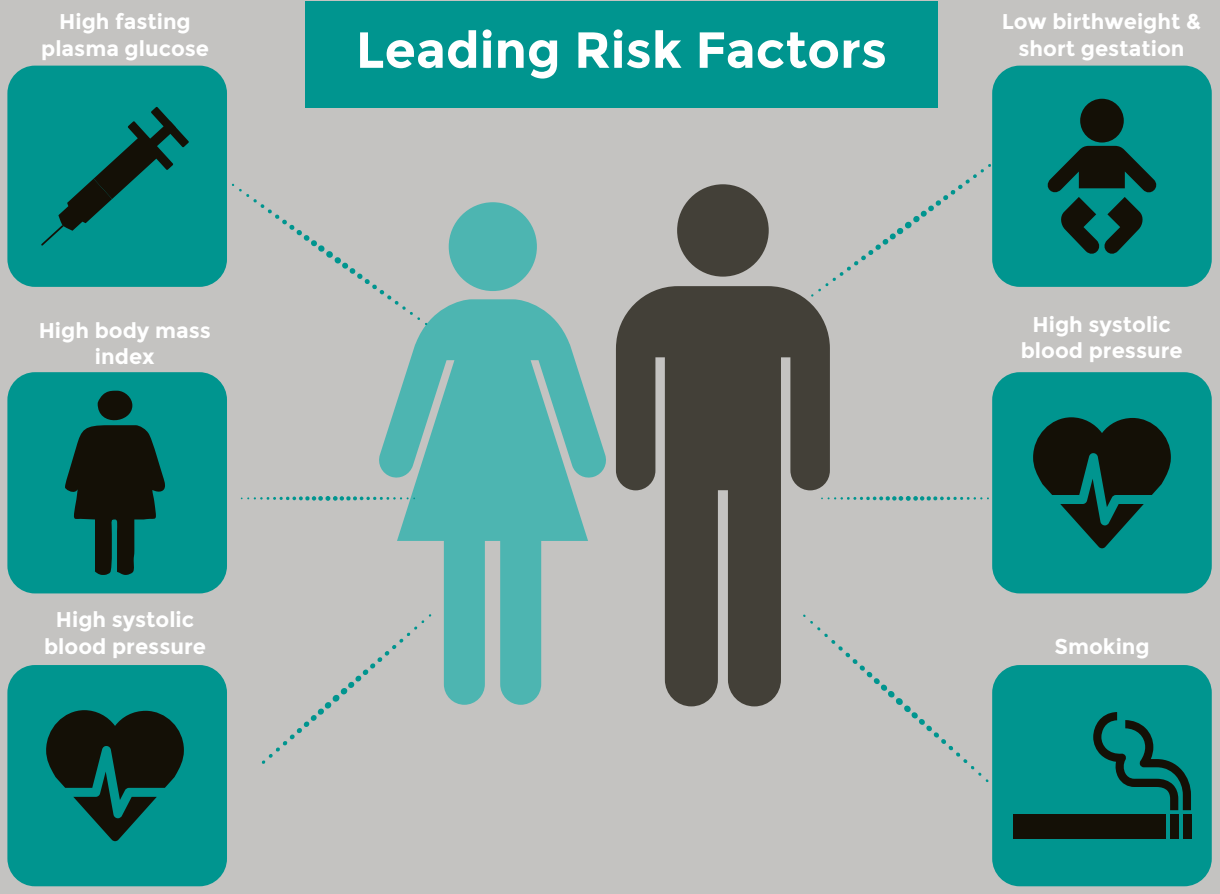
2014			
Female		Male	
Breast	33.35	Prostate	43.73
Cervix	22.56	Colorectal	11.28
Primary Unknown	6.91	Lung	10.12
Colorectal	6.6	Primary Unknown	9.54
Uterus	5.33	Bladder	5.92

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

Cancer incidence 2013. Age-standardised incidence (World Standard Population). Excluding skin cancer.
Cancer incidence 2014. Age-standardised incidence (World Standard Population). Excluding skin cancer.

RISK BEHAVIOUR

Leading Risk Factors



Problematic Alcohol Use

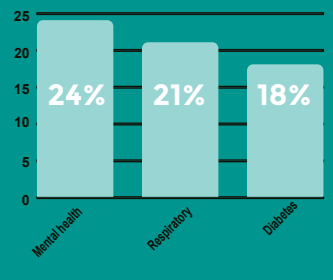
43%

Of all drinkers reported binge drinking in South Africa, representing 14.1% of the total population

Daily Smoking Prevalence

♀ 7.5% ♂ 21.9% ⚥ 17.0%

Comorbidity in Drug Abuse Patients



A high proportion of patients with mental health disorders was found in the Western Cape.

SACENDU, 2017

Risk behaviour and determinants of health

The Global Burden of Disease (GBD) Study 2016 has provided estimates of the comparative risk posed by 84 behavioural, environmental and occupational, and metabolic risks or clusters of risks.[256] Globally, in 2016, the three leading risk factors for men were smoking, high systolic blood pressure, and low birthweight and short gestation. For women, they were high systolic blood pressure, high body-mass index, and high fasting plasma glucose. The GBD has also reported on the health burdens associated with alcohol use, which was the 7th leading risk factor for both deaths and DALYs in 2016.[257] The National Income Dynamics Study 2014–2015 has provided insights into the prevalence of problematic alcohol use in South Africa.[258] Of all drinkers, 43% reported binge drinking in this nationally-representative sample. This represented 14.1% of the total population. Data from the same source have also been used to show that smoking and alcohol use contribute to income-related inequality in health in South Africa.[259]

Much attention has also focused on the burden associated with tobacco use. Data from the GBD 2015 were used to estimate smoking prevalence and the attributable disease burden between 1990 and 2015.[260] A stark difference in age-standardised prevalence of daily smoking was estimated globally for men (25.0%) and women (5.4%) in 2015. Prevalence has declined by 28.4% for men and 34.4% for women since 1990. The corresponding prevalence estimates for South Africa in 2015 were 21.9% (men) and 7.5% (women). In 2015, of the 6.4 million global deaths attributed to smoking, more than half (52.2%) occurred in just four countries, China, India, the United States of America and Russia. The WHO Report on the Global Tobacco Epidemic tracks the extent to which countries are implementing tobacco control measures. The 2017 edition showed an adult smoking prevalence of 17% for South Africa.[261]

Despite the high media profile of drug use in South Africa, particularly of low-grade heroin, there remain limited data on the prevalence of drug use, apart from the in-patient reports from the rehabilitation centres that report via the South African Community Epidemiology Network on Drug Use (SACENDU). The most recent report from SACENDU is for the period July-December 2017.[262]

Table 36: Alcohol and drug abuse indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Alcohol dependence	2011–2016	female 15+ years SADHS										2.7	a
		male 15+ years SADHS										15.9	a
Currently drink alcohol	2011–2016	female SADHS										9.9	b
		male SADHS										36.8	b
	2014–2015	both sexes 15+ years NiDS	28.4	40.9	37.2	23.4	23.5	32.9	44.3	37.7	44.2	33.1	c
		both sexes 15+ years NiDS employed										41.9	c
		both sexes 15+ years NiDS non-smoker										23.7	c
		both sexes 15+ years NiDS not econ. active										22.0	c
		both sexes 15+ years NiDS rural										24.0	c
		both sexes 15+ years NiDS smoker										69.7	c
		both sexes 15+ years NiDS unemployed										35.9	c
		both sexes 15+ years NiDS urban										38.1	c
		female 15+ years NiDS										20.2	c
		male 15+ years NiDS										47.7	c
Ever drank alcohol	2011–2016	female 15+ years SADHS										26.0	d
		male 15+ years SADHS										61.3	d
	2014–2015	both sexes 15+ years NiDS	36.7	57.2	51.0	30.5	38.4	42.1	61.1	48.5	68.3	45.9	e
		female 15+ years NiDS	20.3	48.0	38.2	15.0	21.4	25.2	50.6	31.3	58.6	31.5	e
		male 15+ years NiDS	56.6	67.4	63.8	50.0	60.9	60.5	72.4	65.9	79.8	62.3	e
Number of admissions for alcohol and other drug abuse	Jul-Dec 2016	both sexes all ages SACENDU	537		2 948	1 177					2 808	8 787	f
	Jul-Dec 2017	both sexes all ages SACENDU	515		3 414	1 400					2 541		g
Primary drug of abuse as % of all drugs of abuse	Jul-Dec 2016	both sexes all ages alcohol	38.5		21.8	36.8					20.6		f
		both sexes all ages cannabis	23.8		35.7	34.3					28.7		f
		both sexes all ages cocaine	2.6		2.4	4.3					1.3		f
		both sexes all ages heroin	2.0		13.0	10.3					12.8		f
		both sexes all ages mandrax	8.0		1.9	1.3					6.1		f
		both sexes all ages methamphetamine	15.5		6.3	0.7					28.9		f
	Jan-Jun 2017	both sexes <20 years alcohol	5.0		3.0	24.0					11.0		h
		both sexes <20 years cannabis	62.0		82.0	58.0					79.0		h
		both sexes <20 years cocaine	1.0		0.0	3.0					1.0		h
		both sexes <20 years heroin			3.0	6.0					1.0		h
		both sexes <20 years mandrax	5.0		2.0	2.0					2.0		h
		both sexes <20 years methamphetamine	25.0		3.0	0.0					5.0		h

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
		both sexes all ages alcohol	45.0		17.0	34.0					26.0		h
		both sexes all ages cannabis	18.0		46.0	32.0					29.0		h
		both sexes all ages cocaine	5.0		2.0	6.0					1.0		h
		both sexes all ages heroin	3.0		13.0	10.0					10.0		h
		both sexes all ages mandrax	7.0		2.0	3.0					5.0		h
		both sexes all ages methamphetamine	16.0		5.0	1.0					27.0		h
	Jul-Dec 2017	both sexes <20 years alcohol	23.0		2.0	17.0					8.0		g
		both sexes <20 years cannabis	33.0		81.0	65.0					75.0		g
		both sexes <20 years cocaine	4.0		0.0	1.0					0.0		g
		both sexes <20 years heroin	3.0		4.0	5.0					2.0		g
		both sexes <20 years mandrax	13.0		1.0	2.0					5.0		g
		both sexes <20 years methamphetamine	21.0		4.0	0.0					9.0		g
		both sexes all ages alcohol	34.0		17.0	37.0					24.0		g
		both sexes all ages cannabis	24.0		41.0	29.0					22.0		g
		both sexes all ages cocaine	4.0		3.0	6.0					2.0		g
		both sexes all ages heroin	2.0		14.0	10.0					14.0		g
		both sexes all ages mandrax	10.0		2.0	3.0					7.0		g
		both sexes all ages methamphetamine	20.0		6.0	1.0					30.0		g
Risky drinking – weekends	2011–2016	female 15+ years SADHS										4.8	i
		male 15+ years SADHS										27.5	i
Total alcohol per capita (age 15+ years) consumption (litres per year)	2015	both sexes 15+ years WHO										11.5	j
	2016	both sexes 15+ years WHO										9.3	k

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a SADHS 2016.[38] As assessed by the CAGE Test.
b SADHS 2016.[38] Drank alcohol in the past 7 days
c Vellios et al. 2018.[258]
d SADHS 2016.[38]
e NiDS Wave 4 v1.1.[182]
f SACENDU Phase 41.[263]
g SACENDU Phase 43.[262]
h SACENDU Phase 42.[264]
i SADHS 2016.[38] Defined as 'Drank five or more drinks on at least one occasion in past 30 days.
j SDG Baseline 2017.[6]
k World Health Statistics 2018.[76]

Table 37: Smoking indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Adults aged at least 15 years who had not smoked tobacco in the previous 30 days	2014–2015	both sexes 15+ years NiDS										79.7	a
		female 15+ years NiDS										92.1	a
		male 15+ years NiDS										65.5	a
	2016	both sexes 15+ years SADHS non-smoker	75.8	75.6	78.0	81.3	85.8	76.9	66.9	81.7	65.2	77.5	b
		female 15+ years SADHS non-smoker	92.5	92.0	93.5	97.7	98.0	94.0	78.6	95.4	73.6	92.2	c
		male 15+ years SADHS non-smoker	59.0	59.1	62.4	64.8	73.6	59.8	55.1	68.0	56.8	62.7	c
Ever smoked cigarettes	2011–2016	female 15+ years SADHS										6.6	c
		male 15+ years SADHS										36.4	c
	2014–2015	both sexes 15+ years NiDS	22.2	31.4	26.0	16.9	15.6	19.8	38.8	24.7	49.3	25.6	a
		female 15+ years NiDS	7.2	12.6	10.9	4.0	3.0	4.7	29.0	3.8	38.4	11.3	a
		male 15+ years NiDS	40.6	52.6	41.0	33.3	32.1	36.3	49.3	45.7	62.2	41.9	a
	2008–2012	female NiDS										10.2	d
		male NiDS										39.1	d
	2012	both sexes 15+ years NiDS										22.5	e
		both sexes 15+ years SANHANES	22.5	32.2	16.0	20.8	14.4	17.6	33.2	14.9	38.5	20.8	f
		female 15+ years NiDS										9.8	e
		female 15+ years SANHANES	9.3	14.6	7.3	7.0	2.9	3.9	26.4	6.5	31.7	10.1	f
		male 15+ years NiDS										37.6	e
		male 15+ years SANHANES	36.8	50.4	24.6	38.1	29.4	33.6	40.2	25.2	46.0	32.8	f

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Frequent smokers	2012	both sexes 18+ years SANHANES	15.9	23.6	11.8	15.6	11.0	14.6	28.8	12.1	31.4	15.9	g
		female 18+ years SANHANES	5.6	8.4	3.0	3.6	2.0	3.4	23.1	4.9	25.6	6.5	g
		male 18+ years SANHANES	27.1	39.3	20.6	31.5	23.0	27.3	34.7	21.2	38.0	26.6	g
Prevalence of smoking	2011–2016	female 15+ years SADHS										6.8	c
		male 15+ years SADHS										37.0	c
	2014–2015	both sexes 15+ years NiDS	19.1	23.1	20.2	14.6	12.2	16.2	32.8	20.5	36.5	20.3	a
		female 15+ years NiDS	6.2	6.7	7.2	2.4	2.1	3.5	24.2	2.9	27.3	7.9	a
		male 15+ years NiDS	34.9	41.5	33.3	30.0	25.5	30.1	42.1	38.1	47.3	34.5	a
	2015	both sexes 15+ years WHO age-standardised										17.0	h
		female 15+ years WHO age-standardised										6.7	h
		female GBD age-standardised										7.5	i
		male 15+ years WHO age-standardised										27.8	h
		male GBD age-standardised										21.9	i
	2016	female 15+ years WHO										8.1	j
		male 15+ years WHO										33.2	j
	2014	both sexes 15+ years										18.3	k
		female 15+ years										7.9	k
		male 15+ years										30.3	k

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a NiDS Wave 4 v1.1.[182]
b SADHS 2016.[38] Straight average of male and female values.
c SADHS 2016.[38]
d Vellios et al. 2016.[265]
e NCD Trends 2015.[251]
f SANHANES-1.[104] Indicated as 'have ever smoked tobacco' in SANHANES survey.
g Reddy et al. 2015.[266] SANHANES-1. Adults 18 years and older. Data reported as 'Current daily smoking'
h Global Tobacco 2017.[261]
i GBD 2015 Smoking.[260]
j World Health Statistics 2018.[76]
k Smoking trends 1998–2014.[267] Modelled from weighted survey estimates from multiple sources.

Table 38: Risk behaviour and awareness indicators by population group

Indicator	Period	Sex|Age|Series|Cat	African/Black	Coloured	Indian/Asian	White	Ref
Currently drink alcohol	2014–2015	both sexes 15+ years NiDS	29.4	45.2	28.9	54.1	a
Ever drank alcohol	2014–2015	both sexes 15+ years NiDS	41.3	65.6	32.7	70.3	b
		female 15+ years NiDS	25.0	58.9	12.9	63.2	b
		male 15+ years NiDS	59.6	73.3	52.7	79.2	b
Ever smoked cigarettes	2012	both sexes 15+ years SANHANES	17.4	44.9	25.2	24.5	c
		female 15+ years SANHANES	4.8	39.7	9.4	23.7	c
		male 15+ years SANHANES	31.4	50.8	41.4	25.5	c
	2014–2015	both sexes 15+ years NiDS	20.6	56.3	21.4	40.3	b
		female 15+ years NiDS	3.8	50.7	4.9	36.9	b
		male 15+ years NiDS	39.4	62.8	38.1	44.8	b
Frequent smokers	2012	both sexes 18+ years SANHANES	13.3	38.0	20.1	14.9	d
		female 18+ years SANHANES	2.6	32.1	4.8	12.8	d
		male 18+ years SANHANES	25.5	45.1	35.6	17.3	d
Prevalence of smoking	2014–2015	both sexes 15+ years NiDS	17.0	45.4	20.0	24.6	b
		female 15+ years NiDS	2.6	39.8	4.8	22.0	b
		male 15+ years NiDS	33.2	51.7	35.4	28.1	b

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

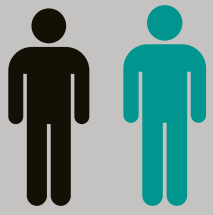
a Vellios et al. 2018.[265]
b NiDS Wave 4 v1.1.[182]
c SANHANES-1.[104]
d Reddy et al. 2015.[266]

INJURIES

470 000 People are victims of homicide

1 in 2

Children are affected by violence globally



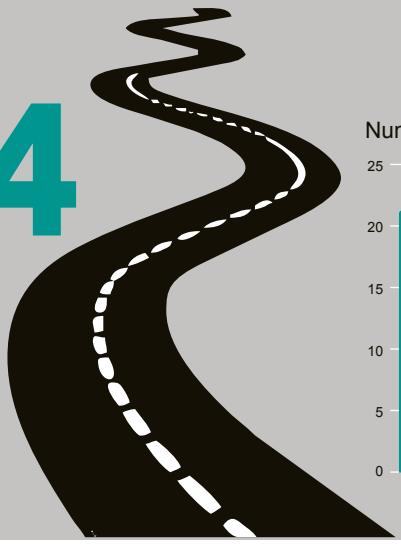
40% of South African children had been exposed to or have been victims of five or six of the categories of violence

Sexual violence is a major problem in South Africa, with studies showing that up to 1 in 4 women have been raped in their lifetime. Only a small proportion of rapes – as few as 1 in 25 – are reported to the police and many survivors never access care

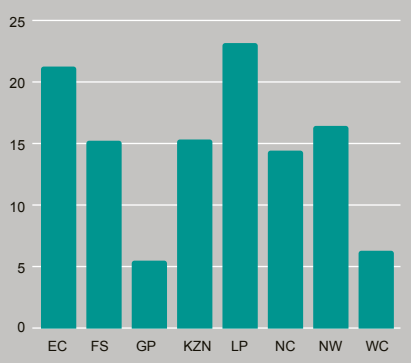
RTMC 2016

12 944

FATALITIES FROM 10 613 ROAD TRAFFIC ACCIDENTS



Number of fatalities per 10 000 vehicles



Injuries

In 2017, the United Nations Children's Fund (UNICEF) published a report entitled "A Familiar Face: Violence in the lives of children and adolescents", highlighting various forms of violence encountered by children and adolescents.[268] Locally, Richter et al. drew on the Birth to Twenty Plus cohort to show that 40% of South African children had been exposed to or been victims of five or six of the categories of violence considered (exposure to violence in the community, at home and at school; exposure to peer violence; direct experience of violence (excluding sexual violence); direct experience of sexual violence; and perpetration of violence).[269] The authors noted that "only 1% of the sample had not been exposed to or experienced violence in their home, school and/or community".

