South African Health Review 2013/14

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Foreword

It is my great pleasure to introduce the 17th edition of the *South African Health Review* (SAHR), Health Systems Trust's annual digest of research on health policy development and reforms through the lens of implementation and intervention for systemic improvement.

As has been established in previous editions, this year's publication presents policy-makers, planners, health managers, researchers, and health and development organisations with analysis that is based on reliable data, scientifically and historically contextualised, and enriched with critical perspectives on what is needed for strategic progress towards optimal health outcomes.

In particular, this year's Review provides information on how we are faring with regard to PHC re-engineering and takes stock of some of the many achievements that have taken place in the health system over the past 20 years. To this end, commentary and analysis of a variety of subjects such as eHealth, cervical cancer, voluntary medical male circumcision, tuberculosis and environmental health are presented.

With immense pride, we announce that as of this year, the *South African Health Review* is officially accredited as a peer-reviewed publication with the Department of Higher Education. We are grateful for the various ways in which the public health community has supported the production of the Review over the years leading to this prestigious achievement.

In keeping with our commitment to strengthen the public health capacity and expertise within the health arena, we are pleased to feature a chapter authored by the second winner of our Emerging Public Health Practitioner Award, in recognition of the best article submitted by a young and emerging public health professional for inclusion in the SAHR.

A strong group within HST, with support from a cadre of highly regarded peer reviewers and authors, has worked throughout the year to bring the Review to completion. On behalf of the Board, I extend our deep appreciation to all HST staff who were involved in the production of the Review, and to the authors, peer reviewers and SAHR Editorial Advisory Committee members who provided oversight and direction to the editorial team.

The collective input of the authors, internal and external peer reviewers, and the Editorial Advisory Committee has enabled us to put together a publication that reflects a diverse range of thought and information.

As ever, we are immeasurably grateful to the National Department of Health for supporting the production of this Review.

We trust that you will find this edition a useful contribution to building health systems in South Africa.

Dr Maureen Tong

Chairperson of the Board of Trustees

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Ashnie Padarath and René English.

Editorial Advisory Committee

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Contributing authors

We acknowledge with gratitude the individual authors' commitment to contributing to the Review and responses to editing demands, often at short notice, despite their competing responsibilities.

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The cover art for the 2013/14 *South African Health Review* is entitled *Nelson Mandela* from Craig Alan's Populus series, and was reproduced under licence from the artist's publisher: Deljou Art Group, Georgia, USA.

Editorial

We proudly introduce the 17th edition of the *South African Health Review* (SAHR), which is now officially accredited by the Department of Higher Education as a peer-reviewed publication.

One of the original intentions of the SAHR was to chronicle the development of South Africa's post-apartheid health system. While earlier Reviews focused on the need for policy development, in recent years we have concentrated on providing an analysis of implementation of those policies.

Recurrent criticisms of the health system emerging in each Review since its inception have been the lack of coherence and cohesion between and within units and programmes, the need for better integration and co-ordination of systems, procedures and processes within the health system, and the need to strengthen the critical support services that ultimately create the base for the delivery of comprehensive, high-quality services. The challenge of translating policies into practice in a complex health system has been longstanding, as is reflected in this quotation contained in the first edition of the SAHR:

> But more and more, the emphasis is moving towards the mechanics of implementation – the practical meaning of policies and assessment of their impact. On one hand, it implies a shift in focus from national to provincial and district level. On the other, it demands explicit support for initiatives which turn plans into operations… For the purposes of analysis, this Review has disaggregated the South African health system into discrete components such as financing, human resources developments and informatics. But these distinctions become more artificial the closer one gets to actual service delivery.[a]

As mentioned in last year's edition of the Review, 20 years into our democracy, the challenges remain; however, this year's Review suggests that not only does the tide seem to be turning, but it appears to be gaining momentum in moving away from pure discourse into action to bridge the gaps between policy and implementation. Elements of discrete policy and subject areas begin to resonate in and with each other, creating the raw weave for a seamless tapestry of synergy, harmony and complementarity as the fabric of one health system for a united country. This brings with it an understanding of the complexities of actual health service delivery, beyond the abstraction of policymaking and planning.

This year's edition of the *South African Health Review* consists of 17 chapters.

As is customary, the first chapter on Health Policy and Legislation provides an overview of South Africa's health policy and legislative landscape. Andy Gray and Yousuf Vawda provide a comprehensive account of the various Notices, Regulations and Amendments passed, and point out that the promulgation of the National Health Amendment Act (12 of 2013) has been fundamental to the creation of an independent Office of Health Standards Compliance (OHSC) which has been established to monitor compliance with norms and standards for the provision of health services in both the public and private sectors. The Office, which will advise the Minister of Health on the development of norms and standards, will also be a critical element in the proposed system of accreditation for National Health Insurance. Gray and Vawda also offer an update on recent case-law relating to health, and cite the case of *Kievits Kroon Country Estate v Mmoledi*, wherein the Supreme Court of Appeal held that a letter from a traditional healer explaining an employee's absence from work was acceptable. The authors suggest that "while the *Kievits* decision appears to place the recourse to traditional healers on par with 'mainstream' medical practitioners in respect of medical certificates and treatment options, it remains to be seen how widely it will be implemented in practice", and recommend that appropriate regulation of the traditional medicines sector will go a long way towards providing clarity on what could become a vexed issue in the workplace.

In Chapter 2, Thulani Masilela, together with Rosemary Foster and Matthew Chetty, provides an analysis of how far South Africa has come in implementing its eHealth Strategy, and concludes that a year after the publication of the Strategy, modest progress has been made, with five of the Strategy's 10 key priorities having been attained. The authors highlight the need for vigilant monitoring of implementation and timely addressing of bottlenecks and barriers. They note, that despite sustained support from the leadership of the health sector, the acquisition of the requisite human resources with the technical expertise and capacity to provide strategic leadership in this area is critical for steering the country towards the goals envisaged by and for the eHealth sector.

As the first few chapters in this year's Review illustrate, South Africa is moving from *knowing* the path to improving our quality of health services to actually *walking* the path.[b] Evidence of this important shift is apparent in the efforts to improve quality of care in a variety of settings. Certainly, the concepts of quality improvement, PHC re-engineering and better planning for the journey to universal health coverage resonate in many of the chapters. However, as a country, we would do well to remember the caveat expressed in the *Lancet* earlier this year that unless the concepts referred to in the term "universal health coverage" are clearly defined, we run the risk of unintended consequences in the form of inequitable outcomes. The authors acknowledge that equity is generally considered to be a "natural consequence of the implementation of UHC policies", but warn that "the extent to which equity is improved through UHC policies is conditional on how UHC terms and policies are defined, designed, implemented and sequenced."[c]

a Harrison D, editor, South African Health Review 1995. Durban: Health Systems Trust; 1995.

b Randolph GD, Lea S. Quality Improvement in Public Health: Moving from Knowing the Path to Walking the Path. J Public Health Management Practice. 2012, 18(1)4-8.

c O'Connell T, Rasanathan K, Chopra M. What does universal health coverage mean? Lancet. 2014;383(9913):277-79.

The pressing need to improve the quality of care in our health system has become a persistent refrain of government and civil society alike, and the successful reform of our healthcare system rests on our ability to take advantage of the significant opportunity inherent in the workings of the OHSC for such improvement to unfold in a co-ordinated and coherent manner. To this end, in Chapter 3, Winnie Moleko, Elliot Bafana Msibi and Carol Marshall describe recent developments in ensuring the quality of care in health establishments, and the steps taken to train and sensitise healthcare workers on existing norms and standards in preparation for the work of the OHSC. The authors conclude that, in addition to the National Core Standards (NCS) providing a useful mechanism for health establishments to measure their own performance, an added advantage has been a heightened awareness of the different dimensions of quality of care. Moreover, together with developments around the establishment of the OHSC, the NCS constitute an invaluable catalyst for stimulating and strengthening a culture of Continuous Quality Improvement in the health sector.

Robert Fryatt, Jeanette Hunter and Precious Matsoso, in Chapter 4, on Innovations in Primary Health Care, suggest that the current climate of change in the health sector – such as financing reforms under NHI and the creation of the OHSC – creates an appropriate context for more experimentation on potential approaches to expanding high-quality primary care services. They describe the recently introduced "Ideal Clinic" initiative which is aimed to systematically improve the quality of care in public sector PHC facilities. The authors also consider the case for introducing social franchising as a mechanism to improve healthcare delivery, using the National Core Standards of the OHSC and the guidelines and protocols being used for the Ideal Clinic project. They point out that, if effectively managed, social franchising can be cost-effective by providing services at a cost equal to or lower than that of existing services. Social franchising has the potential to improve access to care by increasing the number of service delivery points, and to enhance the quality of care by ensuring that the services provided adhere to quality standards and improve on existing levels of quality.

The 2011 edition of the SAHR notes that "the PHC re-engineering strategy is an essential – but not a sufficient – condition to achieve improved health outcomes; it has to be accompanied by a change of culture that incentivises system-wide planning and implementation to achieve desired outcomes and maximise strategic partnerships."[d] The next three chapters in the 2013 Review reflect on some of the achievements and challenges that have materialised in the three streams of PHC re-engineering since 2011.

In Chapter 5, Anna Voce and colleagues describe developments and progress in the implementation of the District Clinical Specialist Team (DCST) stream of PHC re-engineering. They outline the policy and strategic background underpinning the DCST stream, explain the recruitment and training of the teams, and conclude by highlighting the need for strengthened mentoring and coaching practices, the integration of the DCST stream with other PHC-strengthening endeavours, and the need for district-level co-ordination of programmes for improved outcomes.

In Chapter 6, Maylene Shung-King, Marsha Orgill and Wiedaad Slemming provide a comprehensive overview of school health in South Africa. They discuss the implementation of the Integrated School Health Policy (ISHP) and consider how the ISHP fares in relation to established international protocols for school health. Like the authors of the previous chapter on DCSTs, they note that the successful implementation of the ISHP rests on effective collaboration of multiple sectors and the many levels of the health system, suggesting that an important enabling factor has been the collaboration of the Departments of Health and Basic Education, as well as the priority given to school health by the Presidency. These "contextual game-changers", they submit, can potentially convert school health services from having the status of the "stepchild of primary healthcare programmes" into being recognised as a dynamic intervention. They caution, however, that careful planning is required for improving the coverage and staffing of school health teams, and propose that for at least the next two years, attention should remain on the Quintile 1 and 2 schools until service delivery to these disadvantaged groups is consolidated.

In Chapter 7, Thesandree Padayachee and colleagues provide an update on the implementation of Ward-based Outreach Teams (WBOTs) through a case study of the North West Province which was an early adaptor of the WBOT strategy. The authors make several recommendations that are likely to prove salutary for other provinces, and are encapsulated in the following summation of the key themes emerging from the three chapters examining PHC re-engineering.

Analysis of these key themes indicates that over the past three years, much emphasis has been placed on establishing the systems and support structures required to ensure the successful implementation of the re-engineering strategy. This includes recruitment of staff, planning for implementation, developing partnerships with civil society and the private sector, and strengthening communication and feedback mechanisms at district and sub-district levels. However, there remain some common challenges, such as the need for ring-fenced financing, poor management of human resource-related matters, and inadequate availability of and access to physical resources, and unless these are addressed, PHC re-engineering will never be fully implemented and may further weaken the very system it was intended to strengthen.

Chapter 8 focuses attention on the leadership structures of the district and provides insight into the context of a rapidly changing policy environment in which the constraints and challenges faced by District Health Management Teams impact on their ability to effectively translate national policy into district-specific strategies. Although these barriers are not new, they should be borne in mind as the country moves swiftly into consolidation of the gains made in district health systems strengthening and the establishment of "the district" as the site of implementation for many health sector transitions. Gustaaf Wolvaardt, together with a team of authors, reiterates the need for effective, decentralised decision making as one of a series of steps required to strengthen district management.

After sketching a brief history of medical schemes in South Africa, Shivani Ramjee and colleagues report on a study they conducted with key stakeholders in the private health sector, in order to establish what these stakeholders perceive their roles to be in the context of NHI in South Africa (Chapter 9). The authors suggest that there is significant expertise and experience within the private health sector that could be harnessed to accomplish the objectives of NHI.

d Naledi T, Barron P, Schneider H. Primary Health Care in SA since 1994 and Implications for PHC Re-engineering. In: Padarath A, English R, editors. South African Health Review 2011. Durban: Health Systems Trust; 2011.

In Chapter 10, Angela Mathee and Caradee Wright consider some of the challenges encountered and progress made in addressing environmental health issues in South Africa over the past two decades. They examine the contribution of environmental risk factors such as urbanisation, living environments, exposure to toxins, and how the role of poverty and inequity contributes to the burden of disease in the country. While the authors concede the numerous achievements made in this field, they warn that existing environmental problems emanating from poor industrial and agricultural practices and sub-optimally developed human settlements are likely to be exacerbated by the impact of climate change. They also highlight the potential role of environmental health practitioners in mitigating these challenges.

In Chapter 11, Nerisha Tathiah and colleagues provide a comprehensive account of cervical cancer in South Africa and of the lessons that should be considered in implementing the HPV vaccination programme. It is likely that human resource and other constraints are likely to hinder effective delivery of HPV vaccines to schoolgirls, and the authors recommend that the NDoH should mitigate this risk through: proper planning; resource forecasting and strengthened procurement systems; and reliable monitoring and evaluation, to determine the progress and impact of the vaccination strategy, and importantly, social mobilisation and advocacy efforts to improve the demand for the service.

On World AIDS Day in 2013, government re-launched the HIV Counselling and Testing (HCT) campaign under the rallying cry of *Get wise, get tested, get circumcised*. Since then, much has been done to encourage voluntary medical male circumcision (VMMC) and in Chapter 12, Kaymarlin Govender and colleagues review the current situation regarding VMMC in South Africa, including progress in achieving scale-up and the complexities of rolling out such an intervention. They also examine issues related to the integration of traditional and medical circumcision practices, and provide some perspective on implementation of VMMC for the future, including new technologies for non-surgical circumcision, strategies targeting particular groups for maximum cost-effectiveness, and the integration of VMMC into a wider range of HIV prevention and treatment services being rolled out in the country.