A 2016 report by the Road Traffic Management Corporation (RTMC), on the development of a costing model, noted that a total of 12 944 fatalities in 10 613 fatal road traffic crashes were recorded in 2015.[270] No detailed data have been published since 2011. A review of the situation noted media reports that the RTMC's "collection and distribution of data are in chaos and the integrity of the data available is questionable", and that "data on non-fatal accidents were corrupted when they were migrated to a new database".[271]

Crime statistics in South Africa are highly contested. The Stats SA Victims of Crime Survey "focuses on people's perceptions and experiences of crime, as well as their views regarding their access to, and effectiveness of the police service and the criminal justice system".[272] The 2016/17 report showed that while 84% of households felt safe walking in their neighbourhoods during the day, only 30% felt safe walking at night.

A national telephonic survey conducted by Médicins sans Frontières identified major gaps in the provision of comprehensive services for the survivors of sexual violence.[273]

Table 39: Injury indicators for South Africa

Indicator	Period	Sex|Age|Series|Cat	SA	Ref
Estimated direct deaths from major conflicts (per 100 000 population)	2012–2016	both sexes WHO	0.1	a
Mortality rate attributed to unintentional poisoning (per 100 000 population)	2014	both sexes vital registration	0.3	b
	2015	both sexes vital registration	0.2	b
	2016	both sexes WHO	1.2	a
Mortality rate due to homicides (per 100 000 population)	2013/14	both sexes SAPS	33.0	b
	2014/15	both sexes SAPS	34.5	b
	2015/16	both sexes SAPS	36.2	b
	2016	both sexes WHO	33.1	a
Road accident fatalities per 100 000 population	2014	both sexes all ages RTMC	23.5	b
	2015	both sexes all ages RTMC	23.6	c
			26.0	b
	2016	both sexes all ages RTMC	25.2	c

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

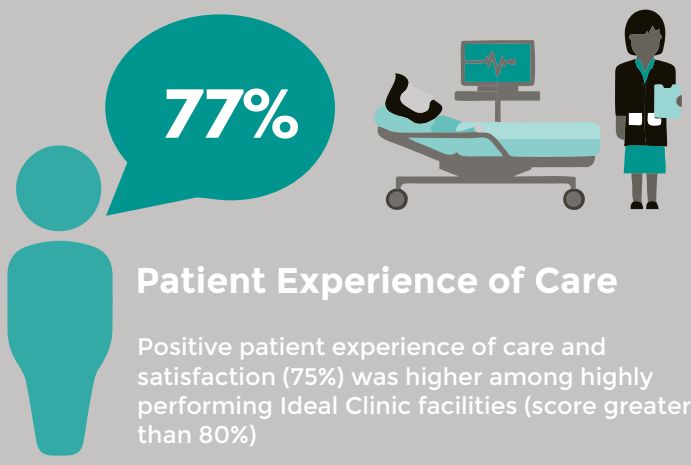
a World Health Statistics 2018.[76]
b SDG Baseline 2017.[6]
c Road Safety Annual Report 2017.[274]

HEALTH SERVICES – FACILITIES

Level of Satisfaction with Healthcare facilities

91.5% Very Satisfied — Private sector

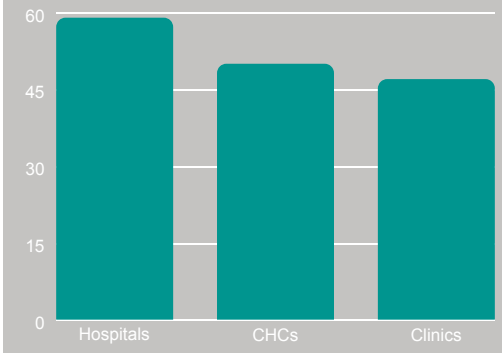
55.1% Very Satisfied — Public sector



Patient Experience of Care

Positive patient experience of care and satisfaction (75%) was higher among highly performing Ideal Clinic facilities (score greater than 80%)

Average scores across 7 quality domains from inspections done by the Office of Health Standards Compliance (OHSC), 2016/17



Nationally, only 5% of health establishments were compliant (had scores of 70% or above)

Five foundational elements of quality healthcare services

1. *Healthcare workers*
2. *Healthcare facilities*
3. *Medicines, devices & other technologies*
4. *Information systems*
5. *Finance*

Globally South Africa's health system ranked

195

127

with a Health Access and Quality Index of 49.7

Health services indicators

Health facilities

The OECD, World Bank and World Health Organization have produced a guideline on the delivery of quality healthcare services as part of UHC, and the ways in which attention needs to be paid to "five foundational elements": health care workers; health care facilities; medicines, devices and other technologies; information systems; and financing.[275] In particular, the guideline notes the need to "ensure that health systems have an infrastructure of information and information technology capable of measuring and reporting the quality of care". This issue is receiving urgent attention from the Health Data Collaborative, a global initiative led by WHO, the World Bank and the United States Agency for International Development (USAID). The Global Burden of Diseases, Injuries, and Risk Factors Study 2016 (GBD 2016) had used coverage data on 32 causes from which death should not occur in the presence of effective care to derive a Healthcare Access and Quality (HAQ) Index.[276] The HAQ Index is scaled from 0 to 100, with the highest index in 2016 being for Iceland (97.1). The report put South Africa's health system at position 127 out of 195, with an HAQ Index of 49.7, but also noted progress from 1990 (when the index was 40.1).

A key structure that is intended to accredit health facilities in order to be contracted with the National Health Insurance Fund is the Office of Health Standards Compliance (OHSC). As the regulations stipulating the quality standards to be assessed by the OHSC were only finalised in February 2018, previous annual reports have dealt with inspections based on the National Core Standards applicable to the public sector. The 2016/17 report was based on inspections at 696 public sector health facilities, plus 204 follow-up inspections.[277] The average scores across seven quality domains attained during this period were 59% in hospitals, 50% in Community Health Centres (CHCs) and 47% in clinics. Scores of 70% or above are considered 'compliant'. Overall, at the national level, only 5% of health establishments were considered 'compliant'. Another measure of 'quality' has been the Patients' Experience of Care Survey, conducted in 2017.[278] The consultants' report stated that the "national average satisfaction rate" was 75.05%, based on assessments at 19 hospitals in four provinces (four in the Free State, six in Gauteng, five in North West and four in the Northern Cape), involving 8 373 interviews. The Health Systems Trust conducted an assessment of patient experiences of care in primary health care facilities, reaching 7 124 consenting adult patients.[279] A positive experience of care was reported by 76.5% of respondents, and 74.8% were satisfied with the services received in the PHC facility. The Statistics South Africa General Household Surveys also include questions about users' satisfaction with health services. The 2017 report showed that 55.1% of respondents were 'very satisfied' and 26.7% 'somewhat satisfied' with public sector health services.[34] The corresponding figures for private sector health care were 91.5% and 5.8%.

Three smaller scale investigations deserve comment. Assegaai et al. evaluated the effect of ward-based outreach teams (WBOTs) in North West, using routine DHIS data, and detected some positive impacts (for example, with regard to contraceptive coverage and vaccination rates).[280] Hodes et al. identified discrepancies between the 'informal' definitions of medicine stock-outs used by front-line health workers in the Eastern Cape and the 'formal' reporting of such events.[281] These data call for a more nuanced understanding of routine stock-out data, whether reported via DHIS or via new mobile applications. The Western Cape's Provincial Health Data Centre is an electronic health information resource that has not been replicated in other provinces. This system was shown to provide a more complete record of medicines use during pregnancy than paper-based maternity case records, with implications for the feasibility of pharmacovigilance and especially teratovigilance.[282]

Table 40: Health services indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Complaints resolution rate	2015/16	DHIS	86.8	81.8	89.4	80.0	82.8	64.0	66.6	92.5	95.6	84.3	a
	2016/17	DHIS	89.1	83.3	90.1	83.2	81.0	69.6	61.1	93.7	98.8	86.2	a
	2017/18	DHIS	88.9	83.2	87.3	86.0	81.7	85.2	81.3	96.1	97.9	88.0	a
Complaints resolution rate within 25 working days	2015/16	DHIS	98.4	98.1	95.6	93.6	97.2	94.4	92.1	99.5	93.3	95.9	a
	2016/17	DHIS	97.2	96.1	98.6	94.3	98.9	94.1	91.3	99.1	93.6	96.3	a
	2017/18	DHIS	97.2	97.1	98.2	94.2	99.2	95.9	91.5	97.5	93.5	96.3	a
Health systems performance rank	1997	World Health Report										175	b
Healthcare Access and Quality (HAQ) Index	1990											40.1	c
	2000											40.9	c
	2016											49.7	c
Percentage of users of private health services very satisfied with the service received	2015	GHS	93.5	89.2	91.3	87.8	97.3	95.3	91.3	89.8	94.6	91.9	d
	2016	both sexes all ages GHS	96.5	89.9	91.7	88.4	97.0	94.7	91.1	89.3	94.9	92.4	e
	2017	both sexes all ages GHS	96.0	86.6	92.0	86.6	93.2	95.0	86.9	90.9	93.2	91.5	f
Percentage of users of public health services very satisfied with the service received	2015	GHS	60.5	53.3	57.0	56.2	73.1	59.2	60.2	50.9	45.5	57.6	d
	2016	GHS	63.8	50.1	58.6	47.8	75.8	61.9	49.3	52.0	49.6	57.3	e
	2017	GHS	59.1	48.1	55.8	46.9	75.1	62.3	49.7	46.7	48.3	55.1	f
Universal health coverage: service coverage index	2015	WHO										67.0	g

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a DHIS.[46]
b World Health Report 2000.
c GBD 2016 HAQ.
d Stats SA GHS 2015.[47]
e Stats SA GHS 2016.[33]
f Stats SA GHS 2017.[34]
g World Health Statistics 2018.[76]

Table 41: Health facilities indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Number of health facilities	Mar 2016	all main types	886	287	500	756	537	366	183	352	372	4 239	a
		Central Hospital	1	1	4	1					2	9	a
		CHC/CDC	41	10	39	21	26	58	33	46	67	341	a
		District Hospital	65	24	12	39	32	23	11	13	34	253	a
		Private Hospital	20	18	97	41	12	19	3	16	45	271	a
		Provincial Hospital	3	1	3	3	2	2	1	2	1	18	a
		Public Clinic	735	226	330	619	456	256	131	270	205	3 228	a
		Regional Hospital	5	4	9	13	5	3	1	3	5	48	a
		Specialised Hospital	16	3	6	19	4	5	3	2	13	71	a
	Mar 2017	all main types	885	288	504	739	539	368	183	348	372	4 226	a
		Central Hospital	1	1	4	1					2	9	a
		CHC/CDC	41	10	39	21	27	58	33	46	68	343	a
		District Hospital	65	24	12	39	32	23	11	13	34	253	a
		Private Hospital	20	19	96	37	12	19	3	14	45	265	a
		Provincial Hospital	3	1	3	3	2	2	1	2	1	18	a
		Public Clinic	734	226	335	606	457	258	131	268	204	3 219	a
		Regional Hospital	5	4	9	13	5	3	1	3	5	48	a
		Specialised Hospital	16	3	6	19	4	5	3	2	13	71	a
	Mar 2018	all main types	882	283	503	741	535	348	182	339	371	4 184	a
		Central Hospital	1	1	4	1					2	9	a
		CHC/CDC	41	10	39	21	26	56	33	46	67	339	a
		District Hospital	25	12	39	30	23	11	13	34	252		a
		Private Hospital	20	19	96	37	12	18	3	9	46	260	a
		Provincial Hospital	3	1	3	3	2	2	1	2	1	18	a
		Public Clinic	731	220	334	608	456	241	130	264	203	3 187	a
		Regional Hospital	5	4	9	13	5	3	1	3	5	48	a
		Specialised Hospital	16	3	6	19	4	5	3	2	13	71	a

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a DHIS.[46]

Table 42: Inpatient health facility indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Average length of stay – total	2015/16		7.2	5.7	5.8	7.0	5.7	5.0	4.6	7.2	5.7	6.2	a
	2016/17		7.1	5.6	5.8	7.0	5.5	5.3	4.9	7.3	5.7	6.2	a
	2017/18		7.3	5.5	6.7	6.8	5.5	4.6	4.7	7.2	5.6	6.2	a
Death in facility under 1 year rate	2015/16	both sexes	6.3	6.9	9.0	7.6	10.9	10.5	6.5	7.8	2.0	6.7	a
	2016/17	both sexes	5.4	8.3	9.7	6.5	9.3	9.6	6.4	7.9	1.9	6.3	a
	2017/18	both sexes	8.0	9.4	10.1	6.6	9.9	10.2	6.0	10.1	2.3	7.1	a
Death in facility under 5 years rate	2015/16	both sexes	5.3	5.1	6.1	5.3	7.3	7.1	4.4	6.3	1.3	4.8	a
	2016/17	both sexes	4.3	5.5	6.7	4.5	5.9	6.1	4.3	6.3	1.3	4.4	a
	2017/18	both sexes	5.7	6.2	6.9	4.5	5.7	7.0	4.2	7.8	1.5	4.7	a
Inpatient bed utilisation rate – total	2015/16		66.7	69.0	76.5	65.4	74.0	71.4	65.7	74.6	85.1	72.0	a
	2016/17		64.3	66.7	77.0	62.4	71.1	72.3	60.8	78.0	84.1	70.6	a
	2017/18		64.6	38.6	78.8	63.7	75.1	65.8	58.3	77.5	84.5	67.7	a
Inpatient crude death rate	2015/16	both sexes	6.3	5.8	4.9	5.2	5.4	5.5	5.1	6.6	2.9	5.0	a
	2016/17	both sexes	6.0	5.7	4.6	5.4	5.1	5.2	5.2	6.2	2.9	4.9	a
	2017/18	both sexes	6.2	4.9	5.1	5.0	4.8	4.8	4.9	6.1	3.0	4.8	a
Number of beds	Mar 2016	public sector	13 986	4 796	18 063	21 286	7 582	4 804	1 757	4 669	11 076	88 019	a
	Mar 2017	public sector	13 841	4 823	18 329	23 895	7 876	4 834	1 998	4 334	11 120	91 050	a
	Mar 2018	Central Hospital	569	636	6 095	846	0	0	0	0	2 359	10 505	a
		District Hospital	6 063	1 619	2 695	8 304	4 205	2 823	607	1 332	2 925	30 573	a
		Provincial Hospital	1 632	588	2 176	948	1 013	742	671	1 229	272	9 271	a
		public sector	13 738	4 753	18 014	21 039	7 764	4 895	1 930	4 259	11 037	87 429	a
		Regional Hospital	2 048	1 150	4 782	6 931	1 497	869	240	847	1 413	19 777	a
		specialised psychiatric	1 316	760	1 639	2 406	987		142	851	1 700	9 801	a
		specialised TB	1 438			849	62	461			1 026	3 836	a
Patient Day Equivalent	2017/18	all facilities	4 328 460	1 976 246	7 315 156	7 054 777	3 013 760	1 991 857	562 637	1 605 401	4 344 306	32 192 598	a
		District Hospital	1 706 494	523 073	982 478	2 527 457	1 726 936	1 234 512	192 102	387 835	1 386 403	10 667 291	a

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Usable beds (all levels) per 1 000 uninsured population	Mar 2018		2.3	2.0	1.7	2.1	1.5	1.3	1.9	1.3	2.2	1.8	a

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a DHIS.[46]

Table 43: PHC health facilities indicators by province

Indicator	Period	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Percentage Ideal clinics	2015/16	1.8	10.0	24.3	23.5	5.7	6.6	1.8	2.2	0.0	9.2	a
	2016/17	18.0	34.8	58.1	47.8	10.6	22.9	41.1	29.3	15.2	29.8	a
	2017/18	20.4	51.1	78.6	63.5	25.2	30.3	55.3	39.3	54.3	43.5	a
Percentage of assessed PHC facilities with 90% of tracer medicines available	2016/17	77.9	78.5	93.7	90.8	56.9	78.4	84.0	74.2	70.7	78.4	a
	2017/18	93.5	99.1	98.9	98.2	76.2	93.0	87.6	93.5	85.9	91.9	a
PHC doctor clinical work load	2015/16	21.5	25.2	27.5	25.8	23.1	16.6	15.3	12.2	26.7	24.3	b
	2016/17	20.2	18.8	22.4	23.1	24.6	16.8	15.3	13.7	27.0	22.6	b
	2017/18	18.9	15.5	21.6	21.0	19.1	15.1	12.9	11.2	26.7	21.0	b
PHC headcount 5 years and older	2015/16	15 250 342	5 573 544	18 028 417	25 677 379	11 220 925	7 538 733	2 500 680	6 765 794	12 042 392	104 598 206	b
	2016/17	15 189 944	5 240 189	17 848 915	24 263 417	11 930 571	7 602 668	2 479 410	6 524 363	12 263 536	103 343 013	b
	2017/18	13 876 432	4 636 930	17 507 927	23 762 730	11 800 460	7 436 251	2 223 741	6 130 252	12 108 071	99 482 794	b
PHC headcount under 5 years	2015/16	2 957 268	963 106	4 071 067	5 194 318	3 130 566	1 770 369	490 940	1 484 930	2 108 296	22 170 860	b
	2016/17	2 906 903	930 205	4 188 200	4 947 149	3 338 774	1 846 366	509 401	1 473 502	2 149 814	22 290 314	b
	2017/18	2 541 601	825 190	3 623 737	4 640 618	3 057 930	1 723 909	465 326	1 312 151	2 031 975	20 222 437	b
PHC professional nurse clinical work load	2015/16	32.6	35.8	28.3	31.9	22.0	32.1	26.6	17.1	22.1	27.5	b
	2016/17	30.5	28.5	25.2	30.0	23.8	29.3	23.0	18.0	22.4	26.2	b
	2017/18	28.2	27.2	24.5	30.0	22.5	27.9	21.5	18.2	22.8	25.4	b
PHC supervisor visit rate (fixed clinic/CHC/CDC)	2012/13	80.5	88.2	89.7	60.8	91.9	75.1	29.0	69.8	79.6	76.0	b
	2013/14	78.2	77.2	79.0	62.4	92.8	72.1	41.8	69.0	71.7	73.7	b
	2014/15	77.6	63.4	80.5	60.5	85.6	76.9	59.2	76.8	71.5	73.5	b
PHC utilisation rate	2015/16	2.6	2.3	1.7	2.8	2.5	2.2	2.5	2.1	2.3	2.3	b
	2016/17	2.6	2.2	1.6	2.6	2.6	2.2	0.4	2.1	2.3	2.2	b
	2017/18	2.3	1.9	1.5	2.5	2.5	2.1	2.2	1.9	2.2	2.1	b
PHC utilisation rate under 5 years	2015/16	3.5	3.4	3.4	3.8	4.6	3.9	4.5	3.5	3.9	3.8	b
	2016/17	3.4	3.4	3.4	3.7	5.0	4.2	4.8	3.7	4.0	3.8	b
	2017/18	3.0	3.0	2.9	3.5	4.6	3.9	4.4	3.3	3.7	3.5	b
Proportion of health facilities with availability of the WHO-recommended core list of essential medicines	2017/18	79.1	65.5	83.0	88.0	47.6	76.6	54.4	66.0	95.8	74.7	c
Tracer items stock-out rate (fixed clinic/CHC/CDC)	2015/16	21.2	50.1	11.6	13.7	40.9	15.0	8.9	37.9	5.6	22.6	b
	2016/17	16.9	33.5	13.4	13.8	42.2	15.0	12.4	2.2	4.8	17.9	b
	2017/18	20.9	34.5	17.0	12.0	52.4	23.4	45.6	34.0	4.2	25.3	b

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a Ideal Clinic System.[283]
b DHIS.[46]
c DHIS.[46] Calculated as the inverse of the Tracer items stock-out rate.

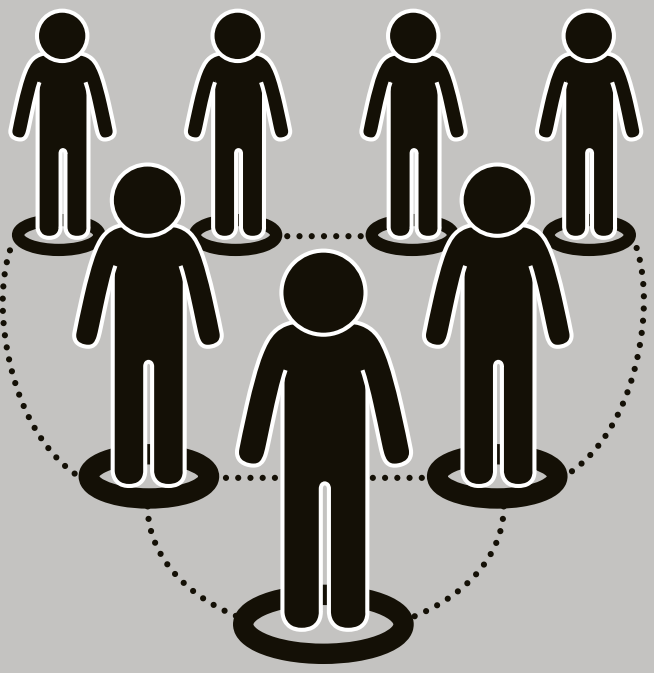
Table 44: Health information system indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Birth registration coverage	2014	both sexes Live births adjusted										52.7	a
		both sexes Live births of total reg										59.1	b
												60.1	c
	2015	both sexes Live births of current reg										76.8	d
		both sexes Live births of total reg										65.1	e
	2016	both sexes Live births of current reg	85.8	92.9	87.6	71.7	84.5	81.1	91.1	89.0	86.8	83.6	f
		both sexes Live births of total reg										75.6	g
Death registration coverage	2015	both sexes 15+ years vital registration										96.0	h
	2007–2016	both sexes 15+ years WHO										92.0	i
	2016	both sexes 15+ years vital registration										96.0	j
		female 15+ years vital registration										95.0	j
		male 15+ years vital registration										97.0	j
International Health Regulations (IHR) core capacity index	2010–2017	WHO										91.0	i

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a Stats SA Live Births 2014.[284] Births registered within 30 days as % of estimated total births. Adjustment based on estimated completeness of birth registration of 89.2%.
b Stats SA Live Births 2014.[284] Births registered within 30 days as % of registered births at time of report.
c Stats SA Live Births 2016.[29] Registered within 30 days, of total registrations in 2014.
d Stats SA Live Births 2016.[29] Registered within 30 days, of current registrations in 2015.
e Stats SA Live Births 2016.[29] Registered within 30 days of total registrations in 2015.
f Stats SA Live Births 2016.[29] Registered within 30 days, of current registrations in 2016.
g Stats SA Live Births 2016. [29] Registered within 30 days of total registrations in 2016.
h Stats SA Causes of death 2015.[44]
i World Health Statistics 2018.[76]
j Stats SA Causes of death 2016.[45]

HEALTH PERSONNEL



Community Health Workers

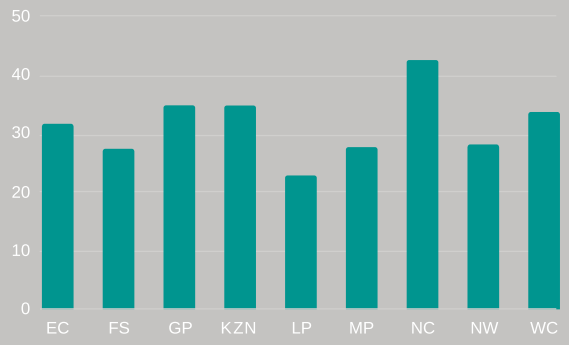
- Case finding of Hypertension
- Improve gaps in Maternal & Child Services
- Rates of Diabetes diagnosis
- Integrated HIV & TB Care

BY 2030

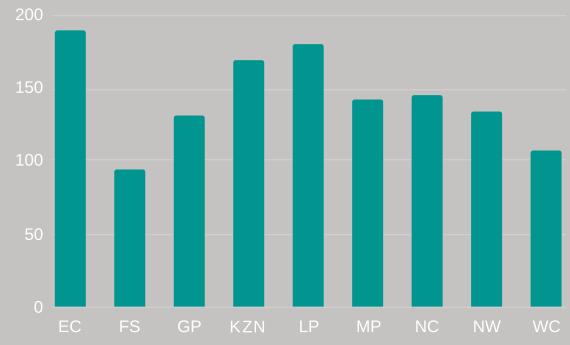
80 MILLION

GLOBAL DEMAND FOR HEALTH WORKERS WILL BE DOUBLE THE CURRENT NUMBER OF HEALTH WORKERS

Medical practitioners per 100 000 population
Public Sector 2018



Professional nurses per 100 000 population
Public Sector 2018



Health personnel

The UHC service coverage index includes a measure of health provider supply as part of the "service capacity and access" component. The proposed measure is the "number of health professionals per person: comprising physicians, psychiatrists, and surgeons". Reporting this figure per country is not easy, as the definitions of the three cadres may vary. If the term 'physicians' is taken to mean general medical practitioners, then the other two ('surgeons' and 'psychiatrists') represent two of many medical specialities, and the first covers a wide range of different surgical specialities. The WHO National Health Workforce Accounts Handbook supports the International Labour Organization's ISCO-8 categories, dividing 'medical doctors' into 'generalist medical practitioners' and 'specialist medical practitioners'.[285] Since human resource numbers are not readily available for both public and private sectors, a more accessible measure, as proposed in Table 1, would be to use the number of *public sector* medical practitioners per 100 000 *uninsured* population, as recorded in PERSAL. PERSAL is not a reliable source for the number of specialists employed in the public sector, since it cannot provide data on specific specialities. The individual registers maintained by the Health Professions Council of South Africa can distinguish between specialist cadres, but cannot be used to determine where or even whether a specific medical practitioner is practising.

Globally, there is predicted to be a net shortage of 15 million health workers by 2030, with middle-income countries unable to meet their own demand.[286] In order to maximise efficiency, all health systems will need to look to task-shifting and upskilling, making maximal use of community health workers (CHWs), for instance. It has been argued that CHWs are key to integrated HIV and TB care,[287–289] and cover important gaps in maternal and child services.[290] Role ambiguity and conflict have been seen as important impediments to the effective implementation of district-based clinical specialist teams (DCSTs) in South Africa.[291] Having family physicians on the staff of both community health centres and district hospitals would be expected to lead to improved care, but the results in South Africa have been mixed.[292] Of concern, a survey of 514 health care professionals employed at public sector districts hospitals in KwaZulu-Natal showed that 87% had worked in such settings for five years or less, 65% planned to leave in the near future (29% at the end of the year in which the survey was conducted).[293] Addressing longer-term staff retention and career paths in the public sector will be difficult with budgetary constraints and the increasing pressure to accommodate ever larger numbers of interns and community service officers. Despite repeated requests, no up-to-date information on the current placement of community service officers of all cadres across the public health sector could be obtained. This remains a highly contested terrain. Updated register data were obtained from the South African Nursing Council (SANC) and the South African Pharmacy Council (SAPC), but could not be sourced from the Health Professions Council of South Africa (HPCSA). For the first time, data from the Community Health Worker system has been included in Table 45.

Table 45: Number of health personnel practising by sector, and registered with applicable professional council, by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Number of clinical associates	Mar 2016	both sexes public sector	68	18	40	62	7	66	2	40		303	a
	Oct 2017	both sexes public sector	76	13	43	91	9	79	3	30		344	a
	Apr 2018	both sexes public sector	83	16	42	121	11	80	3	32		388	a
Number of clinical associates registered	2016	both sexes all ages HPCSA	90	24	156	91	26	101	18	62	9	577	b
Number of Community Health Workers (CHWs)	Jun 2018		4 438	2 009	8 589	9 780	10 570	6 640	2 553	6 059	3 542	54 180	c
Number of dental practitioners	Mar 2016	both sexes public sector	132	55	247	141	191	120	59	44	129	1 118	a
	Oct 2017	both sexes public sector	136	69	255	144	194	126	40	68	167	1 199	a
	Apr 2018	both sexes public sector	146	65	250	146	193	124	41	68	163	1 196	a
Number of dental practitioners registered	2016	both sexes all ages HPCSA	331	199	2 375	851	261	297	98	203	1 417	6 155	b
Number of dental specialists	Mar 2016	both sexes public sector		1	120	1	2	1	1		33	160	a
	Oct 2017	both sexes public sector		1	121	1	1	1			32	158	a
	Apr 2018	both sexes public sector		3	123	2	1	1			29	159	a
Number of dental therapists	Mar 2016	both sexes public sector	9	1	41	120	102	14	8	20	2	318	a
Number of dental therapists registered	2016	both sexes all ages HPCSA	15	20	180	261	73	49	10	47	5	661	b
Number of enrolled nurses	Mar 2016	both sexes public sector	3 222	861	6 886	10 708	4 292	1 724	204	876	2 551	31 325	a
	Oct 2017	both sexes public sector	3 069	920	7 677	10 066	4 167	1 824	225	837	2 602	31 388	a
	Apr 2018	both sexes public sector	3 263	939	7 694	9 926	4 085	1 881	237	958	2 608	31 591	a
Number of enrolled nurses registered	2016	both sexes all ages SANC	6 117	2 482	18 734	25 292	6 617	3 489	452	3 424	6 951	73 558	d
	2017	both sexes all ages SANC	6 468	2 428	19 469	25 541	6 478	3 428	418	3 412	6 914	74 556	d
Number of environmental health practitioners	Mar 2016	both sexes public sector	27	54	101	94	62	85	21	36		711	a
	Oct 2017	both sexes public sector	25	51	126	92	63	56	27	50		749	a
	Apr 2018	both sexes public sector	23	69	128	87	64	68	25	50		514	a

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Number of environmental health practitioners registered	2016	both sexes all ages HPCSA	394	266	899	737	306	239	108	169	462	3 585	b
Number of medical practitioners	Mar 2016	both sexes public sector	1 631	572	3 394	3 517	1 288	937	458	721	1 500	14 036	a
	Oct 2017	both sexes public sector	1 854	701	3 506	3 447	1 311	1 055	446	880	1 654	14 856	a
	Apr 2018	both sexes public sector	1 903	664	3 614	3 383	1 248	1 079	457	934	1 719	15 001	a
Number of medical practitioners (including specialists) registered	2016	both sexes all ages HPCSA General MPs	2 261	1 293	9 522	5 267	1 328	1 288	502	1 136	5 870	29 311	b
		both sexes all ages HPCSA General MPs + Specialists	2 952	1 915	14 961	7 625	1 548	1 555	622	1 423	9 485	43 503	b
		both sexes all ages HPCSA Specialist MPs	691	622	5 439	2 358	220	267	120	287	3 615	14 192	b
Number of medical researchers	Mar 2016	both sexes public sector		4	17	62	8		1		38	130	a
	Oct 2017	both sexes public sector		6	14	92	11		1		41	165	a
	Apr 2018	both sexes public sector	1	5	13	120	12	1	2		6	160	a
Number of medical specialists	Mar 2016	both sexes public sector	161	280	1 998	719	68	73	26	106	1 299	4 737	a
	Oct 2017	both sexes public sector	193	297	1 966	746	66	78	22	107	1 413	4 891	a
	Apr 2018	both sexes public sector	177	293	1 929	808	60	78	21	116	1 345	4 827	a
Number of nursing assistants	Mar 2016	both sexes public sector	5 433	2 162	6 535	6 223	5 113	1 602	878	2 525	4 112	34 583	a
	Oct 2017	both sexes public sector	5 099	2 007	6 581	5 974	4 843	1 389	864	2 225	4 194	33 176	a
	Apr 2018	both sexes public sector	5 260	1 972	6 518	5 976	4 731	1 431	864	2 489	4 152	33 393	a
Number of nursing assistants registered	2016	both sexes all ages SANC	7 779	3 187	19 767	14 061	10 062	3 824	1 075	5 009	8 538	73 302	d
	2017	both sexes all ages SANC	7 558	3 021	18 508	13 493	10 125	3 816	975	4 777	8 158	70 431	d
Number of occupational therapists	Mar 2016	both sexes public sector	131	71	290	219	216	103	54	53	142	1 280	a
	Oct 2017	both sexes public sector	117	75	286	209	205	83	58	57	147	1 237	a
	Apr 2018	both sexes public sector	133	74	303	194	240	90	54	57	152	1 297	a
Number of occupational therapists registered	2016	both sexes all ages HPCSA	226	313	1 679	569	220	239	95	142	1 278	4 792	b
Number of pharmacists	Mar 2016	both sexes public sector	618	351	1 209	822	566	300	150	245	932	5 223	a
	Oct 2017	both sexes public sector	668	333	1 279	821	570	306	170	258	956	5 405	a
	Apr 2018	both sexes public sector	741	323	1 232	847	602	317	184	279	961	5 486	a
Number of pharmacists registered	2017	both sexes SAPC	1 771	486	5 027	2 063	630	625	197	651	2 378	14 412	e
	2018	both sexes SAPC	1 929	534	5 336	2 220	702	652	225	688	2 539	15 230	e
Number of physiotherapists	Mar 2016	both sexes public sector	140	58	268	325	188	91	58	66	145	1 339	a
	Oct 2017	both sexes public sector	127	65	283	351	183	101	66	78	156	1 410	a
	Apr 2018	both sexes public sector	146	76	277	328	197	96	64	86	158	1 428	a
Number of physiotherapists registered	2016	both sexes all ages HPCSA	381	385	2 512	1 018	285	293	119	204	1 879	7 183	b
Number of professional nurses	Mar 2016	both sexes public sector	10 292	2 274	12 906	16 628	9 602	5 213	1 438	4 242	5 156	67 766	a
	Oct 2017	both sexes public sector	10 337	2 270	14 290	17 028	9 417	5 486	1 464	4 240	5 334	69 881	a
	Apr 2018	both sexes public sector	10 993	2 295	14 223	17 163	9 409	5 471	1 520	4 511	5 314	70 899	a
Number of professional nurses registered	2016	both sexes all ages SANC	15 563	8 205	36 603	31 608	11 853	7 502	2 284	9 845	17 135	140 598	d
	2017	both sexes all ages SANC	15 552	8 056	36 948	32 530	12 116	7 551	2 278	9 885	17 176	142 092	d
Number of psychologists	Oct 2017	both sexes public sector	65	27	232	90	118	36	22	50	89	729	a
	Apr 2018	both sexes public sector	62	26	243	80	127	38	19	43	83	721	a
Number of psychologists registered	2016	both sexes all ages HPCSA	486	277	4 014	916	162	194	61	272	1 890	8 415	b
Number of pupil auxiliary nurses registered	2016	both sexes all ages SANC	487	79	1 146	606	96	100	117	84	275	2 990	d
	2017	both sexes all ages SANC	356	76	823	512	64	67	116	49	225	2 364	d
Number of pupil nurses registered	2016	both sexes all ages SANC	1 200	176	3 933	4 005	146	139	0	366	808	10 773	d
	2017	both sexes all ages SANC	324	106	1 746	1 611	94	77		115	369	4 442	d
Number of radiographers	Mar 2016	both sexes public sector	356	170	706	615	183	123	101	119	452	2 827	a
	Oct 2017	both sexes public sector	365	151	697	609	192	118	89	109	457	2 789	a
	Apr 2018	both sexes public sector	378	152	740	611	202	138	91	117	461	2 890	a
Number of radiographers registered	2016	both sexes all ages HPCSA	666	527	2 694	1 434	304	341	175	304	1 563	8 072	b

Indicator	Period	SexIAgeISeriesICat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Number of speech therapists and audiologists	Mar 2016	both sexes public sector	55	7	160	177	93	64	36	23	66	681	a
	Oct 2017	both sexes public sector	43	18	168	167	85	60	28	33	70	672	a
	Apr 2018	both sexes public sector	48	20	187	165	81	81	28	31	71	712	a
Number of student nurses	Mar 2016	both sexes public sector	11		4 059	1 544	445	789		42		6 890	a
	Oct 2017	both sexes public sector	5		3 432	1 038	510	580		19		5 584	a
	Apr 2018	both sexes public sector			2 902	951	470	749		21		5 093	a
Number of student nurses registered	2016	both sexes all ages SANC	3 756	1 213	4 737	3 631	1 895	991	264	2 071	2 781	21 339	d
	2017	both sexes all ages SANC	3 893	1 330	4 961	3 245	1 869	921	209	2 053	2 805	21 286	d

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a PERSAL.[294] The South African total includes the sum of the provinces plus posts within the National Department of Health.
b HPCSA.[295] The South African total includes those where province not specified. The number on the register includes those who are retired, overseas, working part-time, working in other sectors, or not working at all.
c CHW Register.[296] Total of pre-authorised and authorised CHW profiles.
d SANC.[297] The number on the register includes those who are retired, overseas, working part-time, working in other sectors, or not working at all.
e SAPC.[298] The South African total includes those where province not specified. The number on the register includes those who are retired, overseas, working part-time, working in other sectors, or not working at all.