The next set of chapters acknowledges the severity of the tuberculosis (TB) epidemic in our country, and provides information of its extent in the general population as well as in children and adolescents. The final chapter in this trio considers the issue of TB stock-outs in the public health sector.

In Chapter 13, using information from National Department of Health databases, Marian Loveday and colleagues identify areas of sub-optimal performance in the National TB programme, with a focus on three categories of high-risk populations (miners, prisoners and healthcare workers). They offer pragmatic recommendations for addressing these problems, such as developing enhanced case-finding strategies in community settings and screening of all patients who enter health facilities, taking steps to reduce the initial defaulter rate, and reversing the trend of large numbers of TB patients who remain documented as having an unknown HIV status.

Jackie Smith, Sizulu Moyo and Candy Day provide information on TB in children and adolescents in Chapter 14. Using data from the Electronic TB Register over a five-year period, they conclude that TB in this cohort (0–19 years) represented 15.3% of all TB cases in South Africa, with the majority of cases in the 0–4 year age group, which is consistent with trends in most other countries with a high TB burden. They caution, however, that there may be an underestimation of the total disease burden in this group, as TB in children can frequently be misdiagnosed as other respiratory tract infections.

Using information from the District Health Information System and the Stop Stockouts Survey, Tamlyn Seunanden and Candy Day provide an account of the extent and impact of TB drug stock-outs in the public sector. Their analysis includes information on data quality and comparability from the data sources used, along with an assessment of the relationship between stock-outs and TB treatment outcomes. Chapter 15 illustrates that TB drug stock-outs are pervasively evident in several districts in South Africa, posing challenges to patients who require regular access to TB drugs and compromising patient health. They conclude that more research should be conducted using existing information to determine the impact of TB drug stock-outs, and that data quality in our routine information system should be strengthened. They also call for the development of guidelines to prevent TB drug stock shortages in health facilities.

Jessica Price, a fifth-year medical student at the University of Cape Town, is this year's recipient of the Emerging Public Health Practitioner Award (Chapter 16). In her chapter, which focuses on Lean Management, Jessica provides an account of an intervention in an orthopaedic outpatient clinic that aimed to reduce patient waiting times and improve patient satisfaction. Price's study demonstrates that Lean Management methods have the potential to achieve significant improvements in efficiency without additional resource investment, and she urges for more students to be given the opportunity to implement Lean projects as part of their studies, thereby increasing their exposure to examples of practical systems improvement with concomitant improvement of service delivery.

Chapter 17 on Health and Related Indicators, which has become the mainstay of every edition of the *South African Health Review*, provides a comprehensive account of key international and national data sources and literature on a range of health and related indicators. In addition to listing key new data sources as well as a succinct update on key issues and trends, Candy Day and Andy Gray also provide the most up-to-date information spanning health status, health services, health financing, demographic and socio-economic indicators.

2015 sees the end of the timeframe for the achievement of the Millennium Development Goals (MDGs). There is consensus that while these goals will not be met in most developing countries, the MDGs have been instrumental in sustaining global attention on some of the most intractable challenges facing the world and have catalysed the channelling of resources directed at addressing these challenges. It is with this in mind that South Africa would do well to begin to engage with the Sustainable Development Goals proposed by the United Nations General Assembly Working Group to guide the development of the post-2015 development agenda. Goal 3 refers specifically to ensuring healthy lives and the promotion of well-being for everyone at every age, but all 17 proposed goals – with their attendant 169 targets – have direct implications for health and health outcomes, and provide a strategic opportunity for countries to begin addressing the broader socio-economic determinants of health with greater intersectoral collaboration.

The *South African Health Review* is acknowledged as an "institution" – a perennial corpus of translational research that explores the social, behavioural, ethical, legal, economic and management enablers and impediments to the effective implementation of the country's health policies and plans. This edition contains chapters that investigate and track emerging technologies for and novel approaches to health programming, and offer cogent insights on good practice. However, even before the ink is dry, deliberate speed is needed to realise the results we urgently need. Accelerated integration of findings into policy and programming must be expedited, and multisectoral partnerships formed to facilitate the delivery of optimal health services. In addition, community voices must be embedded in our approach and inform impact evaluations. The complex functioning of our health service should be matched by suitably diverse and expeditious responses.

Ashnie Padarath and René English

Health Systems Trust

Health Policy and Legislation

1

Authors:

Andy Gray[i]

Yousuf Vawda[ii]

In 2013, Parliament passed only one Act tabled by the Minister of Health, the National Health Amendment Act (12 of 2013). However, this Act was fundamental to the creation of an independent Office of Health Standards Compliance, a key building block for the eventual introduction of National Health Insurance. However, the expected White Paper on National Health Insurance was not published, nor did the National Treasury issue the expected discussion document on the financing options. Only one draft health Bill was published: the draft International Health Regulations Bill. The Medicines and Related Substances Amendment Bill was approved by Cabinet, but was not tabled as expected. There was also confusion surrounding the proposed Control of Marketing of Alcohol Beverages Bill. The production of secondary legislation continued apace, with final Regulations issued in terms of the National Health Act dealing with the management of human remains. Draft Regulations on health research were also issued. Secondary and tertiary legislation was also finalised, or issued in draft for comment, by most of the statutory health councils. Of note were the amendments to the General Regulations issued in terms of the Medicines and Related Substances Act (101 of 1965), particularly those dealing with the regulation of complementary medicines. There was considerable interest in the potential health-related implications of the Draft National Policy on Intellectual Property. Though not specific to health, the Protection of Personal Information Act (4 of 2013) will require close attention to practices in all health facilities.

The National Health Amendment Act was fundamental to the creation of an independent Office of Health Standards Compliance, a key building block for the eventual introduction of National Health Insurance.

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Introduction

Parliament has amended one of the laws for which the Minister of Health bears responsibility in 2013, in the form of the National Health Amendment Act (12 of 2013).[1] However, that does not alter the list of laws as catalogued in the corresponding chapter of the *South African Health Review* of 2011.[2] The 2012–2013 Annual Report of the National Department of Health (NDoH) also provides an extensive listing of the non-health-related legislation with which the NDoH (and, by extension, the health system) is expected to comply.[3] One additional Bill has been published for comment, but not yet tabled in Parliament.[4]

In addition to describing the changes to the National Health Act, this chapter also focuses on health-related legislative instruments at the national level that have been the subject of change since 2012, including secondary and tertiary legislation, in the form of Regulations published for comment or finalised by the Minister of Health, or Board Notices issued by statutory health councils. Any changes to provincial health legislation or health-related municipal by-laws are outside of the scope of this chapter.

Given the centrality of intellectual property law to access to medicines and other health technologies, the proposed intellectual property policy is covered in some detail.

One new piece of health-related jurisprudence, dealing with traditional health practitioners, is also covered. A court challenge to an element of the South African Pharmacy Council's regulation of pharmacy premises was also decided in late 2013.

In terms of new policy, attention is still firmly focused on the promised White Paper on National Health Insurance (NHI). However, some national policy documents have been released, relating to mental health and to the implementation of the National Drug Master Plan. Changes are also being made to medicines regulatory practice, some of which are detailed in guidelines issued by the Medicines Control Council. However, two major policy developments that were expected to progress in 2013 remain stalled – the issuing of the final White Paper on National Health Insurance, and the creation of the South African Health Products Regulatory Authority.

National legislation related to health

National Health Act

The National Health Amendment Act (12 of 2013) was assented to by the President in July 2013, and brought into effect (save for sections 2 and 3) on 2 September 2013.[5,6] Sections 2 and 3 deal with the planned removal of the responsibility for port health services from provincial departments of health, and its relocation at a national level. The balance of the Amendment Act deals with the creation of the Office of Health Standards Compliance (OHSC) as an independent structure outside of the Department of Health. The OHSC has been created to monitor compliance with norms and standards for the provision of health services in both the public and private sectors. It will also advise the Minister of Health on the development of such norms and standards. The OHSC has been created as a juristic person, to be funded through money appropriated by Parliament and fees received for services rendered. The OHSC is to be headed by a Chief Executive Officer (CEO), to be appointed by the Board in consultation with the Minister of Health. The Board itself is to be appointed by the Minister, and is to consist of at least seven members with pre-specified expertise and nominated in different ways. Five of the members are expected to have expertise in "medicine, pharmacy, reproductive and maternal health, nursing, paediatrics, surgery, clinical governance and risk management, occupational health and safety, infection control, and public health", and are to be nominated by "institutions of higher learning". The balance (one member per category) are expected to have expertise in the law, economics and financial matters or accounting, the private health care sector, public health care and public administration, and quality assurance. Two additional members will represent organised labour and "civil society or the community". A call for nominations was issued in September 2013.[7] Parliamentary oversight of the Office has been ensured by requiring the Minister to table a copy of the annual report, financial statements and audit report within a specified time of receiving such documents from the CEO. Once tabled in Parliament, these documents will also be made public. Nonetheless, the CEO and Board are accountable, primarily, to the Minister. Whether these measures will suffice to ensure the appropriate level of independence of the Office of Health Standards Compliance remains to be seen. Provision has also been made for an Ombud, to be appointed by the Minister, but expected to act independently, impartially and "without fear, favour, bias or prejudice" (section 81B). The Ombud will be able to investigate complaints relating to norms and standards, but also to launch such investigations on his or her own initiative. The OHSC is expected to be a critical element in the proposed system of accreditation for the purposes of National Health Insurance.

One additional set of final Regulations has been issued in terms of the National Health Act in 2013. On 22 May 2013, an extensive set of Regulations dealing with the management of human remains was gazetted in final form.[8] This set of Regulations governs the activities of funeral undertakers, mortuaries, the conveyance of human remains, burial and cremation, exhumations and reburials. While unremarkable in their content, these Regulations do represent one more step in the process of consolidating public health regulation in terms of the National Health Act, and hence in accordance with the new shape and functioning of the national health system.

In May 2012, the Minister had approved the Policy Framework for the Ethics Approval and Endorsement of Health Research by the National Department of Health, which summarised the various ethical and regulatory approvals required for clinical trials and other research.[9] On 29 May 2013, a further set of draft Regulations relating to "Research with Human Subjects" was gazetted for public comment.[10] The draft Regulations clarify the meaning of a number of terms including "best interests of the child" used in section 71(2) of the National Health Act in relation to therapeutic research involving minors. The term is hence defined as follows: "significant decisions affecting a minor's life should aim to promote amongst others the minor's physical, mental, moral and emotional welfare". In the same vein, where section 71(2) of the Act refers to "a significant improvement in the understanding of the minor's condition or disorder", the term "condition" is defined as "physical and psycho-social characteristics shown to affect health". While the term "human subject" was not defined in the Act (section 71 of the Act makes reference to "research or experimentation on a living person"), the term is now defined as "a living person about

whom an investigator obtains data or specimens of identifiable private information through intervention or interaction with that person". Another lacuna in the Act relates to the term "minimal risk", which is now defined as "the probability or magnitude of harm or discomfort anticipated in the research is not greater in itself than that ordinarily encountered in daily life including routine medical, dental or psychological tests or examinations". "Non-therapeutic research" is defined as "research that does not hold out the prospect of direct benefit to the participant but holds out the prospect of generalizable knowledge", while "therapeutic research" is defined as "research that holds out the prospect of direct benefit to the participant". The term "significant risk" is defined as meaning "substantial risk of serious harm".

The Regulations spell out the key principles of health research, including relevance; a basis in valid scientific methodology, protection of the rights of participants to dignity, privacy, bodily integrity and equality; informed consent; and the need for independent ethical review. They impose additional obligations on researchers, including submission of research proposals for ethical review, consultation with relevant authorities, and ensuring the availability of compensation for research-related injury. In addition to the usual requirements for informed consent, the regulations require that research participants be informed of "their freedom to decline or withdraw from the research without prejudice".

Importantly, in relation to non-therapeutic research to be conducted with minors, the Regulations provide for an application process for ministerial consent to such research. Although these Regulations have helped to clarify the normative framework for a broad range of research activities, some weaknesses in the overall framework have been identified.[11] Strode has pointed to the "over-bureaucratisation of ethics", citing as an example the requirement to obtain institutional approval from both the user's healthcare provider and the head of establishment when applying for permission to conduct research into experimental health services at health establishments. She also points to the anomalous situation whereby healthcare workers conducting record reviews are not required to obtain ethical review, whereas other researchers are required to obtain authorisation from an ethics committee.

In September 2013, the Director-General of Health issued draft norms and standards relating to environmental health, as required by section 21(2)(a)(ii) of the National Health Act.[12] Only one month was allowed for comment in the notice, which was issued by the Minister. The intent of these Regulations is to "provide a national approach in ensuring the standardization of functions and activities in the delivery of environmental health services". The norms and standards will form the basis for the monitoring of compliance by the OHSC. Environmental health services are predominantly to be delivered by local authorities, with malaria control and the control of hazardous substances delineated as provincial competencies, and port health as a national competency.

International Health Regulations Bill

A draft Bill providing for the repeal of the International Health Regulations Act (28 of 1974), and incorporating the International Health Regulations of 2005 into domestic law, was gazetted for comment in October 2013. The International Health Regulations (IHR) were adopted by the World Health Assembly in 2005 and came into effect in 2007. They constitute a legally binding agreement and provide a "framework for the coordination of the management of events that may constitute a public health emergency of international concern".[13] Accordingly, the Bill provides for the establishment of a "National IHR Focal Point", the designation of points of entry (including inland container depots), and the application of the IHR in relation to persons, baggage, cargo, containers, ships, aircraft, road vehicles, goods and postal parcels. The notification by World Health Organization of an event which may constitute a "public health emergency of international concern" is based on the following criteria:

"(a) seriousness of the public health impact of the event;

(b) unusual or unexpected nature of the event;

(c) potential for the event to spread internationally; and/or

(d) the risk that restrictions to travel or trade may result because of the event".