Table 46: Number of health personnel by population group

Indicator	Period	SexIAgeISeriesICat	African/Black	Coloured	Indian/Asian	White	Other	Ref
Number of clinical associates	Apr 2018	both sexes public sector	374	3	6	5		a
	Mar 2016	both sexes public sector	291	5	2	5		a
	Oct 2017	both sexes public sector	329	4	6	5		a
Number of clinical associates registered	2016	both sexes all ages HPCSA	521	14	10	25	7	b
Number of dental practitioners	Apr 2018	both sexes public sector	604	127	221	244		a
	Mar 2016	both sexes public sector	560	112	214	228	4	a
	Oct 2017	both sexes public sector	590	123	230	256		a
Number of dental practitioners registered	2016	both sexes all ages HPCSA	989	290	1 114	2 247	1 515	b
Number of dental specialists	Apr 2018	both sexes public sector	52	5	40	62		a
	Mar 2016	both sexes public sector	47	7	39	67		a
	Oct 2017	both sexes public sector	50	8	37	63		a
Number of dental therapists	Mar 2016	both sexes public sector	276	6	32	4		a
Number of dental therapists registered	2016	both sexes all ages HPCSA	418	3	127	30	83	b
Number of enrolled nurses	Apr 2018	both sexes public sector	29 234	1 837	230	290		a
	Mar 2016	both sexes public sector	28 682	1 986	272	334	51	a
	Oct 2017	both sexes public sector	28 965	1 881	238	304		a
Number of environmental health practitioners	Apr 2018	both sexes public sector	484	7	6	17		a
	Mar 2016	both sexes public sector	654	16	16	18	7	a
	Oct 2017	both sexes public sector	697	17	17	18		a
Number of environmental health practitioners registered	2016	both sexes all ages HPCSA	2 317	213	78	355	622	b
Number of medical practitioners	Apr 2018	both sexes public sector	8 225	922	1 969	3 885		a
	Mar 2016	both sexes public sector	7 461	804	1 984	3 689	98	a
	Oct 2017	both sexes public sector	8 206	872	1 967	3 811		a
Number of medical practitioners (including specialists) registered	2016	both sexes all ages HPCSA General MPs	9 294	1 238	4 036	11 297	3 446	b
		both sexes all ages HPCSA General MPs + Specialists	11 114	1 496	6 114	18 767	6 012	b
		both sexes all ages HPCSA Specialist MPs	1 820	258	2 078	7 470	2 566	b
Number of medical researchers	Apr 2018	both sexes public sector	143	3	3	11		a
	Mar 2016	both sexes public sector	83	20	3	24		a
	Oct 2017	both sexes public sector	115	23	5	22		a
Number of medical specialists	Apr 2018	both sexes public sector	1 641	273	1 008	1 905		a
	Mar 2016	both sexes public sector	1 525	254	938	1 999	21	a
	Oct 2017	both sexes public sector	1 623	270	998	2 000		a
Number of nursing assistants	Apr 2018	both sexes public sector	29 968	2 828	155	442		a
	Mar 2016	both sexes public sector	30 647	3 156	174	566	40	a
	Oct 2017	both sexes public sector	29 640	2 905	159	472		a

Indicator	Period	Sex|Age|Series|Cat	African/Black	Coloured	Indian/Asian	White	Other	Ref
Number of occupational therapists	Apr 2018	both sexes public sector	606	153	86	452		a
	Mar 2016	both sexes public sector	572	140	110	453	5	a
	Oct 2017	both sexes public sector	556	148	86	447		a
Number of occupational therapists registered	2016	both sexes all ages HPCSA	733	335	344	2 988	392	b
Number of pharmacists	Apr 2018	both sexes public sector	3 252	657	667	910		a
	Mar 2016	both sexes public sector	3 005	621	686	883	28	a
	Oct 2017	both sexes public sector	3 166	645	666	928		a
Number of pharmacists registered	2017	both sexes SAPC	3 083	534	2 991	7 760	44	c
	2018	both sexes SAPC	3 595	573	3 125	7 899		c
Number of physiotherapists	Apr 2018	both sexes public sector	729	203	189	307		a
	Mar 2016	both sexes public sector	614	192	193	332	8	a
	Oct 2017	both sexes public sector	698	209	198	305		a
Number of physiotherapists registered	2016	both sexes all ages HPCSA	1 133	633	665	3 846	906	b
Number of professional nurses	Apr 2018	both sexes public sector	61 719	5 775	1 579	1 826		a
	Mar 2016	both sexes public sector	58 372	5 587	1 526	2 022	259	a
	Oct 2017	both sexes public sector	60 761	5 695	1 574	1 851		a
Number of psychologists	Apr 2018	both sexes public sector	395	56	47	223		a
	Oct 2017	both sexes public sector	383	58	50	238		a
Number of psychologists registered	2016	both sexes all ages HPCSA	1 057	369	526	5 048	1 415	b
Number of radiographers	Apr 2018	both sexes public sector	1 802	491	269	328		a
	Mar 2016	both sexes public sector	1 633	489	303	391	11	a
	Oct 2017	both sexes public sector	1 712	466	272	339		a
Number of radiographers registered	2016	both sexes all ages HPCSA	2 430	803	803	2 551	1 485	b
Number of speech therapists and audiologists	Apr 2018	both sexes public sector	297	59	130	226		a
	Oct 2017	both sexes public sector	291	50	117	214		a
Number of student nurses	Apr 2018	both sexes public sector	4 800	96	118	79		a
	Mar 2016	both sexes public sector	6 416	128	200	137	9	a
	Oct 2017	both sexes public sector	5 263	107	128	86		a
Total number of health professional posts	Mar 2016	public sector filled posts	111 865	11 532	6 418	10 813	490	a

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a PERSAL.[294]
b HPCSA.[295]
c SAPC.[298]

Table 47: Public and private sector health personnel per 100 000 target population by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Density of dentistry personnel (per 1 000 population)	2007–2016	both sexes WHO										0.2	a
Density of midwifery personnel (per 1 000 population)	2007–2016	both sexes WHO										5.2	a
Density of pharmaceutical personnel (per 1 000 population)	2007–2016	both sexes WHO										0.7	a
Density of physicans (per 1 000 population)	2007–2016	both sexes WHO										0.8	a
Dental practitioners per 100 000 population	Mar 2016	both sexes public sector	2.1	2.3	2.5	1.4	3.6	3.3	6.0	1.4	2.7	2.4	b
	Oct 2017	both sexes public sector	2.3	2.9	2.5	1.5	3.7	3.3	3.9	2.1	3.4	2.6	b
	Apr 2018	both sexes public sector	2.5	2.7	2.4	1.5	3.6	3.2	3.9	2.0	3.3	2.5	b
Dental specialists per 100 000 population	Mar 2016	both sexes public sector		0.04	1.20	0.01	0.04	0.03	0.10		0.69	0.35	b
	Oct 2017	both sexes public sector		0.04	1.20	0.01	0.02	0.03			0.65	0.34	b
	Apr 2018	both sexes public sector		0.12	1.20	0.02	0.02	0.03			0.58	0.34	b
Dental therapists per 100 000 population	Mar 2016	both sexes public sector	0.14	0.04	0.42	1.20	1.90	0.38	0.81	0.62	0.04	0.69	b
Enrolled nurses per 100 000 population	Mar 2016	both sexes public sector	51.1	35.9	70.6	109.7	80.8	47.1	20.8	27.2	53.5	67.9	b
	Oct 2017	both sexes public sector	52.2	38.5	74.3	103.2	79.1	47.9	21.9	25.7	53.1	67.2	b
	Apr 2018	both sexes public sector	55.5	39.0	72.5	100.5	76.7	48.5	22.8	28.8	52.1	66.6	b

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Environmental health practitioners per 100 000 population	Mar 2016	both sexes public sector	0.4	2.3	1.0	1.0	1.2	2.3	2.1	1.1		1.5	b
	Oct 2017	both sexes public sector	0.4	2.1	1.2	0.9	1.2	1.5	2.6	1.5		1.6	b
	Apr 2018	both sexes public sector	0.4	2.9	1.2	0.9	1.2	1.8	2.4	1.5		1.1	b
Medical practitioners per 100 000 population	2007–2016	both sexes WHO										80.0	c
	Mar 2016	both sexes public sector	25.9	23.9	34.8	36.0	24.3	25.6	46.6	22.4	31.4	30.4	b
	Oct 2017	both sexes public sector	31.6	29.4	33.9	35.3	24.9	27.7	43.4	27.0	33.7	31.8	b
	Apr 2018	both sexes public sector	32.3	27.6	34.0	34.2	23.4	27.8	43.9	28.1	34.3	31.6	b
Medical researchers per 100 000 population	Mar 2016	both sexes public sector		0.17	0.17	0.64	0.15		0.10		0.80	0.28	b
	Oct 2017	both sexes public sector		0.25	0.14	0.94	0.21		0.10		0.84	0.35	b
	Apr 2018	both sexes public sector	0.02	0.21	0.12	1.20	0.23	0.03	0.19		0.12	0.34	b
Medical specialists per 100 000 population	Mar 2016	both sexes public sector	2.5	11.7	20.5	7.4	1.3	2.0	2.6	3.3	27.2	10.3	b
	Oct 2017	both sexes public sector	3.3	12.4	19.0	7.6	1.3	2.0	2.1	3.3	28.8	10.5	b
	Apr 2018	both sexes public sector	3.0	12.2	18.2	8.2	1.1	2.0	2.0	3.5	26.9	10.2	b
Nursing assistants per 100 000 population	Mar 2016	both sexes public sector	86.2	90.2	67.0	63.8	96.3	43.8	89.4	78.4	86.2	75.0	b
	Oct 2017	both sexes public sector	86.8	84.0	63.7	61.2	91.9	36.5	84.1	68.2	85.6	71.1	b
	Apr 2018	both sexes public sector	89.4	81.9	61.4	60.5	88.8	36.9	83.0	75.0	82.9	70.4	b
Occupational therapists per 100 000 population	Mar 2016	both sexes public sector	2.1	3.0	3.0	2.2	4.1	2.8	5.5	1.6	3.0	2.8	b
	Oct 2017	both sexes public sector	2.0	3.1	2.8	2.1	3.9	2.2	5.6	1.7	3.0	2.6	b
	Apr 2018	both sexes public sector	2.3	3.1	2.9	2.0	4.5	2.3	5.2	1.7	3.0	2.7	b
Pharmacists per 100 000 population	Mar 2016	both sexes public sector	9.8	14.6	12.4	8.4	10.7	8.2	15.3	7.6	19.5	11.3	b
	Oct 2017	both sexes public sector	11.4	13.9	12.4	8.4	10.8	8.0	16.6	7.9	19.5	11.6	b
	Apr 2018	both sexes public sector	12.6	13.4	11.6	8.6	11.3	8.2	17.7	8.4	19.2	11.6	b
Physiotherapists per 100 000 population	Mar 2016	both sexes public sector	2.2	2.4	2.8	3.3	3.5	2.5	5.9	2.0	3.0	2.9	b
	Oct 2017	both sexes public sector	2.2	2.7	2.7	3.6	3.5	2.7	6.4	2.4	3.2	3.0	b
	Apr 2018	both sexes public sector	2.5	3.2	2.6	3.3	3.7	2.5	6.2	2.6	3.2	3.0	b
Professional nurses per 100 000 population	Mar 2016	both sexes public sector	163.2	94.8	132.2	170.3	180.8	142.5	146.4	131.7	108.1	146.9	b
	Oct 2017	both sexes public sector	176.0	95.1	138.2	174.5	178.8	144.0	142.5	130.0	108.8	149.7	b
	Apr 2018	both sexes public sector	186.8	95.3	134.0	173.7	176.6	141.1	146.1	135.8	106.1	149.4	b
Psychologists per 100 000 population	Oct 2017	both sexes public sector	1.1	1.1	2.2	0.9	2.2	1.0	2.1	1.5	1.8	1.6	b
	Apr 2018	both sexes public sector	1.1	1.1	2.3	0.8	2.4	1.0	1.8	1.3	1.7	1.5	b
Radiographers per 100 000 population	Mar 2016	both sexes public sector	5.7	7.1	7.2	6.3	3.5	3.4	10.3	3.7	9.5	6.1	b
	Oct 2017	both sexes public sector	6.2	6.3	6.7	6.2	3.6	3.1	8.7	3.3	9.3	6.0	b
	Apr 2018	both sexes public sector	6.4	6.3	7.0	6.2	3.8	3.6	8.7	3.5	9.2	6.1	b
Student nurses per 100 000 population	Mar 2016	both sexes public sector	0.2		41.6	15.8	8.4	21.6		1.3		14.9	b
	Oct 2017	both sexes public sector	0.1		33.2	10.6	9.7	15.2		0.6		12.0	b
	Apr 2018	both sexes public sector			27.3	9.6	8.8	19.3		0.6		10.7	b

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a World Health Statistics 2018.[76]
b PERSAL.[294]
c World Health Statistics 2018.[76] Given in source as 0.8 physicians per 1 000 population.

Table 48: Community service health professionals by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Number of CS pharmacists	2013		38	25	66	63	71	51	27	31	35	415	a
	2017	SAPC	115	44	162	138	52	44	39	55	55	706	b
	2018	both sexes SAPC	128	20	204	163	58	36	16	50	83	760	b

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a DoH Community Service.[299]
b SAPC.[298]

HEALTH FINANCING

In 2015, $9.7 Trillion was spent on health worldwide

Between 2000 & 2015 $563 Billion was spent on HIV/AIDS worldwide

Largest health spending growth rates were in middle-income countries

Development Assistance for Health: $38 Billion

Projected global expenditure on health to meet SDG 3: $274 Billion

Per capita health spending will increase at 4.2% per year globally

Government expenditure on health: R191 Billion

Legal Claims against health department: R56 Billion

Allocation for National Health Insurance: R4.2 Billion over 3 years

State spending to to grow by 7.8% per annum

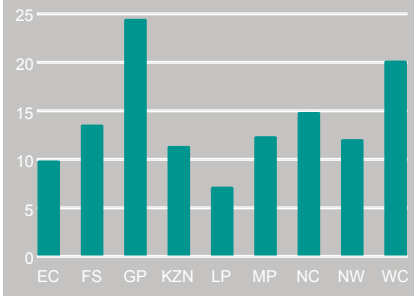
A total of 82 medical schemes

Total expenditure on healthcare benefits by medical aid beneficiaries: R17 158 per beneficiary per annum

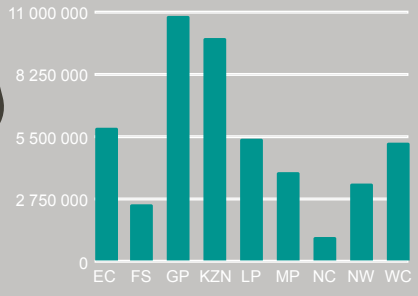
Health Promotion levy expected to raise R2 Billion in taxes

Allocation for the CCMDD Programme: R2.3 Billion

Medical Scheme Coverage %



Public Sector dependant population



Health financing

State spending on health continues to grow, with the expected growth between 2017/18 and 2020/21 being 7.8% per annum, somewhat lower than the expected growth in spending on "learning and culture" (8.5%) and social development (9.2%).[300] Consolidated government expenditure on health for the 2018/18 financial year was expected to be R191.685 billion, growing to R205.448 billion, R222.046 billion and R240.297 billion in the outer years of the medium term. Noting that "provinces face substantial spending pressures in health and education". Treasury has indicated that the health sector is "working with provincial treasuries on a three-year turnaround plan". A major challenge remains that of managing the public sector wage bill while at the same time facing increasing demands for healthcare services from an already over-stretched public health sector. The Treasury Budget Review also acknowledged the impact on provincial health budgets of the contingent liabilities for pending malpractice claims. It noted that the "value of claims against health departments grew from R43.1 billion in 2016 to R56.3 billion in 2017", and while acknowledging that "some of these claims relate to serious errors in clinical practice or hospital management", claimed that "others appear to be unjustified or excessive".

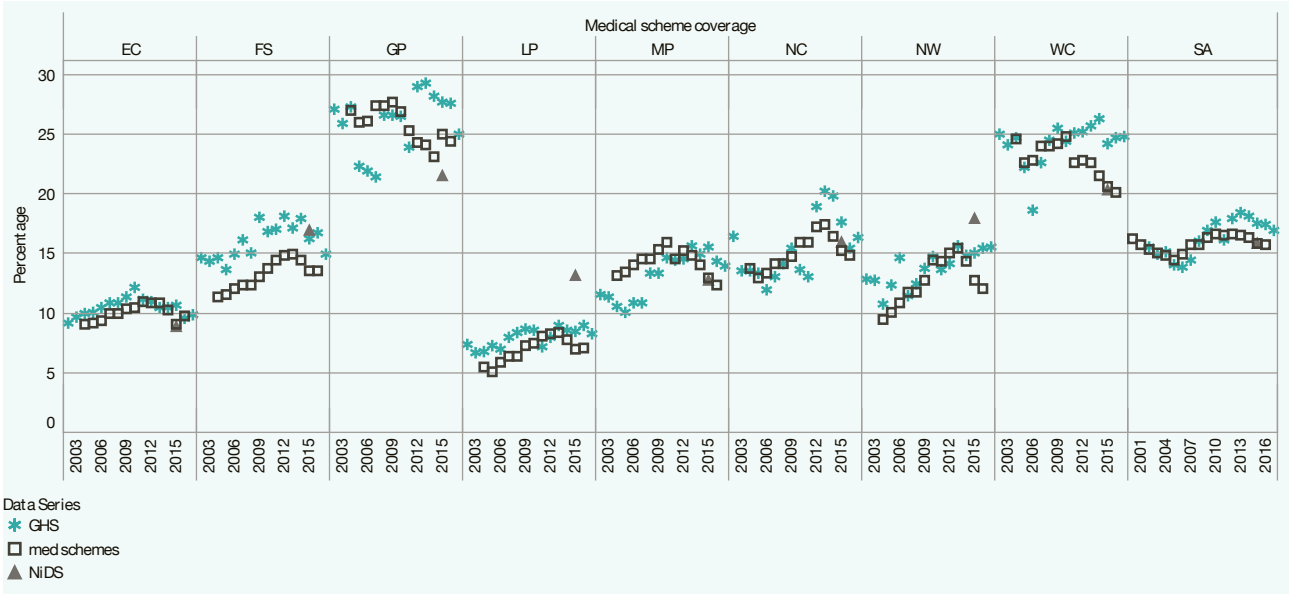
One of the major adjustments to the 2017 Medium Term Budget Policy Statement was the allocation of R4.2 billion (R700 million in year 1, R1.4 billion in year 2 and R2.1 billion in year 3) for national health insurance, funded by adjusting medical credits on personal income tax at a level below inflation for three years. Areas of focus for this grant will include the establishment of the interim NHI Fund and the development of health technology assessment capacity. An additional R2.3 billion over the medium term would also allow the Centralised Chronic Medicine Dispensing and Distribution (CCMDD) programme to service a total of 3 million patients. In 2018/19, the newly-established South African Health Products Regulatory Authority will receive R396.9 million in transfers, but will also need to generate additional revenue through fees for services. The health promotion levy, in the form of a tax on sugar-sweetened beverages, is expected to deliver R1.93 billion in additional revenues.

Private sector health expenditure is largely captured in the annual reports from the Council for Medical Schemes. The 2016/17 annual report showed that consolidation of schemes was continuing, 22 open schemes and 60 restricted schemes were registered at the end of 2016.[49] The number of benefit options registered per scheme was far higher for open schemes (on average 6.5) than for restricted schemes (on average 2.0), with the average for the entire industry being 3.5. The number of beneficiaries remained static, increasing by only 0.78% from 8 809 523 in December 2015 to 8 878 081 in December 2016 (of which 4 953 180, or 55.8%, were beneficiaries of open schemes). Total expenditure on healthcare benefits increased from R138.89 billion in 2015 to R151.21 billion in 2016, amounting to R17 157.77 per beneficiary per annum. The top 3 categories of expenditure were on hospitals (37.44%), medical specialists (24.02%) and medicines (and consumables) dispensed by pharmacists and providers other than hospitals (15.84%). The estimate of out-of-pocket expenditure from this source only reflects the difference between claims submitted and benefits paid, and amounted to R29.7 billion in 2016. The total gross non-healthcare expenditure in 2016 was reported to be R14.1 billion.

The recommendations of the Davis Tax Committee on the financing of National Health Insurance (NHI) were issued in March 2017.[301] While noting the lack of detail on the benefit package to be offered by NHI in particular, the Committee suggested that "substantial increases in VAT or PIT and/or the introduction of a new social security tax would be required to fund the NHI" (where PIT refers to personal income tax). The Committee also warned that the "magnitudes of the proposed NHI fiscal requirement are so large that they might require trade-offs with other laudable NDP programmes such as expansion of access to post school education or social security reform", and accordingly, that "the proposed NHI, in its current format, is unlikely to be sustainable unless there is sustained economic growth". Globally, between 1995 and 2014, economic development has been positively associated with increases in total health spending, and in particular a shift towards government spending rather than reliance on development assistance (donor funding) and out-of-pocket (OOP) expenditure.[302] This report from the Global Burden of Disease Health Financing Collaborator Network estimated South African OOP expenditure at 6.4% of the total of $1 172 per capita total health expenditure. Development assistance accounted for an estimated 2.4% of total health spending. Projected global expenditure on health to be able to meet the SDG 3 targets would need to increase by at least $274 billion, with the greatest demands being in terms of increased health workforce and infrastructure.[303] The Global Burden of Disease Health Financing Collaborator Network has also projected future health financing for the period 2016 to 2040, and has predicted that per capita health spending will rise fastest in upper middle-income countries, at 4.2% per year.[304] However, it is sobering to note that South Africa's UHC service coverage index is well below the 2015 starting point for the average upper middle-income country, so it would be hard-pressed to meet the projected 2030 index value for this group.