In order to ensure compliance with the IHR, the intention to shift port health services from provincial to national control had already been signalled by the National Health Amendment Act (12 of 2013), though not yet implemented.[5,6]

Mental Health Care Amendment Bill

Although tabled in 2012, the Mental Health Amendment Bill (39 of 2012), has yet to be passed by Parliament. Bill 39B, reflecting the changes made by the Select Committee on Social Services of the National Council of Provinces, was issued in March 2013.[14] The Parliament website reflects this Bill as serving before the National Assembly. This is a brief piece of legislation, enabling the Director-General of Health to delegate some, but not all, powers conferred by the principal Act. Among the powers that cannot be delegated are those enabling the designation of facilities for the provision of mental health services.

The National Health Council adopted the Mental Health Policy Framework (MHPF) for SA and the Strategic Plan 2013–2020 in July 2013.[15] As described in the editorial to the local medical journal, the MHPF has eight key objectives: "district-based mental health services and primary healthcare re-engineering; building institutional capacity; surveillance, research and innovation; building infrastructure and capacity of facilities; mental health technology, equipment and medicines; intersectoral collaboration; human resources for mental health; advocacy, mental health promotion and prevention of mental illness". However, the contents of the policy document are no longer accessible on the National Department of Health website, which is undergoing redesign.

Health Professions Act

No fundamental changes to the Health Professions Act have been made during the year under review.

In March 2013, the Health Professions Council of South Africa (HPCSA) amended the ethical rules applicable to practitioners registered with the Council, in order to effect tighter control of the practices of "canvassing" and "touting".[16] Other rule amendments dealt with the registration of additional qualifications for medical practitioners and dentists.[17,18]

In October 2013, the Minister published final Regulations defining the scope of practice of the profession of oral hygiene.[19] Importantly, oral hygienists may only practise independently after a year under

the supervision and control of a dentist, dental therapist or another oral hygienist. Those who qualified before 2001 are also required to have completed additional training before engaging in independent practice.

In November 2013, the HPCSA issued a media statement warning medical practitioners and the public not to participate in or use the telemedicine service "Hello Doctor".[20] While not being specific about what elements of "Hello Doctor" were considered "unethical", the HPCSA's notice characterised the telemedicine service as discouraging "face-to-face consultations between the patient and practitioner". The Council indicated that revised Telemedicine Guidelines were being considered by the professional boards and would be issued in due course.

Nursing Act

In March 2013, the Minister published a raft of Regulations and Notices relating to the registration and education and training of various categories of nursing personnel.[21-24] Other Regulations deal with appeals against decisions of the South African Nursing Council (SANC).[25] On the same day, the Minister issued a notice, in terms of the Nursing Act (33 of 2005), creating the category of "staff nurse".[26] Disappointingly, there has been no progress in creating the category of prescribing nurses envisaged by section 56(1) of the Nursing Act. This continues to hamper the development of authorised prescribing nurses as provided for in the Medicines and Related Substances Act (101 of 1965), and the listing of substances to be prescribed by such nurses in the Schedules. It also prevents, according to some interpretations, the dispensing of prescriptions written by nurses holding either section 38A or 56(6) permits by pharmacists or pharmacist's assistants.

In July 2013, the Minister made minor changes to the Regulations governing disciplinary inquiries conducted by the SANC.[27]

The Regulations regarding the scope of practice of nurses and midwives were issued in draft form in October 2013, with comments being invited within three months of this date.[28]

Pharmacy Act

Despite repeated signals from the South African Pharmacy Council (SAPC), the promised Regulations relating to continuing professional development (CPD) for persons registered in terms of the Pharmacy Act have yet to be gazetted in final form. As a consequence, amendments to Council rules (including the ethical rules) and other Regulations (such as those relating to the maintenance of the registers) have not yet been made. Without these Regulations, the mandatory recording of CPD activities by registered persons cannot be enforced.

On 20 December 2013, the SAPC issued two Board Notices relating to Good Pharmacy Practice (GPP) standards. The first provided new minimum standards relating to the supervision of pharmacy support personnel.[29] The second, a draft for comment, proposed the amendment of a range of GPP standards, including those for the provision of HIV tests in pharmacies (removing the ban on the sale of home-testing kits), requiring all community and institutional pharmacies to either provide a 24-hour service or clearly display the contact details of the on-call pharmacist, covering the procurement, storage and distribution of thermolabile medicines, and stipulating minimum standards for courier pharmacies and the use of automated dispensing units.[30]

Allied Health Professions Act

Only two minor Board Notices were issued by the Allied Health Professions Council of South Africa in 2013, both correcting previous Notices.[31,32] However, as is outlined in relation to the Medicines and Related Substances Act, practitioners registered in terms of this Act will be affected markedly by changes to the registration of complementary medicines. The Medicines and Related Substances Act allows for the designation of "practitioners" (being those registered in terms of the Allied Health Professions Act) as "authorised prescribers", but only in respect of the substances listed for that purpose in the Schedules. This mechanism, which is intended to recognise exceptions rather than norms, seems inappropriate when dealing with complementary products that are within the core competency of specific allied health professions, such as homeopathy. It is as yet unclear, though, how complementary medicines will be incorporated into the existing Schedules.

Medical Schemes Act

Although no new legislation, either primary or secondary, has been issued in relation to the Medical Schemes Act (131 of 1998), the Treasury has released a statement about the complex process of finalising Regulations clearly delineating the boundaries between medical schemes and health insurance products.[33] It was envisaged that a revised second draft of the Regulations would be published for a further comment period by the end of 2013, or after the enactment of the Financial Services Laws General Amendment Bill (29 of 2012), which is currently before Parliament. This Bill introduces an amendment to the definition of a medical scheme in the Medical Schemes Act, as follows (where, as usual, words in bold type in square brackets indicate omissions from existing enactments, and words underlined with a solid line indicate insertions in existing enactments):[34]

'''business of a medical scheme'' means the business of undertaking, **[liability]** in return for a premium or contribution **[-]**, the liability associated with one or more of the following activities:

(a) **[to make provision]** providing for the obtaining of any relevant health service;

(b) **[to grant]** granting assistance in defraying expenditure incurred in connection with the rendering of any relevant health service; **[and]** or

(c) **[where applicable, to render]** rendering a relevant health service, either by the medical scheme itself, or by any supplier or group of suppliers of a relevant health service or by any person, in association with or in terms of an agreement with a medical scheme."

The Treasury summarised the policy stance as follows: "The revised second draft Regulations will acknowledge that while health insurance products have a role in the marketplace, these products must operate within a framework whereby they complement medical schemes and support the social solidarity principle embodied in medical schemes."

In relation to the amended definition, the Treasury explained that: "The revised second draft Regulations will provide for the conditions under which certain health insurance policies will be excluded from the definition of a *"business of a medical scheme"*. The conditions will include, but are not limited to, product standards that define the benefit offering; enhanced product disclosure/marketing requirements; alignment of broker commission between health insurance and medical schemes products; and closer regulatory reporting and monitoring requirements. These conditions are designed to prevent health insurance policies from undermining the business of a medical scheme." Overall, the intention is to allow for the continued sale of Gap Cover and Hospital Cash Plan insurance products, but with enhanced scrutiny of such products.

However, the lack of progress in relation to policy interventions previously signalled but not finalised (and perhaps now abandoned) has been noted.[35] These include the issue of risk equalisation and mandatory scheme membership for those employed above a certain income level.

Foodstuffs, Cosmetics and Disinfectants Act

In March 2013, far-reaching Regulations limiting the inclusion of sodium in certain foods were gazetted in final form.[36] Guidelines for monitoring irradiated foodstuffs were also enabled in terms of the Foodstuffs, Cosmetics and Disinfectants Act (54 of 1972).[37]

Medicines and Related Substances Act

Although a draft of the proposed Medicines and Related Substances Amendment Bill was published for comment in March 2012, this Bill has not been issued in final form, nor does it appear to have been tabled in Parliament, despite being approved by the Cabinet on 18 September 2013.[38,39] Without the passage of this enabling Bill, or the promulgation of the 2008 Amendment Act, the creation of the South African Health Products Regulatory Authority (SAHPRA) cannot proceed.[40] The reasons for the delay of this Bill, which appears now to be somewhere between the tagging mechanism and the First Reading stage before referral to the National Assembly Portfolio Committee on Health, are unclear. To some extent, it may merely be a casualty of the run-up to the 2014 election, but there remain concerns about the viability of the proposed regulatory structure. One of the key definitions in the proposed Bill is that of a "health product", which is defined as "a medicine, Scheduled substance, medical device, IVD, cosmetic or foodstuff". The 2008 Act had defined "IVD" as an "in vitro diagnostic medical device", meaning "a medical device, whether used alone or in combination, intended by the manufacturer for the in-vitro examination of specimens derived from the human body solely or principally to provide information for diagnostic, monitoring or compatibility purposes". The circular reference would indicate that the 2008 Act will also need to be promulgated. However, more importantly, the definition of a "health product" shows the breadth of the regulatory scope envisaged for the new regulatory authority.

The regulatory approach to complementary medicines has been highly contested for many years, not least since the publication of the 2002 notice by the Medicines Control Council (MCC), which was referred to by some as a "call-up" notice, with a much abbreviated requirement for information, and by others as merely an information-gathering exercise.[41] In November 2013, the Minister finally published amendments to the General Regulations to the Medicines Act, which promised to provide much-needed clarity in this regard.[42] The Regulations, which came into effect on the date of publication, defined complementary medicines (CMs) in relation to three elements, all of which would need to be met: "complementary medicine" means any substance or mixture of substances that (a) originates from plants, minerals or animals; (b) is used or intended to be used for, or manufactured or sold for use in assisting the innate healing power of a human being or animal to mitigate, modify, alleviate or prevent illness or the symptoms thereof or abnormal physical or mental state; and (c) is used in accordance with the practice of the professions regulated under the Allied Health Professions Act, 1982 (63 of 1982)". At the same time, the Medicines Control Council published final guidelines on the assessment of complementary medicines in relation to quality, safety, and efficacy.[43] Two additional draft guidelines were published for comment at the same time, dealing with the fees to be charged for complementary medicine applications and the use of the electronic Common Technical Document (eCTD) for such applications.[44,45] Some weeks later, a rather dated document entitled "Roadmap for registration of complementary medicines" was also placed on the MCC's website.[46] One of the clearer statements in that document related to the status of the 2002 notice: "On 22 February 2002 the Council published a notice in Government Gazette No. 7282, R. 204 solely for the purpose of an audit of products already on or about to enter the market at that time, for a period of 6 months. The intention was that the audit should have been completed in respect of those products available on the market by 22 August 2002. Nevertheless, submissions dealing with the subject matter of the 2002 notice continue to be made to the Medicines Control Council". Further, it made the intention clear: "The 2002 notice has led to much uncertainty amongst importers, manufacturers, wholesalers, retailers and consumers regarding the legal status of these products, as companies who submitted such applications were often under the misconception that these submissions were serving as applications for registration rather than simple notifications. Government Gazette Notice R. 870 of 15 November 2013 calls for the legislative control of all these complementary or alternative medicines".

Importantly, the regulation of complementary medicines did not entail an amendment of the Act itself, but relied on the current provisions in sections 14 and 15, and the standard approach to assessing quality, safety and efficacy. In the same way that the specific requirements for data vary between new chemical entities (which are assessed on all three criteria) and generic medicines (which are only assessed on quality, with an additional requirement to show interchangeability), a specific set of criteria has been established for medicines that meet the definition of "complementary medicines". Critically, these would be restricted to medicines "associated with those disciplines regulated by the Allied Health Professions Council of South Africa (AHPCSA). These are commonly known as Homeopathic medicines, Western Herbals, Traditional Chinese medicines, Ayurvedic medicines, Unani-Tibb and Aromatherapeutic medicines/oils". Specific reference sources and lists of substances were prescribed for each complementary category. One of the pressing tasks will be to identify products that are on the market currently, which may have a registry number issued in terms of the 2002 audit, but do not fit the new definition of a CM, and should therefore either be registered as medicines or removed from the market.

A risk-based approach, differentiating between high-risk and low-risk health claims has been adopted. Examples of "high-risk" claims listed include "Treats/cures/manages any disease/disorder", "Prevention of any disease or disorder", "Reduction of risk of a disease/disorder", "Aids/assists in the management of a named symptom/disease/disorder", "Relief of symptoms of a named disease or disorder", and "Treatment of proven vitamin or mineral deficiency diseases". In order to justify such a claim, applicants would be required to submit clinical data, drawn from at least two of the following four sources: recognised Pharmacopoeiae, recognised monographs, three independent written histories of use in the classical or traditional medical literature, or citations from other *in vivo* or *in vitro* studies, case reports or other sources. Lower requirements have been stipulated for low-risk claims, defined as "General health enhancement without any reference to specific diseases or conditions", "Health maintenance, including nutritional support", or "Relief of minor symptoms (not related to a disease or disorder)". This statement from the guideline is self-evident, but may prove difficult to apply: "The evaluation of high-level claims (i.e. for the use of medicines for serious illnesses) requires an assessment of the differential between the benefits of a medicine and the risks of its use. There is no simple measure for this: the acceptable level of risk varies with the nature of the benefits, the risk from taking the medicine and the risks of untreated (and undiagnosed) diseases. Generally, the more serious and life threatening the untreated disease and the greater the benefit, the higher is the level of acceptable risk. The benefit-risk profile is also affected by the availability of accepted (proven) treatments, the risk profile of those accepted therapies, and the risks of foregoing treatment where such a medically acceptable option is available. A benefit-risk profile should be determined for every complementary medicine – even for so-called "minor conditions".

However, regardless of the specific requirements in terms of safety and efficacy, all CMs will be subject to compliance with current Good Manufacturing Practice. Detailed guidance on the approach to assessing the quality of CMs is provided.

As with the implementation of the initial Act from 1967 onwards, this process will take years to implement. The new General Regulations therefore stipulate that all CMs that are as yet unregistered must include the following disclaimer on their labels: "This medicine has not been evaluated by the Medicines Control Council. This medicine is not intended to diagnose, treat, cure or prevent any disease".

Unusually, the amended General Regulations also included a risk-based set of deadlines. Those related to labelling, package inserts and patient information leaflets would come into operation three months from the date of publication of the amendment. With specific reference to the CM category (the new Category D medicines), those which fell in the pharmacological classifications of antiviral agents, oral hypoglycaemics, cardiac medicines and cytostatic agents would be called up immediately for registration. Accordingly, any CM in such categories that was already on the market would need to have an application for registration submitted within six months from the date of publication of the Regulations. Any new CM in such pharmacological classifications that was brought to market after the same date would first need to be registered. Delayed application of the same rules was specified for other pharmacological categories: by 24 months for CMs in the pharmacological classification slimming preparations, male sex hormones, female sex hormones and androgen-oestrogen combinations claiming sexual stimulation and sexual dysfunction benefits; and by 30 months for any CMs claiming immune stimulation (or similar expressions), medicines acting on the muscular system, and vitamins claiming to be sport supplements and exceeding the upper limits for vitamins and minerals as published by the MCC. Finally, it was stated that the entire process, for all remaining pharmacological classifications, would be completed no later than December 2019. Although vitamins were mentioned in relation to sports supplements, they did not appear to meet the definition of complementary medicines. This view was further supported by the inclusion of new inscriptions for both vitamins and probiotics in amended Schedules published by the Minister in February 2014.[47]

Although this regulatory scheme does not deal with the very challenging issue of African Traditional Medicines, it would appear to provide the means to tackle the ever-expanding and out-of-control CM market, using a risk-based approach that draws on the experience of a number of other regulators, notably the Australian Therapeutic Goods Authority. Whether the MCC inspectorate (or its successor in the form of SAHPRA) has the means, capacity and will to implement these Regulations remains to be seen. Three workshops were arranged in February 2014 to enable the regulator to explain the new guidelines to the CM industry.[48]

The existing provisions of the Act were nonetheless sufficient to declare an unregistered product claiming to be an effective anti-malarial (Nordman Artemesia Anti-malaria Capsules) as undesirable.[49]

In addition to the vexed issue of CMs, the amended General Regulations addressed a number of problems that had emerged since the last set was published in 2003. Some were simply typographical errors, such as tidying up the requirements for registers to be kept by all sellers of specified Schedule 5 substances. Others addressed areas of concern, such as the requirement that anyone entering or leaving the country could only do so with 30 days' supply of medicines for personal use. This was replaced with a three-month quantity for those entering the country only. In addition, the control over clinical trials was extended to those involving animals.

Without much fanfare, an important concession was granted in relation to holders of dispensing licences in October 2013.[50] Provided that the holders of such licences paid the annual fee, they would remain valid until suspended or revoked by the Director-General, instead of being renewable every three years. By contrast, licences to manufacture and to act as a wholesaler or distributor of medicines would remain valid for only five years.

The Medicines Act also includes the regulation of prices in the private sector. In January 2013, the Minister stipulated that single exit prices in the private sector could be increased by a maximum of 5.8%.[51] On 1 February 2013, the Director-General issued final guidelines on the submission of pharmacoeconomic analyses in relation to medicines, but their application remains voluntary until further notice.[52] It is unclear whether any such submissions have yet been submitted, or whether the Department has made any determinations on the basis of such submissions. The degree to which the medical schemes will accept or act upon such determinations has also been questioned.[53] In September 2013, the Minister of Health issued a notice calling for submissions in relation to the single exit price increase for 2014, also providing a hint at the

weighting to be applied in relation to local consumer price inflation and the exchange rates relative to the Euro and US dollar.[54] One of the unintended consequences of the single exit price system has been the apparent ban on any donation programmes in the private sector. In that regard, an MCC notice of section 36 exclusions issued in June 2013 was significant.[55] It exempted a particular product from the application of section 22G(3)(a) of the Act and General Regulation 6, but "solely for the sale at no cost to one A Vahed at the prescribed dose of his treating Physician". This is a clumsy and time-consuming solution to the problem, requiring a unanimous recommendation from the MCC for reaching a decision. In May 2013, the Registrar used the same mechanism to extend the exemption of Schedule 0 medicines from the transparent pricing system, including the ban on bonusing, for a further three years.[56] In January 2014, the Minister of Health stipulated that the maximum increase in the single exit price for 2014 would be 5.82%, and the Director-General published the requirements for applying for such an increase.[57,58] The low maximal increase in the single exit price was immediately criticised as not taking ongoing exchange rate fluctuations into account, which elicited a response from the Department indicating that extraordinary increases in 2014 might be considered and that the formula for determining such increases might be reconsidered.[59] However, allowing more than one increase in a single exit price cycle would require a change in the Regulations.

In September 2013, two sets of Schedules to the Medicines Act were issued by the Minister.[60,61] The first of these was significant, as it listed substances in each of the schedules to be prescribed by various categories of emergency personnel, dental therapists and optometrists. These were the first such listings in the Schedules, allowing for the application of Section 22A of the Medicines and Related Substances Act, as had been in place since 2003. However, while other applications for similar listings were in progress, no movement had yet been made in relation to nurses, the most common non-medical prescribers in the health system. A draft guideline for such applications was published by the MCC in October 2013.[62]

Other health-related legislation

Although not under the direct auspices of the Minister of Health, two additional pieces of legislation with health-related consequences were passed or published in draft form in 2013.

Protection of Personal Information Act

The Protection of Personal Information Act (4 of 2013), assented to in November 2013, is a progressive piece of legislation that seeks to give effect to the constitutional right to privacy by protecting citizens' personal information held by public and private bodies, through the regulation of the possession of personal information, and to enforce these measures through the mechanism of an Information Regulator.[63]

In the Act, "personal information" is defined broadly as information relating to identifiable, living natural (or juristic) persons, concerning their race, gender, sex, pregnancy, marital status, national, ethnic or social origin, colour, sexual orientation, age, physical or mental health, well-being, disability, religion, conscience, belief, culture, language and birth. Significantly, such information also includes a person's medical history and biometrics. The bodies identified may handle such information (lawful processing) under stringent conditions stipulated in the Act, and subject to the rights of the individual being protected, which conditions include the principles of accountability, lawfulness, minimality, consent, justification and objection. Further safeguards include security, data subject participation and correction of personal information. In addition, there is a prohibition on the processing of special personal information such as "the religious or philosophical beliefs, race or ethnic origin, trade union membership, political persuasion, health or sex life or biometric information" of an individual. The prohibition relating to an individual's health or sex life does not apply to processing by certain exempt categories: medical professionals, healthcare institutions or facilities or social services (for the purposes of treatment, care or administration), insurance companies or medical schemes (for the purposes of assessing risk to the company or scheme), and a host of other bodies.

The Act has significant implications for the healthcare sector. It bolsters the privacy provisions in the common law, the Constitution[64] and the National Health Act.[65] It does so by requiring the adoption, by public and private bodies, of security measures on the integrity and confidentiality of personal information in their possession or control. This is to be achieved by taking appropriate and reasonable measures to prevent the loss of, and unlawful access to, such information. Breaches are to be visited with both penalties under the Act, as well as civil claims for damages resulting from negligent disclosure of personal information.

A notable exception is the processing of such information "solely for the purpose of journalistic, literary or artistic expression to the extent that such an exclusion is necessary to reconcile, as a matter of public interest, the right to privacy with the right to freedom of expression". It thus appears to sanction the disclosure of medical records, provided it can be established that it would be in the public interest to do so. This is in sharp contrast to the approach adopted by legislators in respect of the 'Secrecy Bill', which does not appear to have struck the same acceptable balance between secrecy and the public interest.[66]

Draft Mine Health and Safety Amendment Bill

In November 2013, the Minister of Mineral Resources issued a draft version of the Mine Health and Safety Amendment Bill, 2013, for comment.[67] The memorandum explains that it seeks to strengthen the setting, monitoring and enforcement of health and safety standards in mines, and the operations of the Mine Health Inspectorate.

Health-related policy

The pre-eminent policy process relating to health should be the introduction of National Health Insurance. However, while there has been some attention paid to the "piloting" of NHI in various districts, the White Paper has yet to be issued.[68,69] The promised discussion document on the financing options for NHI has also not yet been issued by the National Treasury, though academic endeavours to explore the various possibilities continue.[70] Think-tanks within South Africa have also continued to issue analyses of the potential impact of policy changes on the existing private sector.[71]

Of direct relevance to this effort, the Terms of Reference for the market inquiry into the private healthcare sector were issued in final form

in late November 2013.[72] Importantly, the Terms of Reference have been extended to include the "relationship between pharmaceutical manufacturers, logistics services, health professionals, hospitals and hospital groups, doctors and retail pharmacy as systemic cost drivers", as well as "the influence of the Government's tender processes on product prices in the private health sector". The pricing of new medicines and health technologies will also be considered, which tie in with the pharmacoeconomic submissions now requested by the Department of Health. Nonetheless, as pointed out by SECTION27, much remained unclear about the process of the inquiry, which was expected to commence on 6 January 2014 and reported by 30 November 2015.[73] The names of the members of the panel were announced in January 2014.[74]

In 2013, the National Department of Health continued to issue technical policy documents in order to guide healthcare practice. These included the updated contraception guidelines,[75,76] various guidelines to aid the implementation of the Mental Health Care Act,[77] and the Mini Drug Master Plan (2011/12–2013/14).[78] As with the 2012 contraception guidelines, the 2013 guidelines on the management of type 2 diabetes at primary care level did not appear to have been aligned explicitly with the Standard Treatment Guidelines and Essential Medicines List developed by the ministerially appointed National Essential Medicines List Committee, which inform the procurement of medicines in the public sector.[79] Where such uncoordinated policymaking occurs, delays in the procurement of the necessary health products (such as contraceptive implants) may delay implementation of the policy.

While no policy document has yet been issued, the Minister of Health has clearly signalled an intention to address alcohol usage by means of restrictions on the marketing of such products. It has been pointed out that alcohol taxes in South Africa are currently regressive, with the tax on sorghum beer the most regressive.[80] Notably, the Department of Health has issued Terms of Reference for the call for proposals to conduct an independent regulatory impact assessment on the proposed Control of Marketing of Alcohol Beverages Bill.[81] In a statement made on 20 September 2013, the Minister of Social Development stated that the Bill would seek "to contribute to the reduction of alcohol-related harm and the protection of public health and community well-being by limiting the exposure of the public to alcohol marketing by (a) Restricting the advertisement of alcoholic beverages, (b) Prohibiting any sponsorship associated with alcoholic beverages (excluding donations), and (c) Prohibiting any promotion of alcoholic beverages".[82] However, a month later, the media reported that no Bill had been published, and that there appeared to be disagreement in Cabinet about the process to be followed.[83] It is unclear whether the Bill would first be subjected to a regulatory impact assessment (as outlined in the Department of Health's notice) or published for public comment.

Other policies with an impact on health

Draft National Policy on Intellectual Property

The Draft National Policy on Intellectual Property, 2013 was released for public comment by the Minister of Trade and Industry on 4 September 2013.[84] As indicated in the last edition of the *Review*, the broad aim of this policy is to empower South Africans and promote development. While there are some differences, the 2013 Draft National Policy is substantially the same as its predecessor. Significantly, the policy again devotes extensive sections to access to public health and medicines. In particular, it has been described as: "grounded in a developmental approach appropriate to our country, and seeks to eliminate the many perverse outcomes of IP protection which are detrimental to the broader society".[85]

The Draft Policy contains strong recommendations with regard to the following issues:

- the establishment of a substantive system for the search and examination of patents;
- the incorporation of flexibilities in the World Trade Organizations's Trade-Related Aspects of Intellectual Property Rights Agreement (1994), and the Doha Declaration on TRIPS and Public Health (2001);
- amendment of the Patents Act in order to be amenable to public health concerns;
- the inclusion of such flexibilities as pre- and post-grant opposition to patent applications, and the use of parallel importation and compulsory licensing;
- a decision not to enter into bilateral trade agreements that negate the gains attained in multilateral agreements regarding flexibilities; and
- the protection of clinical trial and other data, but not data exclusivity.

However, while the policy refers to the use of flexibilities, in particular in order to enhance access to affordable medicines, it is found wanting in the following respects:

- the lack of the requirement of strict patenting standards with explicit proscription of new use and new formulation patents to prevent patent "ever-greening" ("the submission of a new application for an ostensibly novel product, which is in fact only very slightly different from the one which is about to lose its patent protection. The 'new' product can then receive a further 20 years of patent protection.");[86]
- provision for full disclosure in patent applications, including International Non-proprietary Name;
- provision for parallel importation under an explicit international exhaustion regime;
- provision for simplified procedures for compulsory licensing, including expanded grounds for grant, and remuneration guidelines limiting extensive royalties;
- provision for compulsory licences on the grounds of anti-competitive conduct;
- extensive early working exceptions, as well as other exceptions for educational, scientific and research purposes;
- exclusion of diagnostic, therapeutic and surgical methods, plants, animals and genetic material; and
- broad exceptions to patent rights for research and education.

The impact of intellectual property (IP) protection is clearly evident in the field of tuberculosis (TB). With the prices of first-line antiretrovirals (ARVs) having plummeted in the past decade as a result of generic competition,[87] the spotlight has increasingly been turned on the issue of medicines for tuberculosis, second-line ARVs, and medicines used to treat cancer. A recent study indicates that funding for TB

research and development has declined, primarily as a result of private sector cutbacks on spending.[88] IP protection on key drugs to treat TB further compounds the problem. One example is linezolid, which has been used in treating drug-resistant TB. Pfizer currently markets the drug at the unaffordable price of R676 per tablet in the private sector. A generic version manufactured in India is sold in that country for as little as R10 per tablet, but South Africa cannot import this cheaper option because of Pfizer's patent.[89] An improved pathway to government use licensing or compulsory licensing would ease access to this and other needed essential medicines.