Figure 7 emphasises the difference in estimates of medical scheme coverage based on the Stats SA General Household Surveys and the Council for Medical Schemes reports, particularly in some provinces. The uninsured population is an important denominator for a number of indicators. The specific source used to estimate this number needs to be carefully checked when interpreting indicators over time.

Figure 7: Medical scheme coverage trends per province by source, 2002–2017



Source: Compiled from multiple sources.

Figure 8: Trends in provincial expenditure by programme (Rand billion, real 2017/18 prices), programme expenditure as % of total and percentage change since 2008/09

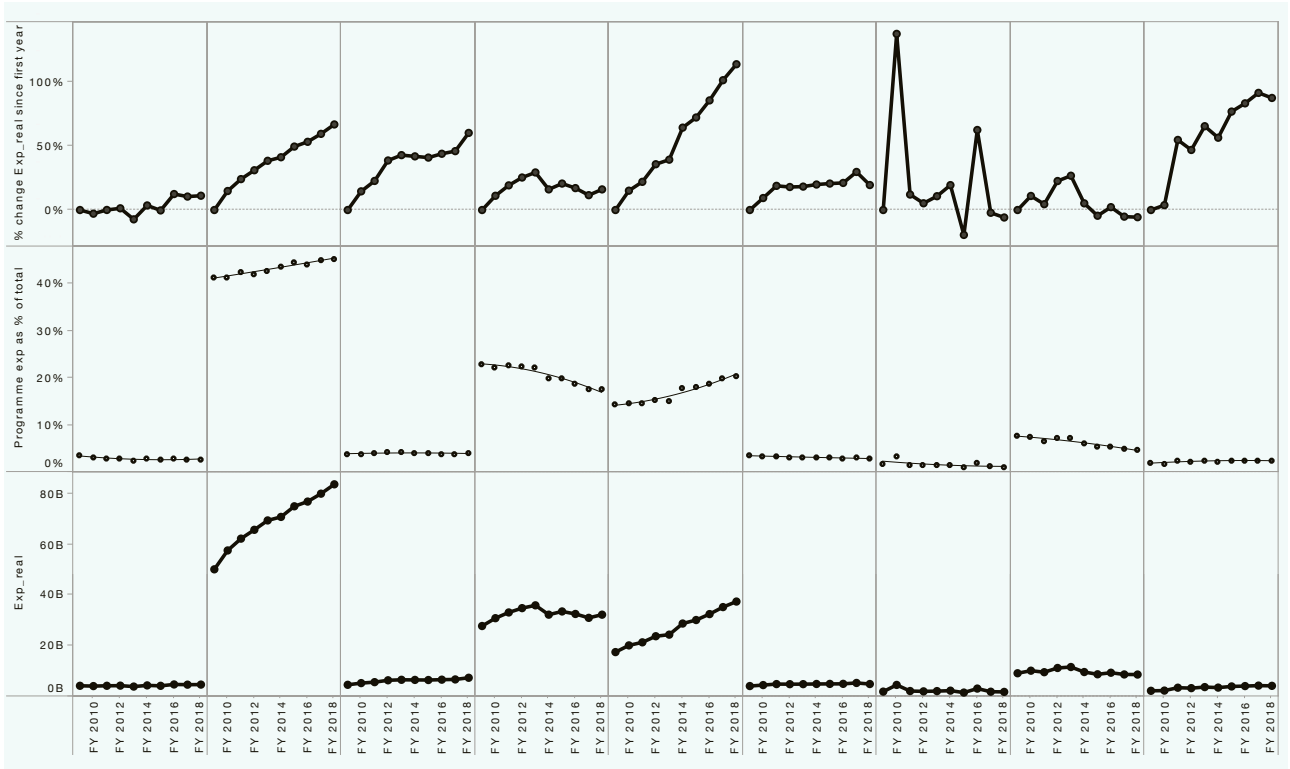


Figure 9: Trends in provincial expenditure by District Health Services sub-programme (Rand billion, real 2017/18 prices), programme expenditure as % of DHS expenditure and percentage change since 2008/09

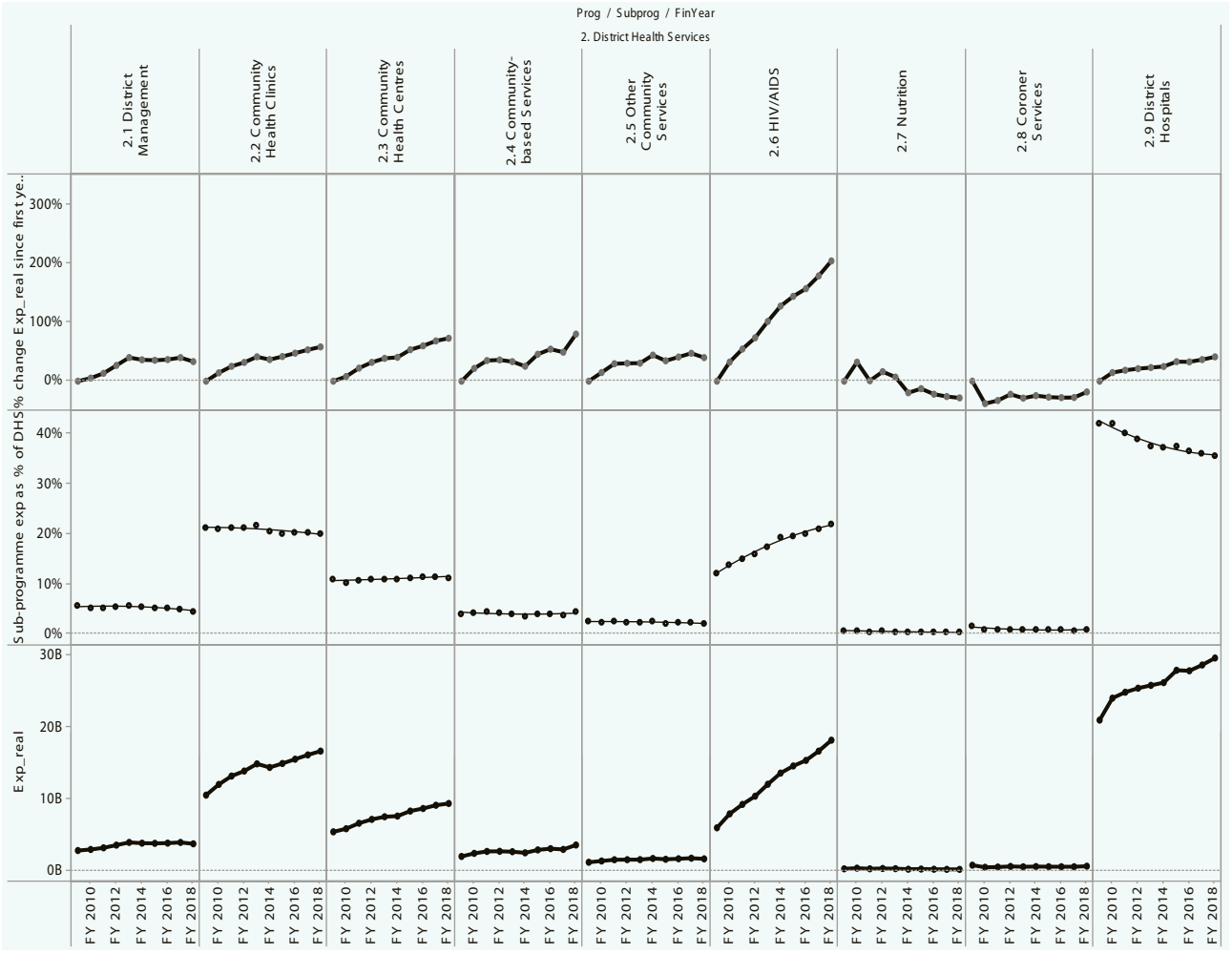


Table 49: Health financing indicators by province

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Claims ratio	2014	both sexes all ages med schemes										88.2	a
	2015	both sexes all ages med schemes										91.4	c
	2016	both sexes all ages med schemes										92.1	c
Expenditure per patient day equivalent (district hospitals)	2015/16	real 2017/18 prices	2 443.0	2 540.0	2 923.0	2 519.0	3 133.0	2 405.0	2 431.0	2 789.0	2 312.0	2 602.0	d
	2016/17	real 2017/18 prices	2 514.0	2 652.0	3 033.0	2 683.0	3 129.0	2 441.0	2 627.0	2 658.0	2 410.0	2 690.0	d
	2017/18	real 2017/18 prices	2 609.0	2 647.0	3 265.0	2 904.0	3 032.0	2 469.0	2 632.0	3 495.0	2 450.0	2 803.0	d
Health as percentage of total expenditure	2014/15	medium-term estimate										15.1	e
	2015	WHO										14.1	f
	2015/16	medium-term estimate										15.0	e
	2017/18	estimate										13.9	g
Medical scheme beneficiaries	2014	all ages med schemes	660 762	389 156	3 341 984	1 260 954	419 866	567 140	185 213	485 795	1 288 978	8 814 458	b
	2015	all ages med schemes	643 620	385 224	3 381 051	1 244 568	405 353	559 573	181 608	480 496	1 297 359	8 809 523	c
	2016	all ages med schemes	638 434	387 739	3 479 810	1 253 144	412 936	545 595	179 595	461 237	1 309 134	8 878 081	h

Indicator	Period	Sex|Age|Series|Cat	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Medical scheme coverage	2014–2015	both sexes all ages NiDS	8.9	16.9	21.5	11.6	13.1	12.7	15.9	17.9	20.3	15.8	i
	2015	both sexes <18 years LCS all children										12.4	j
		both sexes <18 years LCS food poverty line										18.4	k
		both sexes <18 years LCS non-poor										0.3	l
		both sexes all ages GHS	10.7	16.2	27.7	11.9	8.5	15.5	17.6	15.0	24.2	17.5	m
		both sexes all ages med schemes	9.1	13.5	25.0	11.2	7.0	12.9	15.2	12.7	20.6	15.8	b
	2016	both sexes all ages GHS	9.6	16.7	27.6	11.9	9.0	14.3	15.4	15.4	24.7	17.4	n
		both sexes all ages med schemes	9.8	13.5	24.4	11.3	7.1	12.3	14.8	12.0	20.1	15.7	c
	2017	both sexes all ages GHS	9.9	14.9	25.0	12.6	8.3	13.9	16.3	15.5	24.8	16.9	o
Pensioner ratio	2014	both sexes 65+ years med schemes										7.3	a
	2015	both sexes 65+ years med schemes										7.7	b
	2016	both sexes 65+ years med schemes										7.9	c
		female 65+ years med schemes										8.8	c
		male 65+ years med schemes										7.0	c
Per capita health expenditure	2014	med schemes										14 186.0	a
		public sector provincial expenditure	2 878.0	3 612.0	3 337.0	3 339.0	2 827.0	2 475.0	3 942.0	2 690.0	3 852.0	3 183.0	p
	2015	med schemes										15 823.0	b
		public sector provincial expenditure	3 304.0	3 762.0	3 903.0	3 623.0	2 958.0	2 763.0	4 419.0	2 885.0	4 242.0	3 530.0	p
	2016	med schemes										17 158.0	q
Proportion of population with large household expenditures on health as a share of total household expenditure or income	2007–2015	both sexes WHO >10%										1.4	f
		both sexes WHO >25%										0.1	f
Provincial & LG District Health Services expenditure per capita (uninsured)	2015/16	real 2017/18 prices	1 711.0	1 724.0	1 547.0	1 852.0	2 077.0	1 831.0	1 897.0	1 596.0	1 894.0	1 775.0	d
	2016/17	real 2017/18 prices	1 763.0	1 741.0	1 566.0	1 923.0	2 173.0	1 830.0	2 009.0	1 599.0	1 954.0	1 821.0	d
	2017/18	real 2017/18 prices	1 801.0	1 729.0	1 663.0	1 956.0	2 240.0	1 905.0	1 983.0	1 591.0	2 007.0	1 871.0	d
Provincial & LG PHC expenditure per capita (uninsured)	2015/16	real 2017/18 prices	894.0	1 085.0	1 216.0	1 167.0	895.9	899.9	1 177.0	1 070.0	1 163.0	1 075.0	d
	2016/17	real 2017/18 prices	948.3	1 094.0	1 224.0	1 241.0	903.6	922.6	1 229.0	1 097.0	1 222.0	1 112.0	d
	2017/18	real 2017/18 prices	980.9	1 103.0	1 296.0	1 257.0	972.0	1 011.0	1 264.0	1 116.0	1 242.0	1 155.0	d
Provincial & LG PHC expenditure per PHC headcount	2015/16	real 2017/18 prices	304.0	391.4	510.6	363.4	327.3	358.4	394.6	421.9	377.3	383.6	d
	2016/17	real 2017/18 prices	328.4	421.1	526.1	415.0	314.9	367.2	415.8	453.8	395.8	406.8	d
	2017/18	real 2017/18 prices	378.5	482.9	592.5	438.0	352.5	420.8	479.0	503.6	416.6	449.7	d
Total current expenditure on health as percentage of gross domestic product	2014	Treasury private sector										4.4	e
		Treasury public sector										4.3	e
		Treasury total										8.7	e
	2015	Treasury private sector										4.3	e
		Treasury public sector										4.2	e
		Treasury total										8.5	e
		WHO total										8.2	f
Total net official development assistance to medical research and basic health sectors per capita (US$), by recipient country	2016	WHO										1.6	f

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a Medical Schemes 2014–15.[305]
b Medical Schemes 2015–16.[48]
c Medical Schemes 2016–17.[49]

d DHB 2017/18.[306]
e Fiscal Review 2015.[307]
f World Health Statistics 2018.[76]
g Budget Review 2018.[300]
h Medical Schemes 2016–17.[49] SA total includes 2461 outside of the Republic & 207996 unclassified. Provincial numbers are calculated primarily on the basis of location of principal members.
i NiDS Wave 4 v1.1.[182]
j Stats SA Living Conditions 2014/15 (MWC).[216]
k Stats SA Living Conditions 2014/15 (MWC).[216] Poverty status below the food poverty line (FPL)
l Stats SA Living Conditions 2014/15 (MWC).[216] Poverty status above the food poverty line (FPL) – not poor.
m Stats SA GHS 2015.[47]
n Stats SA GHS 2016.[33]
o Medical Schemes 2016–17.[49] Calculated from Medical schemes beneficiaries per population from Stats SA mid-year estimates for 2017.
p National Treasury.[308]
q Medical Schemes 2016–17.[49] Average benefits paid per beneficiary per annum.

Table 50: Medical scheme coverage by population group

Indicator	Period	Sex|Age|Series|Cat	African/Black	Coloured	Indian/Asian	White	Ref
Medical scheme coverage	2014–2015	both sexes all ages NiDS	9.7	15.3	40.3	61.6	a
	2015	both sexes all ages GHS	10.6	19.3	44.5	73.3	b
	2016	both sexes all ages GHS	10.5	19.7	49.5	72.2	c
	2017	both sexes all ages GHS	10.1	20.2	48.9	72.4	d

Reference notes (indicator definitions from page 233 and bibliography of reference sources from page 242):

a NiDS Wave 4 v1.1.[182]
b Stats SA GHS 2015.[47]
c Stats SA GHS 2016.[33]
d Stats SA GHS 2017.[34]

Table 51: Trends in overall provincial and local government health expenditure by programme (Rand million, real 2017/18 prices), 2008/09 – 2017/18

Rand million	Financial Year									
Programme	2008/09	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018
1. Administration	4 219	4 098	4 221	4 275	3 911	4 370	4 206	4 745	4 662	4 690
2. District Health Services	50 147	57 590	62 253	65 731	69 430	70 819	75 002	76 866	79 985	83 671
3. Emergency Health Services	4 606	5 278	5 652	6 388	6 581	6 536	6 492	6 630	6 725	7 380
4. Provincial Hospital Services	27 788	30 879	33 139	34 844	35 944	32 264	33 533	32 545	31 011	32 262
5. Central Hospital Services	17 504	20 148	21 357	23 764	24 388	28 770	30 155	32 493	35 254	37 437
6. Health Sciences and Training	4 113	4 499	4 890	4 853	4 866	4 933	4 964	4 984	5 337	4 916
7. Health Care Support Services	1 919	4 559	2 150	2 020	2 126	2 292	1 545	3 118	1 877	1 806
8. Health Facilities Management	9 164	10 171	9 580	11 240	11 619	9 642	8 754	9 369	8 690	8 651
Local government expenditure	2 239	2 324	3 464	3 289	3 704	3 503	3 960	4 104	4 287	4 199
Other	-30	-55	-20	4	5					-0
Total	121 669	139 489	146 688	156 408	162 574	163 128	168 611	174 854	177 828	185 013

Source: National Treasury databases.

Note: 'Other' includes any other expenditure no indicated as being allocated to any of the above budget programmes.

Table 52: Provincial and local government health expenditure per province by programme (Rand million), 2017/18

Rand million	Financial Year 2017/18									
Programme	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA
1. Administration	590	289	1 085	837	293	342	231	303	721	4 690
2. District Health Services	11 343	4 165	13 684	19 227	12 008	7 182	1 989	5 335	8 739	83 671
3. Emergency Health Services	1 279	807	1 219	1 378	732	372	303	296	995	7 380
4. Provincial Hospital Services	3 488	1 277	7 892	10 639	2 389	1 303	339	1 555	3 380	32 262
5. Central Hospital Services	3 473	2 300	15 317	4 864	1 727	1 121	954	1 553	6 130	37 437
6. Health Sciences and Training	733	283	919	1 246	560	368	99	390	317	4 916
7. Health Care Support Services	100	151	290	198	125	177	92	237	437	1 806
8. Health Facilities Management	1 275	529	1 608	1 523	557	1 185	561	634	780	8 651
Local government expenditure	168	10	2 591	357	63	82	31	75	822	4 199
Total	22 448	9 812	44 605	40 268	18 452	12 131	4 598	10 379	22 320	185 013

Source: National Treasury databases.

Table 53: Provincial health expenditure on district health services per province by sub-programme (Rand million), 2017/18

Rand million	Financial Year 2017/18									
	2. District Health Services									
Sub-programme	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA
2.1 District Management	882	125	525	302	617	332	172	407	396	3 757
2.2 Community Health Clinics	2 420	911	2 416	4 020	2 934	1 303	444	956	1 239	16 645
2.3 Community Health Centres	949	147	1 792	1 625	551	896	289	1 077	2 038	9 364
2.4 Community-based Services	525	395	1 781	306	221	137		8	217	3 590
2.5 Other Community Services	81			1 071	108		68	338	0	1 667
2.6 HIV/AIDS	2 046	1 164	3 890	5 019	1 354	1 421	453	1 291	1 528	18 166
2.7 Nutrition	25	10	50	42	7	17	2	2	48	202
2.8 Coroner Services	101	39	214	222				67	0	642
2.9 District Hospitals	4 314	1 373	3 015	6 619	6 216	3 078	561	1 189	3 232	29 597
2. Other*									41	41
Grand Total	11 343	4 165	13 684	19 227	12 008	7 182	1 989	5 335	8 739	83 671

Source: National Treasury databases.