Although the Minister of Health had not previously appeared to be particularly engaged with the Draft National Policy on Intellectual Property, this changed dramatically with the publication in the media of a proposal from an American lobbying firm to the Innovative Pharmaceutical Association South Africa (IPASA), the body representing transnational pharmaceutical manufacturers.[90] The proposal, entitled "Campaign to Prevent Damage to Innovation from the Proposed Draft National IP Policy in South Africa" was rejected by IPASA, but the reputational damage was sufficient to see two member companies leave IPASA. The document, and the Minister's characterisation of the planned lobbying effort, drew international attention and was also referred to by the Director-General of Health in her address to the World Health Organization Executive Board in February 2014.[91] The Director-General drew immediate parallels with the 1998 attempt to prevent the promulgation of the Medicines and Related Substances Amendment Act (59 of 1997): "Chair, the recent leak by the multinational pharmaceutical industry of the strategy written by Public Affairs Engagement to undermine South Africa's efforts to reform its Intellectual Property policies is unfortunate. One of the objectives of this policy is to contribute towards the protection and promotion of public health, and access to medicines in particular. This is not the first time that South Africa has been under such an attack, even in the face of the most devastating HIV/AIDS and TB co-morbidities. The first time was when Nelson Mandela was the first respondent to the legal challenge". Although the Draft National Policy on Intellectual Property is not restricted to medicines-related issues, it appears that, as in 1998, access to medicines will provide the battleground over which the technical issues are fought.

Jurisprudence

Few court decisions with marked impact on the delivery of health care in South Africa have been delivered in 2013. However, two stand out.

In the matter of *Kievits Kroon Country Estate v Mmoledi*, the Supreme Court of Appeal (SCA), when considering an unfair dismissal, grappled with the issue of whether a traditional healer's certificate may be equated with a medical certificate for the purposes of sick leave.[92] The employee concerned had requested sick leave and provided a letter from a traditional healer to the effect that she was being treated for having "visions" of ancestors, which required her to undergo training with the traditional healer to deal with her condition. Having failed to report to work for the period requested, she was dismissed after an internal disciplinary inquiry found her guilty of misconduct for disobeying an instruction to report for duty and being absent without permission. This decision was overturned by the Commission for Conciliation, Mediation and Arbitration (CCMA), and subsequently confirmed by the Labour Court, the Labour Appeal Court and the SCA. In essence, the CCMA found, after hearing her uncontroverted evidence, that her absence was caused by circumstances beyond her control, and ordered her reinstatement. The Court referred to the "cultural chasm" between the opposing world views of the employer and employee, citing the decision in *Department of Correctional Services v Popcru* in support of the view that "employees' sincerely held cultural beliefs were constitutionally protected".[93] While the *Kievits* decision appears to place the recourse to traditional healers on par with "mainstream" medical practitioners in respect of medical certificates and treatment options, it remains to be seen how widely it will be implemented in practice. In this regard, appropriate regulation of the traditional medicines sector will go a long way towards providing clarity.

In December 2013, the North Gauteng High Court delivered a judgment in the case brought by MediRite (Pty) Ltd, a corporate pharmacy owner, challenging the South African Pharmacy Council's amended Good Pharmacy Practice (GPP) standards relating to the demarcation of a pharmacy located within another business.[94] The GPP standard was changed in 2012 to require that "[t]he demarcation must be permanent, solid and closed at all times, which demarcation may be, inter alia, brick and mortar, aluminium, steel, glass, dry wall or wood partition". The GPP standard also required the demarcation to extend "from the floor to the ceiling height" and to incorporate all areas attached to the pharmacy. This was deemed by the applicant to be excessive and impractical in relation to a pharmacy located in a supermarket, and thus a threat to its viability. The application was dismissed, with costs, as the Pharmacy Council's actions were found to be reasonable with regard to the requirements of the Promotion of Administrative Justice Act (3 of 2000).

Conclusion

Although 2013 did not see release of the much-anticipated White Paper on National Health Insurance, there has been movement in some important areas of health legislation and policy. Of note, the enabling provisions for the independent Office of Health Standards Compliance are now in place and the process of nomination of members of the Board of that structure has commenced. The prospects of progress in relation to the regulation of complementary medicines seem at last to be positive, though the possibility of court action to delay or frustrate the implementation of the new Regulations cannot be dismissed. Although the major changes to national health legislation have been put in place, in particular in the form of the National Health Act (61 of 2003), the challenges of implementing such changes in every sphere of government, at every health facility, and across the persistent public-private divide cannot be underestimated. The enabling nature of much of South African health law requires the development and maintenance of detailed secondary legislation in the form of Regulations and statutory council notices. Though each may seem minor in content, they all contribute to the shaping of the national health system, and to the progressive realisation of the right to health envisaged by the Bill of Rights.

Finally, like all others who use personal information protected in terms the new Act, healthcare providers will need to carefully consider the demands of new legislation on their practices.

Update

After finalisation of this chapter, a number of new developments of relevance to health policy and legislation were noted. These are described in brief:

- On 18 February, notice of intention to table a private members' Bill and inviting comment on the Medical Innovation Bill was gazetted. This Bill, tabled by Mario Oriani-Ambrosini, MP is intended to "make provision for innovation in medical treatment and to legalise the use of cannabinoids for medical purposes". [General Notice No. 100 of 2014, Government Gazette No. 37349, 18 February 2014]
- On 20 February, the explanatory summary for the Medicines and Related Substances Amendment Bill (6 of 2014), was published. However, no public hearings have yet been held in relation to this Bill. [General Notice No. 117 of 2014, Government Gazette No. 37361, 20 February 2014]
- On 28 February 2014, the Minister of Health issued draft Regulations proposing criteria for the licensing of pharmacy premises. Although this licensing scheme is operated in terms of the Pharmacy Act (53 of 1974), it closely mirrors the proposed certificate of need. [Government Notice No. R.151, Government Gazette No. 37399, 28 February 2014]
- On 31 March 2014, the President issued a promulgation notice, setting 1 April 2014 as the date on which sections 36 to 40 of the National Health Act (61 of 2003) would come into operation. Section 36(1) states that "A person may not – (a) establish, construct, modify or acquire a health establishment or health agency; (b) increase the number of beds in, or acquire prescribed health technology at, a health establishment or health agency; (c) provide prescribed health services; or (d) continue to operate a health establishment or health agency after the expiration of 24 months from the date this Act took effect, without being in possession of a certificate of need". The implementation of the certificate of need will require the development of extensive Regulations. [Government Notice No. 21 of 2014; Government Gazette No. 37501, 31 March 2014]
- On 23 April 2014, the Minister of Health published the National Health Normative Standards Framework for Interoperability in eHealth. [Government Notice No. 314 of 2014, Government Gazette No. 37583), 23 April 2014]
- On 2 May 2014, the President issued a promulgation notice, bringing some sections of the Traditional Health Practitioners Act (22 of 2007) into operation. [Government Notice No. 29 of 2014, Government Gazette No. 37600, 2 May 2014]
- On 23 May 2014, the Minister of Health issued draft Regulations regarding healthcare waste management, in terms of the National Health Act. [Government Notice No. R.375, Government Gazette No. 37654, 23 May 2014]

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The eHealth Strategy for South Africa 2012-2016: how far are we?

2

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This chapter reviews progress made by the health sector in implementing the eHealth Strategy 2012–2016, which was approved by the Ministry of Health and published in July 2012. The finalisation of this Strategy following several attempts, and its placement in the public domain, created optimism that a clear vision for improving health information systems in South Africa had been successfully articulated. While this development was an important milestone in the evolution of Health Information Systems, actual achievement will depend on the effective implementation of the Strategy and the extent to which its implementation is monitored and evaluated. We examine the milestones reached towards each of the 10 pillars (or key priorities) of South Africa's eHealth Strategy, as well as constraints and barriers to its implementation.

The chapter concludes that a year after the publication of the Strategy, some progress has been made albeit modest, since key milestones have been attained towards only five of its 10 strategic priorities while limited progress has been made in the remaining five priorities. This highlights the need for consistent monitoring of the implementation to ensure that the achievements made are consolidated, and that barriers are identified and addressed early on.

The implementation of the eHealth Strategy has received solid support from the leadership of the health sector, through its national governance and management structures, as well as the Technical Advisory and Policy Committees of the National Health Council. However, the acquisition of the requisite human resources with the technical expertise and capacity to provide strategic leadership is critical for steering the country towards the goals envisaged by the eHealth sector. Greater investment of effort and resources is required to accelerate progress towards establishing and activating all the pillars of the Strategy.

While the development of an eHealth Strategy was an important milestone in the evolution of Health Information Systems, actual achievement will depend on the effective implementation of the Strategy and the extent to which its implementation is monitored and evaluated.

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Introduction

The World Health Organization (WHO) defines eHealth as:

> The use of Information and Communication Technologies (ICTs) for health to, for example, treat patients, pursue research, educate students, track diseases and monitor public health.[1]

eHealth is thus about improving the flow of information, through electronic means, to support the delivery of health services and the management of health systems.[2] In 2005, WHO member states recognised the potential of eHealth to strengthen health systems and to improve quality, safety and access to care, and supported efforts to incorporate eHealth in health systems and services. In 2012, the WHO and the International Telecommunications Union (ITU) observed that healthcare delivery was increasingly reliant on information and communication, and on technologies that enable these resources, whether to deploy personnel, conduct research or support humanitarian action, at every level and in every country.[2]

Efforts to develop an eHealth Strategy for South Africa date back several years. In July 2010, the National eHealth Steering Committee, consisting of senior managers from the National and Provincial Departments of Health (DoH), produced the 16th version of the draft Strategy, which covered the five-year period from 2010 to 2015.[3] Although the quality of the draft Strategy was commendable, it did not enjoy widespread support as it was seen to be too resource-intensive to implement. The Strategy required the establishment of a Schedule 3A Public Entity to manage eHealth, which would be the organisational vehicle with the basic capabilities and competencies required to deliver the proposed eHealth programme. This public entity would require an annual budget of between R2 billion and R3.5 billion, and the appointment of over 60 additional officials, including six Deputy Directors-General, 11 Chief Directors and 22 Directors.[3]

Through a new process led by the National Health Systems Committee of South Africa (NHISSA), which is a substructure of the Technical Advisory Committee of the National Health Council (TAC-NHC), a new version of the eHealth Strategy was produced in 2012.[4] The process of developing the Strategy was consultative and iterative. Following its endorsement by the National Health Council, which consists of the Minister of Health and the Provincial Members of the Executive Council for Health, the national eHealth Strategy for South Africa was authorised by the Ministry of Health on 9 July 2012. In so doing, South Africa joined other African countries that have produced eHealth Strategies, including Kenya (2011), Mauritius (2010), Nigeria (2007), Rwanda (2009) and Ghana (2011).[5] However, there is a paucity of published literature on the evaluation of the effectiveness of the eHealth strategies produced by other African countries. Such deficiency of evaluation is a pitfall that South Africa should take steps to avoid.

This chapter aims to trace the progress made by the health sector with the implementation of the South African eHealth Strategy, to reflect on key factors facilitating and impeding access, and to propose a suite of interventions to accelerate progress.

In July 2012, the WHO and the ITU produced a National eHealth Strategy Toolkit providing guidance to countries as they develop and implement their eHealth strategies.[2] Although the South African eHealth Strategy was developed before the publication of the Toolkit, researchers found that the processes followed in development of the Strategy conformed to the recommendations provided by the Toolkit.[6]

International developments in the eHealth arena

The production of the eHealth Strategy was not an initiative unique to South Africa, but was consistent with developments globally. Over the seven-year period from 2005 to 2012, the international community, led by United Nations (UN) and agencies such as the WHO and ITU, adopted far-reaching resolutions on the implementation of eHealth. In May 2005, the Fifty-eighth World Health Assembly adopted Resolution WHA58.28 on eHealth.[7] The Resolution urged member states to draw up long-term strategic plans, including an appropriate legal framework and infrastructure, for developing and implementing eHealth services, public and private partnerships, and ICT for health infrastructure to promote equitable, affordable and universal access to its benefits. Governments were also urged to continue to work with information telecommunication agencies and other partners in striving to make eHealth successful. Countries are advised to collaborate closely with the private and non-profit sectors in information and communication technologies, in order to advance public services for health and for effective reach into communities, including vulnerable groups, with eHealth services appropriate to their needs; multi-sector collaboration for determining evidence-based eHealth standards and norms was further envisioned. eHealth activities should be evaluated and the knowledge of cost-effective models be shared, to ensure quality, safety and ethical standards.

In 2010, the Regional Committee for Africa adopted an eHealth resolution that urged member states to promote, inter alia, national political commitment to and awareness of eHealth. Recommended planning involves creating an enabling policy environment by conducting a national needs assessment for eHealth, developing national policies, strategies, norms and appropriate governance mechanisms, and drawing up long-term strategic frameworks for eHealth. This resolution also urged member states to build infrastructure and establish services for eHealth, to systematically develop human capacity for eHealth by introducing an Information and Communication Technologies curriculum in health training institutions, and to establish monitoring and evaluation systems to measure progress in the implementation of the national eHealth strategic plans.[8]

Another pertinent development was the January 2013 resolution of the Executive Board of the WHO on eHealth standardisation and inter-operability.[9] This resolution urges member states to consider options for collaboration with relevant stakeholders, including national authorities, ministries, healthcare providers and academic institutions, in order to devise a roadmap for implementation of health data standards at national and subnational levels. Such alliances should develop policies and legislative mechanisms linked to an overall national eHealth strategy that underpins compliance in the adoption of health data standards by the public and private sectors and the donor community, to ensure the privacy of personal clinical data.

Development of health information systems in South Africa

The vision

As early as 1997, the White Paper for the Transformation of the Health System in South Africa identified the development of a comprehensive National Health Information System (NHIS) as an important priority. The White Paper observed:

> Analysis of the 1994 status of health information systems in South Africa conducted by the NHISSA Committee found that existing information systems were fragmented and incompatible. They were unco-ordinated and not comprehensive; software and hardware were incompatible and not user-friendly; most systems were manually driven, with minimal computerisation, and there was inadequate analysis, interpretation and use of data at the local level. It is anticipated that new attitudes and tools will have to be developed to improve the collection and use of data for the effective management of available resources.[10]

The White Paper envisaged that the new NHIS would comprise various components, and that "individually and collectively, these components would provide the various types of information needed to support the healthcare delivery system in South Africa".[10] In the White Paper, the NHIS was conceived as a parent system encompassing various sub-systems, including the following:

- Management information
- National Health Care Management Information System
- Human Resources Management Information System
- Financial Management Information System
- Facilities Management Information System
- Equipment Management Information System
- Transport Management Information System
- Pharmaceutical and Other Consumables Management Information System
- Service Coverage (i.e. utilisation, coverage, access).