Conclusion

This chapter has focused on the extent to which South Africa is, with current health financing arrangements, managing to meet the demands of universal health coverage (UHC). One way to measure this is through calculation of the UHC service coverage index. On that basis, South Africa is currently assigned an index of 67, marginally above the global median of 65. As this chapter has shown, applying the best available local data does not materially affect the index estimate. As always, caution must be exercised when comparing figures over time, as the definitions and sources may have changed. Nonetheless, the range of data sources continues to expand, allowing greater opportunities for triangulation of data and attention to issues of data quality, reliability and timeliness. An exception, though, is the extent to which an accurate picture of human resources for health can be gleaned from routine sources. Updated and accurate data for both the public and private sectors, by specific cadres, are crucial to effective planning and action. As national figures can hide important sources of inequality, data will need to be disaggregated by key dimensions of inequality. This chapter has identified where existing data can be disaggregated by wealth quintile, educational attainment, place of residence, sex and age. However, these are not the only dimensions of inequality that are relevant in South Africa, so close attention to this aspect will be needed. As the implementation of South Africa's plans to attain UHC by means of the introduction of NHI progress, systematic inclusion of data from the private sector will become the norm rather than the exception. Lastly, meaningful accountability demands that any measures of performance are publicly accessible, transparent, vigorously interrogated, and result in effective remedial action. That remains a key contribution of the *Review* and of this chapter.

Acknowledgements

As in previous years, this chapter is very much the product of collective efforts at all levels of the health system over many years. In particular we acknowledge the national and provincial Departments of Health for the use of data from the District Health Information System and various other databases and publications. Other people and institutions have also contributed significantly. We also appreciate the perceptive comments and strategic inputs of the team of reviewers.

Appendices

Indicator definitions for data tables presented in this chapter

Demographic	Population	Adolescent fertility rate [per 1 000 girls aged 15–19 years]	Annual number of births to women aged 15–19 years per 1 000 women in that age group. Also referred to as the age-specific fertility rate for women aged 15–19 years.
		Ageing index [Number]	Ratio of the number of people 65+ to the number under 15 years. i.e. a value of 16 means there are 16 people aged 65 and over for every 100 under 15 years of age. Calculated as ([65+/0–14]*100)
		Annual population growth rate [%]	The rate at which the population is increasing or decreasing in a given year expressed as a percentage of the base population size. It takes into consideration all the components of population growth, namely births, deaths and migration.
		Area (square km) [km^2]	Land area covered by geographic entity.
		Area as a % of total area of South Africa [%]	Area of province divided by total area of country (South Africa).
		Average household size [Number]	Average number of people living in each household where household is defined as a person, or a group of persons, who occupy a common dwelling (or part of it) for at least four days a week and who provide themselves jointly with food and other essentials for living. In other words, they live together as a unit. People who occupy the same dwelling, but who do not share food or other essentials, are enumerated as separate households.
		Crude death rate [deaths per 1 000 population]	Number of deaths in a year per 1 000 population.
		Live birth occurrences registered [Number]	The number of live birth occurrences registered.
		Population [Number]	Total number of people.
		Population % by population group [%]	Proportion of South African population in each population (ethnic) group (calculated from number of people per population group and population for whole of South Africa).
		Population % by province [%]	Proportion of South African population in each province (calculated from population per province and population for whole of South Africa).
		Population density [people per km^2]	The number of people per square kilometre.
		Public sector dependent (uninsured) population [Number]	This is an adjustment of the total population to the number assumed to be dependent on services in the public health sector based on medical scheme (health insurance) coverage. It is calculated by subtracting the number of people with medical scheme cover (determined from medical scheme membership reports, or surveys indicating percentage of population on medical schemes) from the total population.
		Total fertility rate [Number]	The average number of children that a woman gives birth to in her lifetime, assuming that the prevailing rates remain unchanged.
		Urban percentage [%]	Proportion of population living in urban environment. An urban area is one which has been legally proclaimed as being urban e.g. towns, cities and metropolitan areas.
Socio-economic and risk factors	Development	Poverty prevalence [%]	Proportion of people/households living in poverty. Depending on the poverty line and the methodology used there are various estimates of the extent of poverty, therefore caution should be observed in comparing estimates from different sources, and comparative reliability can be assessed from the rank order correlation between different sets of estimates.
	Education	Education level: percentage of population with no schooling [%]	Percentage of people in a given age group who have received a particular level of education.
	Employment	Unemployment rate (official definition) [%]	The official definition of the unemployed is that they are those people within the economically active population (aged 15–65) who (a) did not have a job or business during the 7 days prior to the interview, (b) want to work and are available to work within two weeks of the interview, and (c) have taken active steps to look for work or to start some form of self-employment in the 4 weeks prior to the interview. Note that the census produces lower estimates of labour force participation because there are less prompts to identify employed people, and the Labour Force Survey provides the official labour market statistics.
	Environmental risks	Age-standardized mortality rate attributed to household and ambient air pollution [per 100 000 population]	The mortality attributable to the joint effects of household and ambient air pollution.
		Air pollution level in cities [particulate matter (PM)]	Annual mean concentration of particulate matter of less than 2.5 microns of diameter ($PM_{2.5}$) [ug/m3] (or of less than 10 microns [PM10] if $PM_{2.5}$ is not available) in cities.
		Average death rate due to natural disasters [per 100 000 population]	Number of deaths, missing persons and directly affected persons attributed to disasters per 100 000 population.
		Drinking Water System (Blue Drop) Performance Rating [%]	Composite score measuring compliance of water suppliers with water quality management requirements. Includes microbiological, chemical and physical compliance criteria.
	Household Facilities	Mortality rate attributed to exposure to unsafe WASH services [per 100 000 population]	Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services)
		Percentage of households by type of housing [%]	Percentage of households that are categorised as formal, informal, traditional or other.
		Percentage of households using electricity for cooking [%]	Percentage of households using electricity as their main energy source for cooking.
		Percentage of households with access to piped water [%]	Includes households with piped water in dwelling, piped water inside yard or piped water on a community stand (< 200m away or further).
		Percentage of households with telephone (telephone in dwelling or cell phone) [%]	Percentage of households with a telephone in the dwelling or a cellular telephone.

		Percentage of people with access to improved sanitation [%]	Percentage of the population using improved sanitation facilities (including flush to piped sewer system, flush to septic tank, flush/pour flush to pit, flush/pour flush to elsewhere).
		Percentage of population with primary reliance on clean fuels [%]	Percentage of population with primary reliance on clean fuels
		Percentage of population with sustainable access to an improved water source [%]	'Improved' water supply technologies are: household connection, public standpipe, borehole, protected dug well, protected spring, rainwater collection. 'Not improved' are: unprotected well, unprotected spring, vendor-provided water, bottled water (based on concerns about the quantity of supplied water, not concerns over the water quality), tanker truck provided water. It is assumed that if the user has access to an 'improved source' then such source would be likely to provide 20 litres per capita per day at a distance no longer than 1 000 metres.
Mortality	Mortality	Adult mortality (45q15 – probability of dying between 15–60 years of age) [%]	The probability of dying between the ages of 15 and 60 years of age (percentage of 15-year-olds who die before their 60th birthday).
		Healthy life expectancy (HALE) [Years]	Healthy life expectancy or health-adjusted life expectancy is based on life expectancy at birth but includes an adjustment for time spent in poor health. It is most easily understood as the equivalent number of years in full health that a newborn can expect to live based on current rates of ill-health and mortality.
		Life expectancy at birth [Year]	The average number of additional years a person could expect to live if current mortality trends were to continue for the rest of that person's life.
Disability	Disability	Cataract surgery rate [per 1 million uninsured]	Cataract operation per million of the population.
		Prevalence of disability [%]	Recent surveys use the International Classification of Functioning, Disability and Health (ICF) approach where respondents are asked about 'difficulty' with various activities rather than disability, with a continuum from 'no difficulty' to 'not able'.
Infectious Disease	Infectious Disease	Prevalence of hepatitis B surface antigen [%]	Prevalence of hepatitis B surface antigen (HBsAg)-positive, adjusted for sampling design. Although there is some literature about hepatitis B prevalence in South Africa the studies quoted appear to be from 1970s and 1980s.
		Reported cases of cholera [Number]	The number of cases of cholera reported to the Department of Health. Since case reporting of notifiable diseases has been incomplete and delayed for several years, the number of laboratory-confirmed cases from NHLS has been included where available, although these would be expected to include only a subset of the total number of notified cases.
		Reported cases of measles [Number]	Number of cases of measles reported to the National Department of Health per year. Since case reporting of notifiable diseases has been so incomplete and delayed for several years, the number of laboratory confirmed cases from NHLS has been included where available, although these would be expected to include only a subset of the total number of notified cases.
		Reported cases of rabies [Number]	Number of cases of rabies reported per year. Since case reporting of notifiable diseases has been incomplete and delayed for several years, the number of laboratory-confirmed cases from NHLS has been included where available, although these would be expected to include only a subset of the total number of notified cases.
		Reported number of people (in thousands) requiring interventions against NTDs [per 1 000 population]	
		Syphilis prevalence rate (antenatal) [%]	Percentage of women surveyed testing positive for syphilis.
	Malaria	Case fatality rate: malaria [%]	Number of deaths divided by number of cases expressed as a percentage.
		Malaria mortality rate [per 100 000 population]	Number of adults and children who have died due to malaria in a specific year, expressed as a rate per 100 000 population.
		Reported cases of malaria [per 100 000]	The number of cases of malaria reported to the Department of Health per 100 000 population (for the relevant year). Also known as incidence of malaria.
		Reported cases of malaria [Number]	The number of cases of malaria reported to the Department of Health.
		Reported deaths from malaria [Number]	The number of deaths from malaria reported to the Department of Health or recorded in vital registration (ICD-10 codes B50-B54).
Tuberculosis (TB)	Case finding	Incidence of TB (all types) [per 100 000]	Estimated number of cases of tuberculosis (all types) per 100 000 population (for the year). Adjusted for estimated under-reporting of TB cases and other factors.
		Incidence of TB DS (cases started on treatment) (ETR.net) [Cases per 100 000 population]	Drug sensitive (DS) TB cases started on treatment (in ETR.net) per 100 000 people in the catchment population.
		MDR-TB started on treatment [Number]	Number of MDR-TB patients who started treatment.
		Number of TB DS cases started on treatment (ETR.net) [Number]	Number of drug sensitive (DS) TB cases started on treatment in ETR.net.
		Prevalence of multidrug resistance among new TB cases [%]	Estimated percentage of new cases of TB which are multidrug resistant.
		Reported cases of MDR-TB [Number]	Number of laboratory-diagnosed cases of MDR-TB. MDR-TB is defined as resistance to rifampicin and isoniazid, with or without resistance to other first-line anti-TB drugs.
		Reported cases of TB (all types) [per 100 000]	Number of cases of tuberculosis (all types) reported to the Department of Health per 100 000 population (for the year).
		TB Rifampicin resistance confirmed client rate	Percentage of positive TB tests that are RIF resistant (based only on tests done using GeneXpert technology).
		XDR-TB started on treatment [%]	Number of XDR-TB patients who started treatment.
	Programme Management	Case detection rate (all forms) [%]	Proportion of incident cases of TB (all types) that were notified. For a given country, it is calculated as the number of notified cases of TB in one year divided by the number of estimated incident cases of TB in the same year, and expressed as a percentage.
		HIV prevalence in TB incident cases [%]	Percentage of new TB cases that are HIV-positive.

		Tuberculosis death rate per 100 000 (in HIV-positive people) [%]	Number of deaths due to TB in HIV-positive people per 100 000 population. Note that these deaths are officially classified as being caused by HIV/AIDS according to the International classification of diseases.
		Tuberculosis mortality rate per 100 000 (excluding HIV) [per 100 000 population]	Number of deaths due to tuberculosis (all types) reported per 100 000 population (for the year). The reported TB mortality excludes deaths occurring in HIV-positive TB cases, in accordance with the definition used in ICD-10.
		Tuberculosis prevalence rate [per 100 000 population]	Number of people with TB (all types) per 100 000 population.
	Treatment outcomes	TB client lost to follow up rate (ETR.net) [%]	The percentage of TB clients (all types of TB) who defaulted treatment.
		TB death rate (ETR.net) [%]	The percentage of TB clients (all types of TB registered in ETR.net) who died.
		TB DR client death rate (EDRWeb) [%]	The percentage of TB clients (DR TB) who died.
		TB DR client loss to follow up rate (EDRWeb) [%]	The percentage of TB clients (DR TB) who are lost to follow up.
		TB DR treatment success rate (EDRWeb) [%]	The percentage of TB clients (DR TB) cured plus those who completed treatment.
		TB treatment failure (ETR.net) [%]	The percentage of TB clients (all types of TB) who failed treatment.
		TB treatment success rate (ETR.net) [%]	The percentage of TB clients (all types registered in ETR.net) cured plus those who completed treatment.
HIV and AIDS	HIV and AIDS	Adult Remaining in care (RIC) after 12 months [%]	Cumulative proportion of clients on treatment after interval. This value will enable the programme to assess retention on treatment over time.
		Adult remaining on ART at end of the month – total [Number]	
		Adult with viral load completion rate at 12 months [%]	Proportion of clients still on treatment who had viral load test done at specific time intervals.
		Adult with viral load suppressed rate 12 months [%]	Proportion of ART clients with viral load suppressed at different time intervals. This indicates the population level immunological impact of clients on ART.
		Antiretroviral coverage (2nd 90) [%]	The number of patients receiving ART, divided by the number needing treatment. The denominator has changed over time, due to changes in treatment guidelines affecting the criteria for treatment eligibility. The latest definition is that all HIV-infected patients should be on ART. This indicator is also one of the 90-90-90 global targets for AIDS (UNAIDS).
		Antiretroviral treatment exposure [%]	Percentage of people living with HIV on ART. Measured by laboratory testing for antiretroviral drugs in HIV-positive samples.
		Child Remaining in care (RIC) after 12 months [%]	Cumulative proportion of clients on treatment after interval. This value will enable the programme to assess retention on treatment over time.
		Child under 15 years remaining on ART at end of the month – total [Number]	
		Child with viral load completion rate at 12 months [%]	Proportion of clients still on treatment who had viral load test done at specific time intervals.
		Child with viral load suppressed rate 12 months [%]	Proportion of ART clients with viral load suppressed at different time intervals. This indicates the population level immunological impact of clients on ART.
		Clients remaining on ART rate [%]	Percentage of estimated people living with HIV who remain on ART.
		HIV testing coverage (excluding ANC) [%]	Clients HIV tested as proportion of population 15–49 years.
		HIV testing coverage [%]	Percentage of target population who have been tested for HIV.
		HIV testing coverage age 19 months and older [%]	Clients 19 months and older who were tested for HIV as a proportion of the population one year and older
		HIV viral load suppression (3rd 90) [%]	Percentage of people on ART who are virologically suppressed (VL level <= 1 000 copies/mL).
		Male circumcision (% of men who are circumcised) [%]	The percentage of men (15–59 years, unless otherwise specified) who have been circumcised.
		Medical male circumcision 10 years and older [Number]	Males 10 years and older who are circumcised under medical supervision
		Medical male circumcision rate [%]	Number of medical male circumcisions per 1 000 males 10 years and older
		Number of patients receiving ART	Number of patients receiving ART.
		People living with HIV [Number]	The number of people who are HIV-positive.
		People with HIV receiving antiretroviral therapy and virally suppressed [%]	Proportion of HIV-positive adults on ART and virally suppressed
		Percentage of deaths due to AIDS [%]	Percentage of total deaths attributed to AIDS related causes.
		Percentage of people living with HIV (PLHIV) who know their status (1st 90) [%]	Percentage of people living with HIV who know their HIV status.
		Percentage of TB cases with known HIV status (ETR.net) [%]	Percentage of TB cases (all TB) with known HIV status (positive or negative).
		TB/HIV co-infected client on ART rate (ETR.Net) [%]	Percentage of HIV-positive TB cases (all TB) who are recorded as being on ART.
	Incidence and prevalence	HIV incidence [%]	The HIV incidence rate is the percentage of people who are uninfected at the beginning of the period who will become infected over the twelve months.
		HIV prevalence (age 15–49) [%]	Percentage of population (age 15–49) estimated to be HIV-positive.
		HIV prevalence (total population) [%]	Percentage of population estimated to be HIV positive. WHO Core indicator is given per 1 000 population rather than %.
		HIV prevalence among antenatal clients (15–49 years) [%]	The proportion of antenatal clients surveyed who tested positive for HIV.
		HIV prevalence among antenatal clients [%]	Percentage of women surveyed testing positive for HIV.

Maternal and reproductive health	PMTCT	Antenatal client HIV 1st test positive rate [%]	Antenatal clients tested HIV positive as the proportion of antenatal clients HIV tested for the first time during current pregnancy.
		Antenatal client initiated on ART rate [%]	Antenatal clients on ART as a proportion of the total number of antenatal clients who are HIV positive and not previously on ART.
		HIV PCR birth testing coverage [%]	The percentage of infants born to HIV-positive mothers who receive a PCR test within 7 days of birth.
		HIV test around 18 months uptake rate [%]	Infant rapid HIV test around 18 months after birth as the proportion of infants under 18 months.
		Infant PCR test positive around 10 weeks rate [%]	Infants tested PCR positive for follow up test as a proportion of Infants PCR tested around 10 weeks
		Percentage PCR tests positive within 6 days [%]	The percentage of PCR tests that are positive for HIV (in infants within 7 days of birth).
	Maternal Health	Antenatal 1st visit before 20 weeks rate [%]	Women who have a booking visit (first visit) before they are 20 weeks (about half way) into their pregnancy as a proportion of all antenatal 1st visits
		Antenatal care coverage [%]	Proportion of pregnant women receiving some antenatal care. DHIS data source: Estimated from the number of first ANC visits divided by the population under 1 year x 1.15 (as a proxy for the number of pregnant women).
		Births attended by skilled health personnel [%]	Percentage of women who gave birth in the 5 years preceding the survey who reported receiving medical assistance at delivery from either a doctor, a nurse or a midwife.
		Delivery by Caesarean section rate (district hospitals) [%]	Caesarean section deliveries, expressed as the proportion of total deliveries in facility
		Delivery by Caesarean section rate [%]	Percentage of births that are by Caesarean section.
		Delivery in facility – total [Number]	Any delivery taking place in a health facility under the supervision of trained medical/nursing staff
		Delivery in facility rate [%]	The proportion of deliveries taking place in health facilities under supervision of trained personnel.
		Delivery in facility under 18 years rate [%]	The proportion of pregnant women under 18 years at delivery
		Live birth in facility[Number]	Live birth resulting from a delivery in a facility
		Maternal mortality ratio (MMR) [per 100 000 live births]	The number of women who die as a result of childbearing, during the pregnancy or within 42 days of delivery or termination of pregnancy in one year, per 100 000 live births during that year.
		Maternal mortality ratio in facility / institutional (iMMR) [per 100 000 live births]	The number of women who die as a result of childbearing, during the pregnancy or within 42 days of delivery or termination of pregnancy in one year, per 100 000 live births during that year.
		Mother postnatal visit within 6 days rate [%]	Mothers who receive postnatal care within 6 days of delivery after discharge from place of delivery as proportion of all deliveries in facility
		Number of maternal deaths [Number]	The number of women who die as a result of childbearing, during the pregnancy or within 42 days of delivery or termination of pregnancy in one year. In the International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, 1992 (ICD-10), WHO defines maternal death as: The death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes. For countries using ICD-10 coding for registered deaths, all deaths coded to the maternal chapter (O codes) and A34 (maternal tetanus) were counted as maternal deaths. Note that the system of Confidential Enquiries into Maternal Deaths (NCCEMD) only captures INSTITUTIONAL deaths, and thus is known to miss deaths occurring at home. The confidential enquiry system is ideally suited to identifying the most common causes of death and being able to rank the causes of death according to priority.
		PM (proportion of deaths among women of reproductive age that are due to maternal causes) [%]	An alternative measure of maternal mortality, the proportion of deaths among females of reproductive age (PMDF) that are due to maternal causes, is calculated as the number of maternal deaths divided by the total deaths among females aged 15–49 years.
	Neonatal	Early neonatal death in facility rate [per 1 000 live births]	Early neonatal deaths per 1 000 infants who were born alive in health facilities.
		Live birth under 2500g in facility rate [%]	Percentage of live births under 2 500g. Was previously called 'Low birth weight rate' in DHIS.
		Neonatal death in facility rate [per 1 000 live births]	Infants 0–28 days who died during their stay in the facility per 1 000 live births in facility
		Neonatal mortality rate (NNMR) (deaths <28 days old per 1 000 live births) [per 1 000 live births]	Number of deaths within the first 28 days of life, in a year, per 1 000 live births during that year.
		Perinatal mortality rate (stillbirths plus deaths <8 days old per 1 000 total births) [per 1 000 total births]	The number of perinatal deaths per 1 000 births. The perinatal period starts as the beginning of foetal viability (28 weeks gestation or 1 000g) and ends at the end of the 7th day after delivery.
		Stillbirth in facility rate [per 1 000 births]	Stillbirths in facility per 1 000 total births in a facility
		Stillbirth rate [per 1 000 total births]	Number of stillbirths per 1 000 total births.
	Reproductive Health	Age of first sex under 15 years (% having first had sex at age 14 or younger) [%]	Percentage of people surveyed (of various age groups) who report having first had sexual intercourse at age 14 years or younger. The age cut-off varies slightly between surveys with the HSRC HIV Household survey including 'under 15 years' compared to the NYRBS which includes 'under 14 years'.
		Cervical cancer screening coverage [% of women 30+ /10]	Women 30 years and older with a cervical (pap) smear done for screening purposes according to the national policy of screening all women in this age category every 10 years, as the proportion of all women 30 years and older in the target population
		Condom use at last sex [%]	Percentage of those, who reported ever having had sex, who used a condom the last time they had sex. Note that the precise definition of this indicator varies between surveys.
		Condom use at the last high-risk sex [%]	Percentage who say they used a condom the last time they had sex with a non-marital/non-cohabiting partner, of those who were sexually active in the last 12 months.
		Condom use rate of the contraceptive prevalence rate [%]	Condom use to overall contraceptive use among currently married women aged 15–49, per cent.

Child Health		Contraceptive prevalence rate (any method) [%]	Percentage of women of reproductive age (15–49) who are using (or whose partner is using) a modern contraceptive method. Contraceptive methods include female and male sterilisation, injectable and oral hormones, intrauterine devices, diaphragms, spermicides and condoms, natural family planning and lactational amenorrhoea.
		Couple year protection rate [%]	Women protected against pregnancy by using modern contraceptive methods, including sterilisations, as proportion of female population 15–49 year. Couple year protection is the total of (Oral pill cycles / 15) + (Medroxyprogesterone injection / 4) + (Norethisterone enanthate injection / 6) + (IUCD x 4.5) + (Sub dermal implant x 2.5) + Male condoms distributed / 120) + (Female condoms distributed / 120) + (Male sterilisation x 10) + (Female sterilisation x 10).
		Demand for family planning satisfied with modern methods [%]	Percentage of women of reproductive age (15–49 years) who are sexually active and who have their need for family planning satisfied with modern methods.
		HIV knowledge: correct knowledge about prevention and rejection of major misconceptions [%]	The percentage of people who correctly answer a composite measure of accurate knowledge of two questions related to HIV prevention in combination with rejecting four myths and misconceptions about the disease. The two questions on prevention of HIV transmission were 'To prevent HIV infection, a condom must be used for every round of sex' and 'One can reduce the risk of HIV by having fewer sexual partners' while the four questions about myths and misconceptions were 'There is a cure for AIDS', 'AIDS is caused by witchcraft', 'HIV causes AIDS', and 'AIDS is cured by having sex with a virgin'.
		Male condom distribution coverage [condoms per male 15 years and older]	Number of male condoms distributed to clients via the facility or via factories, offices, restaurants, NGOs or other outlets – per male 15 years and older
		Male condoms distributed [thousands]	Number of male condoms distributed. Data should be interpreted with caution depending on what distribution channel it is for – i.e. condoms distributed by national to provinces, or number distributed through PHC facilities (since some condoms are distributed to provinces, that are then distributed through several channels including PHC facilities).
		Teenage pregnancy [%]	Percentage of women aged 15–19 who are mothers or who have ever been pregnant. The percentage of women who are mothers at the time of the survey is a more restrictive definition. Note that some of the surveys report this indicator as the percentage who have ever been pregnant of those WHO HAVE EVER HAD SEX. This is a different denominator to that used by the Demographic and Health Surveys, and the data can therefore not be directly compared.
		Unmet need for family planning [%]	Women with unmet need for family planning for limiting births are those who are fecund and sexually active but are not using any method of contraception, and report not wanting any more children. This is a subcategory of total unmet need for family planning, which also includes unmet need for spacing births. The concept of unmet need points to the gap between women's reproductive intentions and their contraceptive behaviour.
	Termination of Pregnancy	ToP rate as percentage of pregnant women [%]	Percentage of pregnant women who have had an abortion. DHIS definition: Termination of pregnancies performed in a health facility as the proportion of all expected pregnancies in the catchment population.
		ToPs (Terminations of Pregnancy) [Number]	The number of terminations of pregnancy.
	Child Health	Child under 5 years diarrhoea with dehydration incidence [Cases per 1 000 children]	Children under 5 years newly diagnosed with diarrhoea with dehydration per 1 000 children under 5 years in the population.
		Child under 5 years pneumonia incidence [Cases per 1 000 children]	Children under 5 years newly diagnosed with pneumonia per 1 000 children under 5 years in the population.
		Child under 5 years severe acute malnutrition incidence [Cases per 1 000 children]	Children under 5 years newly diagnosed with severe acute malnutrition per 1 000 children under 5 years in the population.
		Children living far from their usual health facility [%]	This indicator reflects the distance from a child's household to the health facility they normally attend. Distance is measured through a proxy indicator: length of time travelled to reach the nearest health facility, by whatever form of transport is usually used. The health facility is regarded as 'far' if a child would have to travel more than 30 minutes to reach it, irrespective of mode of transport.
		Children with diarrhoea receiving oral rehydration solution (ORS) [%]	Percentage of children under 5 years of age with diarrhoea in the last two weeks receiving ORS (fluids made from ORS packets or pre-packaged ORS
		Percentage of children under 5 years of age with suspected pneumonia taken to a health facility [%]	Percentage of children under 5 years of age with suspected pneumonia (cough and difficult breathing NOT due to a problem in the chest and a blocked nose) in the two weeks preceding the survey taken to an appropriate health facility or provider.
	Child mortality and related	Child mortality [deaths between 1–4 years per 1 000 live births]	The number of children aged 12 months to 5 years (i.e. to the end of the 4th year) who die in a year, per 1 000 live births.
		Infant mortality rate [deaths under 1 year per 1 000 live births]	The number of children less than one year old who die in a year, per 1 000 live births during that year.
		Number of under-5 deaths [Number]	The estimated number of deaths in children younger than 5 years.
		Post-neonatal mortality rate [deaths 28–365 days age per 1 000 live births]	Number of deaths occurring between 28 and 365 days after birth per 1 000 live births in the same period.
		Under 5 mortality rate [deaths under 5 years per 1 000 live births]	The number of children under 5 years who die in a year, per 1 000 live births during the year. It is a combination of the infant mortality rate, plus the age 1–4 mortality rate.
	Immunisation	BCG coverage [%]	The proportion of expected live born babies that received BCG under 1 year of age (note: usually given immediately after birth)
		DTaP-IPV-Hib-HBV 4th dose coverage [%]	Children under 1 year who received DTaP-IPV-Hib-HBV 4th dose, normally at 18 months as a proportion of the 1 year population. Both Pentaxim and Hexavalent will form part of the numerator to ensure accurate coverage of historical data.
		DTaP-IPV-Hib-HBV (Hexavalent) 3rd dose [Number]	DTaP-IPV-Hib-HBV (also known as Hexavalent) 3rd dose vaccination given to a child under one year – preferably at around 14 weeks after birth
		DTP3 coverage [%]	The proportion of children who received their third DTP-Hib doses (normally at 14 weeks).
		Immunisation coverage of children 12–23 months [%]	Proportion of children aged 12 to 23 months who had received BCG, 3 doses of DTP and polio, and Measles vaccine, but not necessarily Hepatitis B.
		Immunisation under 1 year coverage [%]	The proportion of all children in the target area under one year who complete their primary course of immunisation. A Primary Course includes BCG, OPV 1,2 & 3, DTP-Hib 1,2 & 3, HepB 1,2 & 3, and 1st measles (usually at 9 months).
		Immunised fully under 1 year new [%]	A child who have completed his/her primary course of immunisation before the age of one year

		Measles 1st dose under 1 year coverage [%]	The proportion of children who received their 1st measles dose (normally at 9 months) – annualised
		Measles 2nd dose coverage [%]	The proportion of children who received their 2nd measles dose (around 18 months) – annualised
		OPV 1st dose coverage [%]	The proportion of children under 1 immunised with OPV dose 1.
		PCV 3rd dose coverage [%]	The proportion of children who received their third PCV dose (around 9 months) – annualised
		RV 2nd dose coverage [%]	The proportion of children who received their second RV dose (around 14 weeks) – annualised
	Orphans	Number of orphans [Number]	Number of children under 18 years whose biological mother, biological father or both parents have died. Different kinds of orphans are defined as: maternal orphans – a child whose mother has died, or whose living status is not known, but whose father is alive. paternal orphans – a child whose father has died, or whose living status is not known, but whose mother is alive. double/dual orphan – a child whose mother and father have both died, or whereabouts are unknown.
		Orphanhood [%]	Proportion of children under 18 years whose biological mother, biological father or both parents have died.
	School health	School Grade 1 screening coverage [%]	Proportion of Grade 1 learners screened by a nurse in line with the ISHP service package.
		School Grade 8 screening coverage [%]	Proportion of Grade 8 learners screened by a nurse in line with the ISHP service package.
Nutrition	Breastfeeding	Exclusive breastfeeding rate [%]	Proportion of living children receiving only breast milk from birth to various ages.
		Infant exclusively breastfed at DTaP-IPV-Hib-HBV 3rd dose rate [%]	Infants exclusively breastfed at 14 weeks as a proportion of the DTaP-IPV-Hib-HBV 3rd dose vaccination. Take note that DTaP-IPV-Hib-HBV 3rd dose (Hexavalent) was implemented in 2015 to include the HepB dose
	Nutrients	Vitamin A dose 12–59 months coverage [%]	Proportion of children 12–59 months who received vitamin A 200 000 units, preferably every six months. The denominator is therefore the target population 1–4 years multiplied by 2.
	Risk factors	Obesity [%]	Percentage of people with a body mass index (BMI) (body mass in kg divided by the square of the height in m) equal to or more than 30kg/m^2.
		Overweight [%]	Children: Proportion of children with weight for height over 2 standard deviations from the norm (reference population median). Adults: Percentage of people with body mass index (BMI) of 25–29.9 kg/m^2. BMI is weight in kg divided by the square of height in m.
		Stunting [%]	Proportion of children with height for age under 2 standard deviations from the norm (reference population median).
		Underweight [%]	Children: Proportion of children with weight for age under 2 standard deviations from the norm (reference population median). Adults: Percentage of people with body mass index (BMI) <18.5 kg/m^2. BMI is weight in kg divided by the square of height in m.
		Wasting [%]	Proportion of children with weight for height under 2 standard deviations from the norm (reference population median).
Non-communicable disease	Cancer	Cancer incidence rate, by type of cancer [per 100 000 population]	Number of new cancers of a specific site/type occurring per 100 000 population. Numerator: Number of new cancer cases diagnosed in a specific year. This may include multiple primary cancers occurring in one patient. The primary site reported is the site of origin and not the metastatic site. In general, the incidence rate would not include recurrences. Denominator: The at-risk population for the given category of cancer. The population used depends on the rate to be calculated. For cancer sites that occur only in one sex, the sex-specific population (e.g. females for cervical cancer) is used.
	Diabetes	Diabetes client 40 years and older new [Number]	Client above the age of 40 years and older who is newly diagnosed with diabetes in the facility
		Diabetes incidence [per 1 000]	Newly diagnosed diabetes clients initiated on treatment per 1 000 population
		Diabetes prevalence [per 1 000]	Number of people with diabetes per 1 000 people in the target population.
		Diabetes prevalence [%]	Percentage of people with diabetes. Defined in SANHANES as those with HbA1c > 6.5% WHO Core indicator is: Age-standardised prevalence of raised blood glucose/diabetes among persons aged 18+ years or on medication for raised blood glucose Defined as: fasting plasma glucose value >= 7.0 mmol/L (126 mg/dL) or on medication for raised blood glucose among adults aged 18+ years.
		Percentage of diabetics treated and controlled [%]	
		Percentage of people with diabetes receiving treatment [%]	
	Hypertension	Hypertension incidence [per 1 000 population 40+]	Newly diagnosed hypertension clients initiated on treatment per 1 000 population 40 years and older
		Hypertension prevalence [per 1 000]	Number of people with hypertension per 1 000 people in the target population. Data for the private sector are based on the number of people being TREATED for this condition.
		Hypertension prevalence [%]	Percentage of people with hypertension, where hypertension is usually defined as individuals with systolic blood pressure >=140 m Hg and/or diastolic blood pressure >=90 mmHg and/or who reported the current use of antihypertensive medication.
		Hypertension prevalence rate 15+ years (crude) [%]	Percentage of population 15 years and older with hypertension.
		Hypertension prevalence rate (age-standardised) [%]	Percentage of population 15 years and older with hypertension, age-standardised (Census 2011 population).
		Hypertension treatment coverage [%]	Percentage of people with hypertension who report being on treatment
		Hypertensives controlled on treatment	Percentage of hypertensives on treatment who are controlled (BP measurements below threshold)

		Prevalence of nonraised blood pressure regardless of treatment status [%]	The prevalence of normal blood pressure is the sum of those who do not have hypertension and those whose hypertension is controlled by medication.
		Prevalence of raised blood pressure 15+ years [%]	Percentage of adults (15+) with raised blood pressure
		Prevalence of raised blood pressure [%]	Percentage of people with systolic blood pressure >=140 mmHg or diastolic blood pressure >=90 mmHg. WHO Core indicator definitions is: Age-standardised prevalence of raised blood pressure among persons aged 18+ years (defined as systolic blood pressure >=140 mmHg and/or diastolic blood pressure >=90 mmHg), and mean systolic blood pressure.
	Mental Health	Prevalence of mental disorders [%]	Percentage of the population suffering from any common mental disorders.
		Suicide mortality rate [per 100 000 population]	Suicide rate per 100 000 population in a specified period (age-standardised).
	Other NCDs	Asthma prevalence [per 1 000]	Number of people with asthma per 1 000 people in the target population. Data for the private sector are based on the number of people being TREATED for this condition. Data for the total population from SADHS are based on the number of adults 15 years and older who were told by a doctor, nurse or health worker that they have this chronic health condition.
		Hyperlipidaemia prevalence [per 1 000]	Number of people with hyperlipidaemia per 1 000 people in the target population. Data for the private sector are based on the number of people being TREATED for this condition. Data for the total population from SADHS are based on the number of adults 15 years and older who were told by a doctor, nurse or health worker that they have this chronic health condition.
		Mortality between 30–70 years from cardiovascular, cancer, diabetes or chronic respiratory disease [%]	Unconditional probability of dying between exact ages 30 and 70 from any of cardiovascular disease, cancer, diabetes, or chronic respiratory disease. Deaths from these four causes will be based on the following ICD codes: I00–I99, COO–C97, E10–E14 and J30–J98. According to WHO Core indicators: Modelling, using multiple inputs, is often used if no complete and accurate data are available. Age standardisation is done for comparability over time and between populations.
		Prevalence of abnormal lipid profiles [%]	Percentage of people with raised cholesterol or other abnormal lipid profiles.
Risk behaviour	Alcohol	Alcohol dependence [%]	Proportion of people who show signs of alcohol dependence. Alcohol dependence is identified using four screening questions that indirectly inquire about alcohol use (CAGE questionnaire). An affirmative answer to two or more questions is classified as alcohol dependence. CAGE questions are: C – Has anyone ever felt you should Cut down on your drinking? A – Have people Annoyed you by criticizing your drinking? G – Have you ever felt Guilty about your drinking? E – Have you ever had a drink first thing in the morning (Eye-opener) to steady your nerves or to get rid of a hangover?
		Currently drink alcohol [%]	Proportion of people who currently drink alcohol.
		Ever drank alcohol [%]	Proportion of people who ever drank alcohol.
		Risky drinking – weekends [%]	Proportion of current drinkers of alcohol who engage in risky drinking at the weekend, defined as >=5 drinks per day (males) or >=3 drinks per day (females).
		Total alcohol per capita (age 15+ years) consumption [litres per year]	Total alcohol per capita is the total amount (sum of recorded alcohol per capita three-year average and unrecorded alcohol per capita) of alcohol consumed per adult (15+ years) in a calendar year, in litres of pure alcohol. Recorded alcohol consumption refers to official statistics (production, import, export, and sales or taxation data), while unrecorded alcohol consumption refers to alcohol which is not taxed and is outside the usual system of government control. In circumstances in which the number of tourists per year is at least the number of inhabitants, tourist consumption is also taken into account and is deducted from a country's recorded alcohol per capita.
	Drug use	Number of admissions for alcohol and other drug abuse [Number]	Number of patients admitted for treatment by treatment centres who are part of the SACENDU Project sentinel surveillance system.
		Primary drug of abuse as % of all drugs of abuse [%]	Percentage breakdown of the primary drug of abuse reported by patients admitted to treatment centres that are part of the SACENDU sentinel surveillance system.
	Smoking	Adults aged at least 15 years who had not smoked tobacco in the previous 30 days [%]	Percentage of adults 15+ years who are non-smokers, or who have not smoked tobacco in the previous 30 days.
		Ever smoked cigarettes [%]	Proportion of people who have ever smoked a cigarette, even one or two puffs.
		Frequent smokers [%]	Proportion of people who smoked (cigarettes) on 20 or more days of the past 30 days.
		Prevalence of smoking [%]	Proportion of population who currently smoke. This indicator is also known as 'Current smokers (%)' Note that the indicator may be given just for cigarettes or for other tobacco products.
Injuries	Injuries	Estimated direct deaths from major conflicts [per 100 000 population]	Conflict-related deaths per 100 000 population, by sex, age and cause
		Mortality rate attributed to unintentional poisoning [per 100 000 population]	
		Mortality rate due to homicides [per 100 000 population]	
		Road accident fatalities [per 100 000 population]	Number of fatalities due to road accidents per 100 000 population.