Despite the clear vision encapsulated in the White Paper, a review conducted in 2004 identified key weaknesses in health information systems, noting that a uniform patient information system – enabling the tracking of patients regardless of where they present – had not been developed.[11] The review also noted that implementation of the National Health Care Management Information System had been uneven, with provinces implementing the system in selected hospitals; this constrained the capacity of the public health sector to track patients using the facilities across various provinces.[11]

Some achievements

Over South Africa's 20 years of democracy, there have been some positive developments. The routine District Health Information System (DHIS), which was first developed in 1996 in a partnership between the University of the Western Cape, the University of Oslo and the Western Cape Department of Health (WCDoH), has since evolved into a District Health Information System (DHIS), that facilitates organised processes of gathering, sharing, analysing and using health-related data for decision-making. The DHIS now contains routine data representing around 1,4 billion patient encounters.[12] The WCDoH uses an information system known as SINJANI for data collection and collation, but like other provinces, submits data to the national level through the DHIS.

Diverse efforts to develop some form of electronic medical record keeping have also been implemented in the country. These include:

- a national Electronic TB Register, which is used across all nine Provincial Departments of Health;
- the national three-tier monitoring and evaluation system for antiretroviral therapy, which was developed in the Western Cape and subsequently endorsed by the National Health Council for implementation across all nine provinces;
- the Western Cape Primary Healthcare Information System (PHCIS) and Patient Master Index – a government-owned system that has won two awards: the 2008 the African ICT Achievers Award for the Best ICT Project in Africa, and first place in the IT@Networking Awards 2012 in Brussels;[6]
- different hospital information systems used in provinces include Meditech (Free State), Delta 9 (Eastern Cape and Western Cape), and Clinicom (Western Cape);
- the government-owned Patient Administration and Billing System is used in three provinces: Gauteng, North West and Mpumalanga; and
- the TrakCare Lab system is used by the National Health Laboratory Services at more than 190 sites across all nine provinces.

At the level of governance and regulation, various legislative instruments have been developed, including:

- Minimum Information Inter-operability Standards (MIOS)[13]
- State Information Technology Agency Act (88 of 1998)[14]
- Minimum Information Security Standards[15]
- National Archives and Record Service of South Africa Act (43 of 1996)[16]
- National Health Act (61 of 2003)[17]
- Policy of Free and Open Source Software Use for South African Government[18]

Persistent challenges

While these efforts have yielded some significant successes for the geographic areas in which they are used, they have been bedevilled by various challenges, including:

- the lack of a national eHealth strategy (until July 2012);
- widely differing levels of eHealth maturity across and within provinces;
- a large number of disparate systems between which there is little or no inter-operability and communication;
- inequity of eHealth services provided and expenditure on eHealth across Provincial and National Departments of Health;
- expensive broadband connectivity;

- the absence of a national master patient index;
- the absence of a national unique identification system of patients; and
- limited capacity within the public sector for implementation.

The health sector's Negotiated Service Delivery Agreement (NSDA) 2010–2014, produced in 2010 observed:

> Although large sums of money have been used to procure health ICT and HIS in South Africa in the past, the ICT and HIS within the health system, are not meeting the requirements to support the business processes of the health system thus rendering the healthcare system incapable of adequately producing data and information for management and for monitoring and evaluating the performance of the national health system. This results from the lack of technology regulations and a lack of policy frameworks for all aspects of infrastructure delivery.[19]

The eHealth Strategy for South Africa 2012–2016

Against the backdrop of the foregoing challenges, the eHealth Strategy for South Africa 2012–2016 was produced. In the foreword to the Strategy, the Minister of Health explains that a decision was taken by the National Health Council in 2009 to halt the acquisition of software solutions that were not inter-operable, until an eHealth strategy for the country was finalised. He also pointed out that the vision for the Strategy was to provide a blueprint for moving from the current fragmented situation to a well-functioning national patient-based information system, based on scientific standards for inter-operability (which essentially refers to the ability and capacity of different information systems to access information and harmonise different data sources). The potential role and importance of this system in the context of the implementation of National Health Insurance was also stressed by the Minister.[4]

The aims of the eHealth strategy are to:

- provide a single, harmonised and comprehensive e-Health strategy to support the medium-term priorities of the public health sector;
- pave the way for future public sector eHealth requirements; and
- lay the requisite foundations for the future integration and co-ordination all eHealth initiatives in the country (both public sector and private sector).[4]

The eHealth Strategy presents 10 pillars or strategic priorities with attendant rationales (Table 1).

Progress to date

The eHealth Strategy sets out several targets with ambitious short-term timeframes, due to the urgent need to introduce policy coherence and harmonisation in an environment characterised by fragmentation, lack of co-ordination, a prevalence of manual systems and a lack of automation. Medium- to long-term targets were also included to lay a solid foundation for the development of a well-functioning and nationally integrated information system for National Health Insurance. A year after the publication of the Strategy, progress has been made with respect to five strategic priorities, namely: Strategy and Leadership; Stakeholder Engagement; Standards and Inter-operability; Governance and Regulation; and Monitoring and Evaluation. These developments are reviewed below.

Strategy and leadership

The eHealth Strategy has received endorsement by the executive and administrative leadership of the health sector. In September 2012, the National Department of Health commissioned the Meraka Institute of the Council for Scientific and Industrial Research (CSIR) to develop a Health Normative Standards Framework, which would provide guidance to the health sector in the choice of eHealth standards, assist in the assessment of the applicability of international eHealth standards to health information systems currently deployed in South African health institutions, and serve as a national guideline for the selection and use of eHealth standards in the country, with which all information systems used in the public sector should comply.

A partnership led by the CSIR, together with the Medical Research Council (MRC) and the Nelson Mandela Metropolitan University, provided technical support to the health sector to produce an inter-operability framework that would facilitate data exchange and transfer between different information systems at all levels of the health system. The partnership conducted a landscape analysis of all health information systems used in the public health sector, in consultation with NHISSA, and produced the study report in February 2013.[20] This partnership subsequently completed the Health Normative Standards Framework for Inter-operability in eHealth and presented its report to the National Department of Health in March 2013.[21] The report was noted by the Technical Advisory Committee of the health sector, and the CSIR was requested to pursue a modular approach in the development of the Health Normative Standards Framework, and incrementally produce modules for different aspects of health service delivery, such as Diagnostic Related Groups, pharmacological classifications, patient identification, the distinction between suppliers and providers of health care, and identification of key equipment used in the public sector.

Stakeholder engagement

A national eHealth Strategy Conference convened jointly by the MRC and the NDoH in September 2012 attracted diverse participants, drawn from stakeholder formations such as the private health sector, academic institutions and non-governmental organisations. The event was widely accepted as a forum for participatory development of an important roadmap for the evolution of eHealth in South Africa. Crucially, the Conference also emphasised that the Strategy needed to be translated into a detailed implementation plan, with concomitant cost implications.

Much more remains to be done to enhance stakeholder engagement around the eHealth Strategy. It was anticipated in the Strategy that Provincial Health Information Systems Committees would have been established by Provincial MECs for Health in all provinces by May 2013, as required in terms of section 74 of the National Health Act (61 of 2003), to establish, maintain, facilitate and implement the envisaged health information systems at provincial and district level, so as to create a comprehensive national health information system. It was also expected that these

Table 1: Strategic Priorities of the eHealth Strategy

Strategic Priority	Core content
Strategy and Leadership	• Recognises that the successful implementation of eHealth is complex and requires a strong national eHealth strategy. • Locates the Strategy within the broader context of the NDoH's strategic aims and is aligned with the priorities of the Department. • Recognises importance of political, executive and clinical leadership to its successful realisation.
Stakeholder Engagement	• Notes that effective collaboration can be achieved by engaging with all stakeholder groups affected by eHealth, including mHealth and Telemedicine. Examples of such stakeholders include the South African Telemedicine Association, the South African Health Informatics Association and the South African Medical Association. • eHealth structures can assist in mobilising support, identifying opportunities, highlighting priorities, and managing and mitigating risk in relation to eHealth. • Takes into account the (future) establishment and potential role of the Provincial Health Information Systems Committees whose brief is to establish, maintain, facilitate and implement, at provincial and district level, health information systems envisaged by the NDoH in order to create a comprehensive national health information system.
Standards and Inter-operability	• Regards standards as the cornerstone of successful implementation. • Notes that, apart from inter-operability standards, which are essential for the accurate exchange of data, there is a requirement for national standards for procurement (hardware and software), software accreditation, data structure, terminology, clinical coding, security, messaging and electronic health records.
Governance and Regulation	• Takes into consideration that eHealth affects multiple stakeholder types and extends across multiple domains including personal health, healthcare provision, ICT and management. • Identifies a need for a governance structure, such as an eHealth Standards Authority, which would be accountable to the Minister of Health. • Notes that, while the potential benefits of eHealth implementation are highly desirable, realisation could be risky, costly and challenging.
Investment, Affordability and Sustainability	• Accentuates the importance of securing and protecting financing for any eHealth project prior to its commencement to ensure sustainability over the duration of the project. This requires proper planning and identification of benefits, so that value for money and affordability are balanced and results are delivered as quickly as is feasible. • Observes that there is a paucity of economic assessments of potentially beneficial eHealth solutions in the developing world that would assist in supporting policy-makers and health departments in making informed decisions when allocating scarce resources.
Benefits Realisation	• Refers to the identification and quantification of the anticipated benefits of eHealth implementation for all stakeholders. • Key activities include developing a benefits realisation plan which specifies health outcome benefits expected at local level for all eHealth interventions, and establishing a mechanism for conducting usability assessments to ensure that the public health sector is an "informed buyer" of ICT solutions. • New ICT solutions to be tested at an eHealth laboratory, as an essential measure to ensure that benefits are demonstrated within a realistic timeframe and funding envelope.
Capacity and Workforce	• Recognises that adequate human resource capacity is crucial to successful delivery of the eHealth Strategy. • Commits to developing career path frameworks, and training and skills retention strategies, in order to build up a workforce that can innovate, develop, deploy, maintain and support all eHealth interventions, especially health information systems and health management information systems. • Key activities include developing a workforce development strategy for Health ICT, Information and Knowledge Management that is aligned with the National Health Workforce Strategy, seeking professional accreditation for Health Informatics professionals with the Health Professions Council of South Africa (HPCSA), and leveraging partnerships with local academic institutions towards collaboration for Health Informatics training.
eHealth Foundations	• Aims to deploy eHealth capability in a step-wise manner. • Four areas identified as providing the foundations for all other eHealth activities: infrastructure, connectivity, registration of patients, facilities and providers, and a basic national electronic health record.
Applications and Tools to support Healthcare Delivery	• Notes that there is a wide range of digital applications and tools available with the potential to support and improve healthcare delivery. These include electronic medical record systems, healthcare information systems, surveillance systems, business intelligence for health, electronic content management, decision support, and knowledge management. Tools include software and hardware devices, such as those used in mHealth and Telemedicine. • Cautions against the further fragmentation of health information systems, especially at the level of health application. • Stresses the importance of all systems complying with the Health Normative Standards Framework. • Highlights the importance of integration of health applications and recommends a single system for population identification at national level. • Stresses that primary health care, which includes preventative mechanisms, be supported by appropriate electronic tools and applications, and highlights the possibilities that exist with regard to using mobile devices in this regard. • NHISSA to lead the prioritisation of eHealth application implementation and will submit its recommendations to the Technical Advisory and Policy Committees of the National Health Council (TAC-NHC).
Monitoring and Evaluation	• Stresses the importance of consistently monitoring and evaluating the performance of the Strategy implementation. • Key activities include developing a Monitoring and Evaluation (M&E) Strategy for eHealth, aligned with the overarching M&E Strategy of the health sector. • NHISSA to monitor the M&E strategy.

Source: National Department of Health, 2012.[4]

Committees would have incorporated the eHealth Strategy into their work with districts and local communities, and that key stakeholder groups at all levels of the health system would have been identified and consulted on the impact of implementation of the eHealth Strategy. Progress with these initiatives has not yet been made.

Standards and inter-operability

The most significant progress made to date has occurred in the area of Standards and Inter-operability. As indicated, the CSIR and its partners have:

- completed a landscape analysis – which identified a total of 42 health information systems being used in the public sector;[20]
- completed the Health Normative Standards Framework – which will be published once the technical work requested by the TAC-NHC has been completed;[21] and
- developed proposals for an inter-operability framework for South Africa for consideration by the TAC-NHC.[21]

On 23 April 2014, the Ministry issued the National Health Normative Standards Framework for Inter-operability in eHealth, in terms of the National Health Act (61 of 2003).[22] This Standards Framework prescribes eight provisions, four of which are aimed at enforcing the adoption and use of normative standards in patient information systems used in the public sector. These are:

- any patient information system that is used and/or intended for use in the health sector in South Africa should comply with National Health Normative Standards for Inter-operability in eHealth;
- any patient information system that is used and/or intended for use in the health sector in South Africa must be subjected to conformity assessments to ascertain its level of compliance with the National Health Normative Standards for Inter-operability in eHealth;
- such conformity assessments must be carried out independently; and
- certificates of conformity in compliance with National Health Normative Standards for Inter-operability in eHealth must be issued.

The other four provisions of the Standards Framework commit the National Department of Health to allocate resources for the implementation of eHealth infrastructure, to ensure compliance with the Framework by establishing a Standards Board, and to update the Standards Framework regularly. These provisions specify that the National Department of Health must:

- allocate a budget to establish and maintain the foundational national shared eHealth infrastructure (e.g. health information exchange, demographic registries, shared clinical repositories, and security and audit services);
- allocate a budget to establish and maintain a "connectathon" which will be used for compliance assessment;
- establish a National eHealth Standards Board to govern and maintain the implementation of the National Health Normative Standards Framework for Inter-operability in eHealth, as well as the standards referenced in the Framework; and
- publish and update, when necessary, the National Health Normative Standards Framework for Inter-operability in eHealth.

The development and publication of this legal framework is another important milestone in the evolution of eHealth in South Africa.

Governance and regulation

To support governance and regulation, the Ministry of Health has approved the creation of an eHealth Standards Board for South Africa. Advertisements for the nomination of members with the relevant expertise to guide the evolution of eHealth in South Africa were placed in the media in 2013, and the appointment process is underway. This is an important first step.