Health Services	Health Facilities	Number of health facilities [Number]	Number of health facilities
	Health Services	Complaints resolution rate [%]	Complaints resolved as a proportion of complaints received
		Complaints resolution rate within 25 working days [%]	Complaints resolved within 25 working days as a proportion of all complaints resolved
		Health systems performance rank [Number]	Rank from 1 to end given to each country according to summary comparison of health systems performance and attainment of health systems goals. Note that the methodology for this assessment is highly controversial and is being reviewed prior to reassessment.
		Healthcare Access and Quality (HAQ) Index [Number]	Constructing the index involves: mapping the Nolte and McKee cause list to GBD causes; constructing mortality-to-incidence ratios (MIRs) for cancers and risk-standardising non-cancer deaths to remove variations in mortality not directly amenable to health care; calculating the HAQ Index on the basis of principal components analysis (PCA), providing an overall score of personal health-care access and quality on a scale of 0–100.
		Percentage of users of private health services very satisfied with the service received [%]	Percentage of users of private health services highly satisfied with the service received.
		Percentage of users of public health services very satisfied with the service received [%]	Percentage of users of public health services highly satisfied with the service received.
		Universal health coverage: service coverage index [Number]	Coverage of essential health services (defined as the average coverage of essential services based on tracer interventions that include reproductive, maternal, newborn and child health, infectious diseases, noncommunicable diseases and service capacity and access, among the general and the most disadvantaged population)
	Information Systems	Birth registration coverage [%]	Percentage of births that are registered within one month of age in a civil registration system.
		Death registration coverage [%]	Percentage of deaths that are registered (with age and sex).
		International Health Regulations (IHR) core capacity index [%]	Percentage of attributes of 13 core capacities that have been attained at a specific point in time. The 13 core capacities are: (1) National legislation, policy and financing; (2) Coordination and National Focal Point communications; (3) Surveillance; (4) Response; (5) Preparedness; (6) Risk communication; (7) Human resources; (8) Laboratory; (9) Points of entry; (10) Zoonotic events; (11) Food safety; (12) Chemical events; (13) Radionuclear emergencies.
	Management Inpatients	Average length of stay – total [Days]	The average number of patients days that an admitted patients spends in hospital before separation.
		Average length of stay (district hospitals) [Days]	The average number of patients days that an admitted patients spends in hospital before separation.
		Death in facility under 1 year rate [%]	Children under 1 year who died during their stay in the facility as a proportion of inpatient separations under 1 year. Inpatient separations under 1 year is the total of inpatient discharges, inpatient deaths and inpatient transfer outs
		Death in facility under 5 years rate [%]	Proportion of children under 5 years admitted/separated who died during their stay in the facility. Inpatient separations under 5 years is the total of inpatient discharges, inpatient deaths and inpatient transfer outs
		Inpatient bed utilisation rate – total [%]	A measure of the average number of beds that are occupied – expressed as the proportion of all available bed days, which is calculated as the number of actual beds multiplied by the average number of days in a month (30.42).
		Inpatient crude death rate [%]	Proportion of admitted clients/separations who died during hospital stay. Inpatient separations is the total of day clients, inpatient discharges, inpatient deaths and inpatient transfer outs.
		Number of beds [Number]	Total number of beds in health facility.
		Patient Day Equivalent [Number]	The sum of Inpatient days total x 1, Day patient total x 0.5, and OPD/Emergency total headcount x 0.3333333
		Usable beds (all levels) [per 1 000 uninsured population]	Number of usable beds (public sector, all levels) per 1 000 uninsured population.
	Management PHC	Percentage Ideal clinics [%]	Percentage of fixed PHC facilities assessed on the ideal clinic dashboard that achieved Ideal Clinic status (silver, gold, platinum or diamond status).
		Percentage of assessed PHC facilities with 90% of tracer medicines available [%]	Percentage of PHC facilities, out of all facilities that have conducted a status determination, with 90% of the tracer medicines available.
		PHC doctor clinical work load [Clients per doctor per day]	Average number of clients seen per doctor per clinical work day. This includes doctors employed in the public and private sector.
		PHC headcount 5 years and older [Number]	
		PHC headcount under 5 years [Number]	
		PHC professional nurse clinical work load [Clients per nurse per day]	Average number of clients seen per professional nurse per professional nurse clinical work day.
		PHC supervisor visit rate (fixed clinic/ CHC/CDC) [%]	Proportion of fixed PHC facilities visited by a dedicated clinic supervisor, who performs a visits according to the clinic supervision manual.
		PHC utilisation rate [Average number of visits per person]	Average number of PHC visits per person per year in the population.
		PHC utilisation rate under 5 years [Average number of visits per person under 5 years]	Average number of PHC visits per year per person under 5 years of age in the population.
		Proportion of health facilities with availability of the WHO-recommended core list of essential medicines [%]	Proportion of health facilities with availability of the WHO-recommended core list of essential medicines
		Tracer items stock-out rate (fixed clinic/ CHC/CDC) [%]	The proportion of all fixed clinics, CHCs and CDCs that had stock out of ANY tracer item for any period.

Human Resources	Community Service	Number of CS pharmacists [Number]	Number of community service pharmacists.
	Health Personnel	Number of (health professionals) [Number]	Number of this category of health professional registered with the relevant professional council. This number includes those working in the public or private sector as well as those registered but not working or overseas.
		Number of Community Health Workers (CHWs) [Number]	Number of community health workers on the CHW Register system
		Total number of health professional posts [Number]	Total number of health sector posts (health professional categories) including dental, medical, nursing, pharmacy, occupational therapy, physiotherapy, radiography and psychology professions. Data from 2002 also includes environmental health professionals. Note that older data from PERSAL also included some vacant posts for each profession. Newer data has most of the vacant posts identified, and therefore the number of posts primarily reflects filled posts.
	Personnel per population	Density of (health professionals) [per 1 000 population]	
		(Health professionals) [per 100 000 population]	Ratio of the number of personnel to the population (per 100 000). Note that the measure of the number of personnel may differ for the public and private sectors and also that the population may be adjusted to be the population assumed to be dependent on that sector.
Finance	Finance	Claims ratio [%]	Proportion of member contributions that has been utilised for the payment of benefits claimed by members of medical schemes, as opposed to allocation of contributions for non-health benefits and the building of reserves.
		Expenditure per patient day equivalent (district hospitals) [Rand (real prices)]	Average cost per patient per day seen in a hospital (expressed as Rand per patient day equivalent).
		Health as percentage of total expenditure [%]	Proportion of total (government) expenditure on health. Provinces with central hospitals have a higher share.
		Medical scheme beneficiaries [Number]	Number of medical scheme beneficiaries, as reported by the Medical Schemes Council.
		Medical scheme coverage [%]	Proportion of population covered by medical schemes.
		Pensioner ratio [%]	Proportion of members of medical schemes who are 65 years or older, in registered medical schemes.
		Per capita health expenditure [Rand]	Amount spent on health per person (in Rand). For the public sector, this is often calculated for the population without medical aid coverage (public sector dependent population). For the private sector this is usually calculated for the number of medical schemes beneficiaries. Note that attention should be given to the notes for each data item, since financial indicators are affected by inflation, and expenditure may be reported according to currency value for a particular year to facilitate comparison of real differences.
		Proportion of population with large household expenditures on health as a share of total household expenditure or income [%]	Proportion of population (%) with total household expenditures on health > 10% and > 25% of total household expenditure or income
		Provincial & LG District Health Services expenditure per capita (uninsured) [Rand (real prices)]	Provincial expenditure on District Health Services (all sub-programmes except 2.8 Coroner services) plus net local government expenditure on PHC per uninsured population.
		Provincial & LG PHC expenditure per capita (uninsured) [Rand (real prices)]	Provincial expenditure on sub-programmes of DHS (2.2 – 2.7) plus net local government expenditure on PHC per uninsured population.
		Provincial & LG PHC expenditure per PHC headcount [Rand (real prices)]	Provincial expenditure on sub-programmes of DHS (2.2 – 2.7) plus net local government expenditure on PHC divided by PHC headcount from DHIS.
		Total current expenditure on health as percentage of gross domestic product [%]	Proportion of national Gross Domestic Product that is spent on healthcare.
		Total net official development assistance to medical research and basic health sectors per capita (US$), by recipient country [US$]	

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Abbreviations

3TC	lamivudine
A	
AB	Acinetobacter baumannii
ACDIS	Africa Centre Demographic Information System
AGSA	Auditor-General of South Africa
AHP	Africa Health Placements
AIDS	Acquired Immune Deficiency Syndrome
AMA	African Medicines Agency
ANC	antenatal care
ART	antiretroviral therapy
ASA	Advertising Standards Authority
ASSAf	Academy of Science of South Africa
ATZ/r	atazanavir/ritonavir
AU	African Union
AZT	azidothymidine (and/or zidovudine)
B	
BBS	biological and behavioural survey
BCA	Best Care Always
BDACS	bleeding during and after caesarean section
BHF	Board of Healthcare Funders
BMAT	bone marrow aspirate and trephine
BMI	body-mass index
BRICS	Brazil, Russia, India, China, South Africa
C	
CA-MRSA	community-associated MRSA
CBO	community-based organisation
CCI	composite coverage index
CCMDD	Centralised Chronic Medicine Dispensing and Distribution
CCRC	Cullinan Care and Rehabilitation Centre
CDC	Centers for Disease Control and Prevention
CDR	crude death rate
CDW	Corporate Data Warehouse
CFR	case fatality rates
CfWI	Centre for Workforce Intelligence
CHC	community health centre
Child PIP	Child Healthcare Problem Identification Programme
CI	confidence interval
CHW	community health worker
CMHS	community-based mental health services
CMSA	Colleges of Medicine of South Africa
COHSASA	Council for Health Service Accreditation of Southern Africa
COPC	community-orientated primary care
CPD	continuing professional development
CPGs	clinical practice guidelines
CrAg	cryptococcal antigen
CRE	Carbapenam resistant Enterobacteriaceae
CRPD	Convention on the Rights of Persons with Disabilities
CS	community service
CSIR	Council for Scientific and Industrial Research
CVD	cardiovascular disease
D	
DALYs	disability-adjusted life-years
DCST	District Clinical Specialist Team

DHIS	District Health Information System
DHS	District Health System
DoH	Department of Health
DR	drug-resistant
DRMs	drug resistance mutations
DS	drug-sensitive
DSD	Department of Social Development
DST	Department of Science and Technology
DST	drug susceptibility testing
DTP	diphtheria and tetanus toxoids and pertussis-containing
E	
EAP	Employee Assistance Programme
EDCTP	European & Developing Countries Clinical Trials Partnership
EDRWeb	Electronic Drug Resistant TB Register
EFV	efavirenz
EID	early infant diagnosis
EMA	European Medicines Agency
EMR	excess mortality rates
eMTC	elimination of mother-to-child transmission
EN	enrolled nurse
EPI	Expanded Programme on Immunization
ESMOE	essential steps in managing obstetric emergencies
EVD	Ebola virus disease
F	
FPL	food poverty line
FTC	emitricitabine
G	
GBD	Global Burden of Disease
GDP	gross domestic product
GHS	General Household Survey
GMHMP	Gauteng Mental Health Marathon Project
GP	General Practitioner
GPWG-DB	Global Poverty Working Group Database
GVAP	Global Vaccine Action Plan
GXP	Xpert MTB/RIF
H	
HALE	healthy life expectancy
HA-MRSA	healthcare-associated MRSA
HAQ	Healthcare Access and Quality
HAST	HIV/AIDS, STI and TB
HBsAg	hepatitis B surface antigen
HBV	hepatitis B virus
HCW	healthcare worker
HDSS	Health and socio-Demographic Surveillance System
Hib	Haemophilus influenzae type b
HICs	high-income countries
HIU	Health Innovation Unit
HIV	Human Immunodeficiency Virus
HIVDR	HIV drug resistance
HMI	Health Market Inquiry
HPCSA	Health Professions Council of South Africa
HPV	human papillomavirus
HQA	Health Quality Assessment
HR	Human Resources
HRH	Human Resources for Health
HRP	Health Research Programme
HRU	Health Research Unit

HSRC	Human Sciences Research Council
HST	Health Systems Trust
HTS	HIV counselling and testing services
HUS	Haemolytic uraemic syndrome
I	
iALARM	Information to Align Services and Link and Retain Men in the HIV Cascade
iCAHE	International Centre for Allied Health Evidence
ICF	International Classification of Functioning, Disability and Health
ICRM	Ideal Clinic Realisation and Maintenance
ICSM	Integrated Clinical Services Management
ICSP	online application and placement system
IHD	invasive Haemophilus influenzae disease
IHI	Institute for Healthcare Improvement
IHR	International Health Regulations
ILI	influenza-like illness
ILO	International Labour Organization
IMD	invasive meningococcal disease
iMMR	institutional maternal mortality ratio
IOM	Institute of Medicine
IP	intellectual property
IPD	invasive pneumococcal disease
IPECP	inter-professional education and collaborative practice
IRECs	institutional research ethics committees
IRS	indoor spraying of residual insecticides
ISO	International Standards Organization
ISQUA	International Society for Quality in Health Care
IVDs	in vitro diagnostics
K	
KZN	KwaZulu-Natal
L	
LARC	long-acting reversible contraceptive
LGBTI	Lesbian Gay Bisexual Transgender and Intersex
LIS	laboratory information system
LMICs	low- and middle-income countries
LPA	line probe assay
LPV/r	lopinavir/ritonavir
LRI	lower respiratory tract infections
M	
MCC	Medicines Control Council
MCWH&N	Maternal, Child, Women's Health and Nutrition
MDR-AB	multidrug-resistant Acinetobacter baumannii
MDR-TB	multidrug-resistant tuberculosis
MHCA	Mental Health Care Act
MIRs	mortality-to-incidence ratios
MMR	maternal mortality ratio
MoH	Ministry of Health
MoNITOR	Mother and Newborn Information for Tracking Outcomes and Results
MoU	memorandum of understanding
mPTB	microbiologically confirmed pulmonary TB
MRC	Medical Research Council
mRFEI	Modified Retail Food Environment Index
MRSA	methicillin resistant Staphylococcus aureus
MSAT	Multi-Sectoral Action Team
MSM	men who have sex with men
MSSA	methicillin-susceptible S. aureus
MTCT	mother-to-child transmission (of HIV)
MUS	male urethral syndrome

N	
NAAQS	National Ambient Air Quality Standards
NAPHISA	National Public Health Institute of South Africa
NCCEMD	National Committee on Confidential Enquiries into Maternal Deaths
NCD	non-communicable disease
NCD CCS	NCD Country Capacity Survey
NCD-RisC	NCD Risk Factor Collaboration
NCOP	National Council of Provinces
NCR	National Cancer Registry
NCS	National Core Standards
NDoH	National Department of Health
NDP	National Development Plan
NGO	non-governmental organisation
NHA	National Health Act
NHI	National Health Insurance
NHIF	National Health Insurance Fund
NHLS	National Health Laboratory Service
NHRC	National Health Research Committee
NHRD	National Health Research Database
NHREC	National Health Research Ethics Council
NHRS	national health research system
NHS	National Health Service
NICD	National Institute of Communicable Diseases
NIDS	National Indicator Data Set
NiDS	National Income Dynamics Study
NINCD	National Institute of Non-Communicable Diseases
NIOH	National Institute of Occupational Health
NIVIP	National Institute for Violence and Injury Prevention
NMC	Notifiable Medical Conditions
NMHPF	National Mental Health Policy Framework
NMR	neonatal mortality rate
NNMR	Neonatal mortality rate
NNRTI	Non-nucleoside reverse-transcriptase inhibitors
NQPS	National Quality Policy and Strategy
NRTI	nucleoside reverse-transcriptase inhibitors
NSFAS	National Student Financial Aid Scheme
NVP	nevirapine
O	
OAU	Organisation of African Unity
OECD	Organisation for Economic Co-operation and Development
OHSC	Office of Health Standards Compliance
OMRO	Outcomes Measurement and Reporting Organisation
OOP	out-of-pocket
ORS	oral rehydration solution
OT	occupational therapist
OTL	outreach team leader
P	
PCA	principal components analysis
PCR	polymerase chain reaction
PCV-13	13-valent pneumococcal conjugate vaccine
PCV-7	7-valent pneumococcal conjugate vaccine
PDoHs	Provincial Departments of Health
PEPFAR	United States President's Emergency Plan for AIDS Relief
PERSAL	Personnel and Salary Administration System
PGVT	postgraduate vocational training
PHC	primary health care
PHDC	Provincial Health Data Centre

PI	protease inhibitor
PLHIV	people living with HIV
PLWMI	people living with mental illness
PMDF	proportion of deaths among females of reproductive age
PMTCT	prevention of mother-to-child transmission
PN	professional nurse
PT	physiotherapist
Q	
QA	quality assurance
QCTO	Quality Council for Trades and Occupations
QI	quality improvement
QP	quality planning
R	
R&D	research and development
R4H	research for health
RFI	Research Fairness Initiative
RHF	recommended homemade fluids
RIC	remaining in care
RMNCH	reproductive, maternal, newborn and child health
RMRs	routine monthly reports
RMS	Rapid Mortality Surveillance
RTMC	Road Traffic Management Corporation
RWOPS	Remunerative Work outside of Public Service
S	
S.H.E.	Social, Health, and Empowerment Feminist Collective of TGW of Africa
SA	South Africa
SAAQIS	South African Air Quality Information System
SABSSM V	Fifth South African National HIV Prevalence, Incidence, Behaviour and Communication Survey
SACENDU	South African Community Epidemiology Network on Drug Use
SACOMD	South African Committee of Medical Deans
SADHS	South Africa Demographic and Health Survey
SAGE	South African Guidelines Excellence Project
SAHPRA	South African Health Products Regulatory Authority
SAHR	South African Health Review
SAIMD	South African Index of Multiple Deprivation
SAMRC	South African Medical Research Council
SANC	South African Nursing Council
SANHANES	South African National Health and Nutrition Examination Survey
SAPC	South African Pharmacy Council
SAPMTCTE	South African PMTCT Evaluation
SASH	South African Stress and Health Survey
SDGs	Sustainable Development Goals
SDI	socio-demographic Index
SMI	severe mental illness
SR	sub-recipient
SRHR	Sexual and Reproductive Health and Rights
SSBs	sugar-sweetened beverages
SSRH	Supply Side Regulator for Healthcare
SSS	Supervision Satisfaction Score
STAs	speech therapists and audiologists
Stats SA	Statistics South Africa
STI	sexually transmitted infection
SWEAT	Sex Workers Education and Advocacy Taskforce
T	
TB	Tuberculosis
TBCs	TB Blue Cards
TDF	tenofovir

TFR	total fertility rate
TGW	transgender women
ToPs	terminations of pregnancy
U	
U5MR	under-5 mortality rate
UCSF	University of California, San Francisco
UCT	University of Cape Town
UHC	universal health coverage
UN	United Nations
UNAIDS	United Nations Programme on HIV/AIDS
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
UYDF	Umthombo Youth Development Foundation
V	
VDS	vaginal discharge syndrome
VF	virological failure
W	
WASH	Water, Sanitation and Hygiene for All
WB	World Bank
WBOTs	Ward-based Outreach Teams
WBPHCOTs	Ward Based Primary Health Care Outreach Teams
WHO	World Health Organization
WIRHE	Wits Initiative for Rural Health Education
WISN	Workload Indicators of Staffing Need
X	
XDR-TB	extensively drug-resistant tuberculosis
Y	
YLDs	years lived with disability
YLLs	years of life lost


THE TREE
OF
HOPE