Monitoring and evaluation

The development of the M&E strategy for eHealth aligned with the overarching M&E strategy of the health sector, which was expected to be complete by September 2012, has not materialised. However, the second activity in this priority area, namely the submission of quarterly progress reports to the National Health Council, has occurred. The TAC-NHC has provided consistent oversight for the implementation of the eHealth Strategy, for instance, by ensuring that from the outset of the project of developing the eHealth Normative Standards Framework, the CSIR and its partners regularly provided progress reports to meetings of the TAC-NHC.

A systematic monitoring of the eHealth Strategy should measure performance along several dimensions, including the impact on patients, citizens, health workers, healthworker teams, health managers and healthcare provider organisations. For each of these, benefits from eHealth solutions should contribute to better performance in health service delivery and demonstrably contribute to the improved health status of the population, more effective health resource utilisation and efficiency, increased quality of care, improved outcomes for patients, and higher levels of health worker satisfaction. Generally, the more sophisticated the eHealth architecture, the greater the opportunities for improved performance, albeit over a longer timescale.

Areas of limited progress

Limited progress has been made towards five priority areas of the eHealth Strategy namely: Investment, Affordability and Sustainability; Benefits Realisation; Capacity and Workforce; eHealth Foundations; and Applications and Tools to support healthcare delivery.

Investment, affordability and sustainability

Momentum for several key activities in this priority area, which were to be completed by December 2012, has ebbed and requires acceleration. These activities include:

- development of an enterprise architecture that is aligned to the eHealth strategy and is used to guide planning, procurement and standardisation;
- costing the eHealth strategy and development of a 10-year budget, decoupled from political cycles, that addresses the issue of affordability and sustainability;

- development of rules (guidelines) for financing of eHealth enterprise architecture, as well as for eHealth procurement aligned to the Health Normative Standards Framework. It was anticipated that these would be completed by August and December 2012 respectively, guided by the information needs of National Health Insurance implementation; and
- the alignment of provincial ICT plans and procurement for the enterprise architecture was to commence in December 2012 and be conducted annually until 2017. This is an important condition to be met prior to the lifting of the moratorium on the acquisition of large ICT solutions. Inter-operability of new information systems across the health sector must be a non-negotiable goal for the future.

Implementing a national eHealth programme requires a multi-year commitment to a series of investments, as well development of the required governance, policies, legislation, skilled human resources, infrastructure and performance management necessary to sustain the eHealth programme and to optimise (and measure) the resultant accrual of benefits for the health system. eHealth financing entails securing the extra finance needed, and funding not only ICT solutions, but also the resources that should be reallocated from existing activities, such as health workers' engagement and time for training. These requirements change over time, so a medium-term financial plan is needed to assemble and provide for these functions.

Generally, the more sophisticated the eHealth architecture, the greater the requirement for extra and redeployed finance and the increased exposure to risk. Developing an overarching comprehensive budget estimate allows politicians, health authorities and citizens to understand the full extent of the eHealth initiative. This will equalise expectations around this politically sensitive area of investment and will help to obviate stressful ad hoc decision-making. Provisions and methods for periodical revision of the budget should also be established, taking into account several factors such as performance, new opportunities and changes in the eHealth environment.

The increased costs of strategic investment in eHealth initiatives and architecture should be offset by the increased benefits from improved health system performance and the associated benefits over the longer term, such as the next decade. However, realisation of these benefits requires a disciplined approach, strategy and application, with a focus on managing the related investments and sustaining the benefits post-implementation.

Strategies for financing and ensuring the performance of eHealth investments typically include:

- continually ensuring that the eHealth Strategy is not only aligned with, but is also seen by the public, politicians and health leaders as an important enabler for health system reform and priorities;
- establishing a target benchmark (e.g. 3–5%) for eHealth spending as a proportion of overall healthcare spending, as well as the metrics for tracking ICT spending, and reporting against this target. Reported achievements must be supported by evidence, for example from high-performing health systems (and other industries that have undergone positive transformative change) that can attribute achieving their business goals to a sustained ICT investment of at least this benchmarked rate;
- ensuring that eHealth strategies are multi-year in nature and that funding commitments include both out-year capital and operating cost impacts for all stakeholders (national and local), so that projects do not commence and cease with fiscal year-ends and changes in government, or falter once implemented and depend on local organisations for sustainability; and
- incorporating an adoption and benefit realisation component in all major projects. It is important to be able to provide clear evidence of both direct financial benefits as well as more indirect or downstream impacts on patient care and, whenever possible, on population health. It is also important to recognise that benefit realisation in health care typically requires a sustained investment in change management for processes and people, since transformative change rarely happens immediately after a system is activated.

Benefits realisation

A key aspect of eHealth implementation is the identification and quantification of the anticipated benefits of eHealth implementation for all stakeholders. This is essential to justify continued investment in eHealth projects. The time-frames outlined in the eHealth Strategy required that a benefits realisation plan, which specifies health outcome benefits expected at local level for all eHealth interventions, be produced by October 2012.

The eHealth Strategy also outlined the establishment of a mechanism for conducting usability assessments, to ensure that the public health sector is an "informed buyer" of ICT solutions. This has not yet occurred. However, the Health Normative Standards Framework produced by the CSIR and its partners will provide important checks and balances to ensure that the health sector acquires only health information solutions that comply with agreed norms.

Capacity and workforce

Key activities in this priority area included the development of a Health ICT, Information and Knowledge Management workforce development strategy, aligned with the National Health Workforce Strategy, as well as a Health IT workforce development strategy, which were due for completion by December 2012. With respect to leveraging partnerships and collaborations for Health Informatics training, it was anticipated that by December 2013, Memoranda of Understanding (MoU) would be concluded with relevant institutions to establish partnerships and collaborations for Health Informatics training. Professional accreditation for Health Informatics professionals with the HPCSA is due for completion in December 2014.

eHealth foundations

Several areas in establishing eHealth foundations have fallen behind schedule and require accelerated implementation.

While a national patient master index for unique patient identification has not been fully implemented in the public sector, the NDoH

took an important policy decision in 2012 that the South African Identity number should be the primary identifier for all information systems, and written communication to this effect was sent to all nine Provincial Departments of Health. Effective implementation of this directive requires greater effort at sub-national levels of the health system.

Ensuring broadband connectivity and last mile connectivity remains a critical challenge particularly in primary health care facilities and in rural areas. These were expected to be completed by May 2013. However, a quotation from Telkom for providing connectivity to all primary health care clinics in need of this resource nationally amounted to over R500 million. Cost estimates from Sentech, a state-owned company established under the Sentech Act (63 of 1996),[23] were in excess of R700 million. It is highly likely that the key impediment to executing this work had more to do with a lack of health sector resources for connectivity than with exorbitant service charges levied by the two companies. Collaboration and cost-sharing with other government departments is required to overcome such connectivity challenges. For example, once the required infrastructure has been installed in a local area, it will benefit several other government departments apart from the health sector.

Implementation of a basic national Electronic Health Record (EHR), including an information exchange to support inter-operability, was expected to be completed by May 2013. The work completed by the CSIR lays an important foundation for the design of a basic EHR, and for piloting the model in health facilities across districts.

Applications and tools to support healthcare delivery

This priority area required the finalisation of several health sector strategy and policy documents, including the eHealth policy, Mobile Health (mHealth) Strategy, mHealth Policy, Telemedicine Strategy, and Telemedicine Policy, all of which were due for completion by December 2012. However, most of these documents exist in draft form, and the pace for submitting these documents to the TAC-NHC for approval must be accelerated. It was also expected that eHealth projects and mHealth projects would be undertaken in line with objectives of the eHealth Strategy, commencing in June 2012 and reviewed quarterly.

The ripple effect of the delays in these five priority areas is an overall delay in the implementation of the eHealth Strategy as a whole. Certain narrow time-frames and compressed deadlines reflected in the eHealth Strategy 2012–2016 have not been achieved. This is in part linked to the interdependencies between the completion of the Health Normative Standards Framework and the Inter-operability Framework, and the balance of the eHealth Strategy components. For instance, the development of an enterprise architecture to be used to guide planning, procurement and standardisation of electronic information systems requires that national standards be available for alignment purposes. Additionally, the lack of capacity within the public health sector to drive the development and implementation of eHealth is a barrier to the implementation of the eHealth Strategy. Given this reality, it is also possible that the time-frames set in the Strategy were not realistic. To enhance the implementation of the eHealth Strategy, the health sector should address increasing its human resources capacity significantly, by recruiting officials with both technical expertise and capability to provide strategic leadership. It is imperative that the implementation of these vital components be undertaken with deliberate speed in 2014 and beyond.

International experience suggests that the development and implementation of eHealth has generated key challenges for several countries, notwithstanding the existence of goodwill and commitment. In South Africa, these challenges were highlighted in the failed implementation of a hospital information system in Limpopo Province. This project began in 1998 with the aim of implementing the system in all 42 hospitals in the province. The total cost of the project was R134 million which, at that time, represented 2.5% of Limpopo's annual health and welfare budget. Challenges with the implementation were experienced soon after the start of the project and when the initial contract for the work ended in 2000, the system was not working as planned. A second contract was entered into with another supplier and this work also failed to meet the project objectives.[24]

A subsequent review by Littlejohns et al. identified the key reasons for the failure of the project, including a lack of basic infrastructure such as reliable electricity and airconditioning, a poor fit between the functionality of the system and the day-to-day workflow requirements, and inadequate management of the project.[25] The Limpopo case study illustrated important considerations that should be taken into account when countries implement information systems for health care. Adequate change management that takes into account the impact of health information systems on complex business processes was identified as critical.

Recommendations

In 2012, the WHO-ITU observed that the global state of eHealth was characterised by:

- a landscape of isolated islands of small-scale applications that were unable to communicate effectively or to share information with other health systems or across geographies, technologies or programmes;
- barriers to scale-up that would support a larger patient and care-provider base;
- decision-makers' inability to understand the actual health situation, drive meaningful planning and guide policy formulation; and
- duplication of efforts, which may lead to integrated solutions being obviated.[2]

Notwithstanding these concerns, the publication of South Africa's eHealth Strategy 2012–2016 is a significant advancement that should not be marred by challenges of implementation. The TAC-NHC and the Policy Committee of the NHC have provided leadership and support for the production of the Strategy. In this crucial stage of implementation, there is an urgent need for:

- sustaining the momentum gained through the publication of the eHealth Strategy in July 2012 and the development of the Health Normative Standards Framework;
- maximising benefits from the existing support for eHealth provided by the political and administrative leadership of the health sector;

- accelerating the finalisation and adoption of the Health Normative Standards Framework, which is means to an end – the end being the development and implementation of a national, integrated patient-based information system;
- accelerating the development of an Inter-operability Framework for all existing information systems;
- ensuring that all new systems demonstrate compliance with the Inter-operability Framework;
- identifying a laboratory wherein new systems will be tested for compliance with the Health Normative Standards Framework;
- implementing the National Identity number as a Unique Patient Identifier for all users of public health services;
- building capacity across all levels of care in the implementation of the eHealth Strategy, starting with the correct application of the Health Normative Standards Framework;
- raising awareness across the country about the Health Normative Standards Framework;
- identifying catalytic resources, technical resources, skills transfer and change management from diverse sources in a sustainable manner;
- appointing a small team of senior officials with technical skills and expertise to steer the implementation of the eHealth Strategy. This should be a miniscule fraction of the numbers proposed in the Schedule 3A Public Entity;
- identifying best practices and learning from other countries such as Kenya and Rwanda, which, although much smaller than South Africa in population size and Gross Domestic Product, have made good progress with the implementation of eHealth; and
- identifying resources to support research and to assess readiness of provinces, districts and health facilities for the implementation of the eHealth Strategy.

Conclusion

This chapter has provided a critical review of progress made by the health sector with the implementation of the eHealth Strategy 2012–2016, approved by the Ministry of Health and published by the health sector in July 2012. Whereas the publication of the Strategy was an important milestone, this was only the first step in a long journey.

This chapter illustrates the modest progress that has been made, as milestones were recorded towards only five of the 10 key priorities set out in the Strategy. It is imperative that the health sector enhances its investment of effort and resources in all the pillars of the Strategy. Key interventions required include acquiring the requisite human resources, with the capacity and technical expertise to provide strategic leadership.

Finally, the WHO cautions that "the goal of a health information system is often narrowly defined as the production of good-quality data. However, the ultimate goal is more than this – it is to produce relevant information that health system stakeholders can use for making transparent and evidence-based decisions for health system interventions. Health information system performance should therefore be measured not only on the quality of data produced, but on evidence of the continued use of data to improve health system performance, to respond to emergent threats and to improve health. Improving health information systems in terms of data availability, quality and use often requires interventions that address a wide range of possible determinants of performance".[26] This is a caveat that South Africa would do well to observe.

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3 Recent developments in ensuring quality of care in health establishments in South Africa

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Improving the quality of care in health establishments has received significant attention in South Africa over the past few years. This chapter traces the development of the national core standards and sketches recent developments in ensuring quality of care in health establishments, particularly the steps taken to establish the Office of Health Standards Compliance (OHSC) as a public entity. The Office is mandated to protect and promote the health and safety of users of health services through monitoring, enforcing compliance with prescribed standards, and through the investigation and disposal of complaints. The authors suggest that the National Core Standards provide a useful mechanism for health establishments to measure their own performance. They further assert that the process has had important additional benefits in that it has introduced an awareness of the different dimensions of quality of care, objectively identifies and prioritises gaps, and allows facilities to measure their performance against other facilities within the district, provincially and nationally. The authors conclude that the establishment of the OHSC with powers to recommend needed changes and to enforce progressive sanctions constitutes a major opportunity to stimulate a culture of continuous quality improvement.

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i Office of Health Standards Compliance

Introduction

Improving the quality of health care has been an important objective of the South African Department of Health for a number of years,[1-4] especially given increasing concerns about progressive deterioration in this regard.[5] Sections 27 and 28 of the Constitution guarantee the right of all South Africans to access health care. The National Health Act (61 of 2003) (NHA) builds on the transformation of health care introduced in 1994, and presents the district health system as a vehicle for service delivery, improving quality and standards of health care in public and private sectors, human resource planning and development, and increasing universal access to health services.[6]

In recent years, there has been greater focus on health systems strengthening and capacity-building to ensure improved quality of health services and sustainability of the public health system in South Africa.[7,8] The Negotiated Service Delivery Agreement (NSDA) identifies strengthening health system effectiveness as an important output for the health sector, which will be achieved through re-engineering of primary health care, the strengthening of human resources, and improvement and standardisation of quality of care through the certification of health establishments.[2] This priority is mirrored internationally – as illustrated by extensive efforts to support and develop health system improvement strategies by organisations such as the World Health Organization (WHO), the World Bank, and major bilateral donors, such as the United Kingdom's Department for International Development (DFID), the United States President's Emergency Plan for AIDS Relief (PEPFAR), the United States Agency for International Development (USAID), and large private donors.[9]

Recent quality improvement initiatives have been largely uncoordinated and minimally monitored, especially at a national level. In 2008, the Department of Health therefore embarked on an initiative to standardise, measure and enforce quality of care across all health establishments in South Africa. This was overseen by the establishment of the Office of Standards Compliance, a cluster in the Department of Health, based on provisions in the NHA and tasked with preparing for the establishment of an "independent quality management body".[3,10] Several quality assurance initiatives have been implemented in selected districts and facilities (such as the Council for Health Service Accreditation of Southern Africa (COHSASA) initiative), but this was the first time a co-ordinated, national approach had been developed in South Africa.

Underpinning these efforts, a set of National Core Standards (NCS) provided a benchmark for quality of care across South Africa, and has been the focus of a national development and dissemination process, together with countrywide training and support in using the standards to close identified quality gaps.[11] The NCS reflect the concerted effort being made to ensure that quality health care becomes an integral part of health system strengthening in South Africa.

The NCS set out what is expected and required to deliver decent, safe, quality care, and are accompanied by a set of measurement tools to assess compliance with these measures.

The NCS are structured into seven cross-cutting domains to reflect a systems approach, and define the scope or intent of assessing a health area where quality or safety might be at risk. Domains 1–3 relate to the core business of the health system while the final four refer to the support system that ensures that the former are delivered. These domains are further subdivided into sub-domains (Table 1) which comprise a set of standards with associated measurement criteria and measures.[11]

The Office of Standards Compliance: preparing for regulation

The Office of Standards Compliance was established within the Department of Health in 2008 and based its work on the provisions set out in the NHA. This office co-ordinated the development of the National Core Standards which, after several revisions, were finalised in 2010, ratified by the National Health Council and published and implemented across provinces from 2011 onwards.

In attempting to fulfil the purpose of the NCS, over the past five years, there has been a participatory process to develop standards appropriate to the South African context followed by a national dissemination and training initiative. An important aspect has been the provision of support to health facilities to apply the standards, and as such, the introduction of the NCS represents a landmark intervention to ensure that quality care becomes the norm in South Africa.

These standards essentially serve as a reasonably comprehensive set of guidelines for facilities on what is expected of them. Six areas of critical concern to patients, covering a sub-set of the full standards, have been identified as non-negotiable priorities, as follows:[11]

- **Values and attitudes** of staff, so that patients are treated in a respectful manner with due respect for privacy and choice (Domain: Patient Rights).
- **Reducing waiting times and queues** for administration, assessment, diagnosis, pharmacy, surgery and referral and transfer time (Domain: Patient Rights).
- **Cleanliness of hospitals and clinics**, including buildings, grounds, amenities, equipment and staff (Domain: Patient Rights).
- **Keeping patients safe and providing reliable care** by reducing adverse events resulting from care given, including operations and failures of the system and its workers through ignorance, inadequate inputs, systems failure or negligence (Domain: Patient Safety, Clinical Governance and Care).
- **Preventing infections from being passed on in hospitals and clinics**, specifically hospital-acquired infections (Domain: Patient Safety, Clinical Governance and Care).
- Ensuring that **medicines, supplies and equipment are available** and that patients get their prescribed medicine on the same day (Domain: Clinical Support Services).

Over the past few years, these priorities have become the central focus for quality care and are widely known. They are gradually being mainstreamed into general management practices through inclusion in budgeting processes, recruitment and performance management, and in planning and monitoring of delivery.

Although the focus in this introductory phase has been predominantly on the public sector, the standards are intended to be universally applicable, and to extend to the private sector. To this end there has been extensive engagement with private health sector bodies and personnel, and the standards were piloted within private health care facilities and adapted to be applicable to both private and public health facilities.

Compliance has been voluntary, and as yet there are no specific sanctions for health facilities that fail to meet the standards. The NCS do, however, represent a major advance towards compliance monitoring, in that they provide a framework to consolidate the essential pillars of what is meant by quality health care in the South African context: reliable implementation of evidence-based interventions that contribute to expected clinical results and a service that meets users' expectations of "care".

Table 1: Domains and sub-domains of the National Core Standards

Domain	Sub-domain
Domain 1: Patient Rights The domain of Patient Rights sets out what a hospital or clinic must do to make sure that patients are respected and their rights upheld, including getting access to needed care and to respectful, informed and dignified attention in an acceptable and hygienic environment, seen from the point of view of the patient, in accordance with Batho Pele principles and the Patient Rights Charter.	• Respect and dignity • Information to patients • Physical access • Continuity of care • Reducing delays in care • Emergency care • Access to package of services • Complaints management
Domain 2: Patient Safety, Clinical Governance and Care The Patient Safety, Clinical Governance and Care domain covers how to ensure quality nursing and clinical care and ethical practice; reduce unintended harm to healthcare users or patients in identified cases of greater clinical risk; prevent or manage problems or adverse events, including health care associated infections; and support any affected patients or staff.	• Patient care • Clinical management for improved health outcomes • Clinical leadership • Clinical risk • Adverse events • Infection prevention and control
Domain 3: Clinical Support Services The Clinical Support Services domain covers specific services essential in the provision of clinical care and includes the timely availability of medicines and efficient provision of diagnostic, therapeutic and other clinical support services and necessary medical technology, as well as systems to monitor the efficiency of care provided to patients.	• Pharmaceutical services • Diagnostic services • Therapuetic and support services • Health technology services • Sterilisation services • Mortuary services • Efficiency management
Domain 4: Public Health The Public Health domain covers how health facilities should work with non-governmental organisations and other healthcare providers along with local communities and relevant sectors, to promote health, prevent illness and reduce further complications; and ensure that integrated and quality care is provided for their whole community, including during disasters.	• Population-based service planning and delivery • Health promotion and disease prevention • Disaster preparedness • Environment control
Domain 5: Leadership and Corporate Governance The Leadership and Governance domain covers the strategic direction provided by senior management, through proactive leadership, planning and risk management, supported by the hospital board, clinic committee as well the relevant supervisory support structures and includes the strategic functions of communication and quality improvement.	• Oversight and accountabiity • Strategic management • Risk management • Quality managment • Effective leadership • Communications and public relations
Domain 6: Operational Management The Operational Management domain covers the day-to-day responsibilities involved in supporting and ensuring delivery of safe and effective patient care, including management of human resources, finances, assets and consumables, and of information and records.	• Human resource management and development • Employee wellness • Financial resource management • Supply chain management • Transport and fleet management • Information management • Medical records
Domain 7: Facilities and Infrastructure The Facilities and Infrastructure domain covers the requirements for clean, safe and secure physical infrastructure (buildings, plant and machinery, equipment) and functional, well managed hotel services, and effective waste disposal.	• Buildings and grounds • Machinery and utilities • Safety and security • Hygiene and cleanliness • Linen and laundry • Food services

Source: National Department of Health, 2011.[11]

Core standards for other health services (e.g. Emergency Medical Services) are still to be developed.

Office of Health Standards Compliance

The past three years have seen the development and finalisation of the legislative provisions in the amendment to the National Health Act for the establishment of an independent Schedule 3A Public Entity as a quality regulator, namely the new Office of Health Standards Compliance (OHSC – to be distinguished from its NDoH precursor, the Office of Standards Compliance or OSC). This Office is mandated to protect and promote the health and safety of users of health services through monitoring, enforcing compliance with prescribed standards, and ensuring the investigation and disposal of complaints. With the promulgation of the Amendment Act in September 2013, concrete steps have been taken to establish the Office as a public entity in 2014.

In terms of the National Health Amendment Act (12 of 2013), the OHSC is empowered to fulfil functions that include:[13]

- advising the Minister on the norms and standards that will be prescribed for the national health system;
- inspecting and certifying health establishments as compliant or non-compliant with prescribed norms and standards and holding the authority to withdraw certification for non-compliance;
- investigating complaints in relation to the national health system;
- monitoring indicators of risk to provide early warning of serious breaches of norms and standards, and reporting serious breaches to the Minister;
- making recommendations for intervention by national, provincial or municipal health departments or health establishments (including private establishments) in order to achieve compliance with norms and standards;
- publicising information relating to norms and standards;
- recommending quality assurance and management systems for the national health system to the Minister;
- collecting information relating to norms and standards from establishments and users; and
- maintaining records of all its activities.

Extensive preparatory work has been done towards the establishment of the Office as a separate legal entity. Table 2 identifies the key activities undertaken by the OSC towards the creation of an independent unit, the OHSC, with a summary of progress made in 2013.

Table 2: Key activities towards the development of the Office of Health Standards Compliance

Key activity	Progress to date
Establishment of a competent inspection team	• The first team of 30 inspectors was engaged and trained by the Office of Standards Compliance. Four team leaders were sent on a study tour to the United Kingdom Care Quality Commission. The inspectors continue to receive ongoing in-service training.
Development and refinement of the assessment tools	• The inspectors have conducted 833 "mock" or training inspections of public health establishments in order to test tools and procedures for future regulation. Several tools have been developed to ensure clarity and consistency in interpretation of assessment criteria, and to ensure reliability of results.
Assessment and analysis of compliance with standards	• The NCS enables the assessment and comparison of quality – across facilities within districts, across districts within provinces, between provinces – and can thus compose a national picture of the state of quality of care in South Africa. • Analysis of 833 mock inspection reports to date shows mixed results. While some hospitals are meeting standards and providing quality care, others (including some of the better-resourced public health establishments) fall short on some essential measures. Of the 833 inspected health establishments, 47 were re-inspected, with some showing improvement and others remaining unchanged.
Testing the universal applicability of the standards	• Assessing the applicability of the assessment tools to different health settings – primary health care, Community Health Centres and hospitals – is an important part of the introduction of the NCS. • Many clinics, which are the foundation of primary health care, are barely able to meet 50% of the NCS requirements. This has led to an in-depth review of what can be reasonably expected of a clinic in terms of accountability for the care they provide, as well as further refinement of the measurement tools as a whole. • Extensive work has been done to test the applicability of the standards in the private sector.
Baseline assessment	• A sub-set of the NCS covering only the "six priorities" served as the basis for the Health Facilities Baseline Audit conducted by a consortium led by Heath Systems Trust (HST) in all public hospitals and clinics during 2011 and 2012.[14] • This audit provided baseline information on the gravity of the quality deficits in a number of provinces (although no province was found to be at the required level) and served as an impetus for more intensive quality improvement interventions.

Improvement work

The NCS provide a framework for quality assurance. An integral part of compliance with norms and standards is the identification and closing of deficits which is done by means of the assessment process. To support this, the OSC has encouraged a model of continuous quality improvement, whereby a gap or problem is identified, the problem is analysed to identify both the cause and possible remedial action, and the Plan-Do-Study-Act (PDSA) model is applied to evaluate, rethink, refine and ultimately scale up the corrective intervention.[15-17]

A number of different initiatives have been implemented over the past two to three years to support implementation of the NCS and to ensure that their intent is realised, namely to improve the quality of basic care provided to patients throughout the country at all levels of care. Given that this is a very new initiative and is breaking new ground in many ways, much emphasis has been placed on raising awareness and disseminating knowledge through seminars, workshops and more formal training activities. As awareness has grown and as the implications of the functions and powers of the future OHSC have become clearer, the focus is now shifting towards concrete efforts to introduce corrective action in order to make the system work more effectively and efficiently for better quality.

Initial training and awareness creation

An important aspect of igniting the implementation of the NCS was an intensive national training programme, run from February 2011 to August 2012, targeting hospital management and district teams across all nine provinces. The purpose of the training was to orientate senior leadership, secure buy-in and commitment, and highlight the importance of skills development on how to conduct an assessment and take remedial action. The training methodology involved on-site use of the assessment tools and provided managers with the opportunity to assess and benchmark their own health establishments.

The training focused on the NCS, and prioritised teamwork. Teams were encouraged to identify those gaps that were easily solved and effect immediate remedies, and then to engage in more formal quality improvement activities to close significant gaps. It was thought that by focusing on attaining rapidly achievable results, the teams would be encouraged to continue addressing other, more daunting quality gaps. The response from many management teams was indeed that "these are things we know about – we should have been doing them all along". Where formal teams were needed, these often worked better when supported by provincial and district quality co-ordinators, managers and personnel from the NDoH Office of Standards Compliance.

Problem-solving approaches were used to ensure that the root causes of problems were identified.[16] The primary aim was to transfer skills and make positive changes in healthcare processes to achieve favourable outcomes in relation to quality, using the PDSA model.[17,18] One of the unique features of this model is the cyclical nature of designing and assessing change, which is achieved through small and frequent PDSA cycles (rather than large and slow ones), used to test impact before changes are made system-wide. The PDSA cycle starts with determining the nature and scope of the problem, the changes that can and should be made, devising a plan for a specific change, and identifying who should be involved, what should be measured to understand the impact of change, and where the strategy should be targeted. This model leads to the development of detailed and specific improvement plans at facility level. These measures are far more effective at making change happen than the generic statements of intent "for all hospitals in the district (or province)", which are typically confused with a plan (or even regarded as implementation).

Facility Improvement Teams

In order to respond constructively to the Baseline Audit findings, implement the NCS in preparation for the unfolding implementation of National Health Insurance, expedite rapid, high-impact quality improvement activities, and ensure that all key departments were actively involved in this process, the NDoH established Facility Improvement Teams (FITs), which were activated in February 2012.[19] The FITs comprise senior, multi-disciplinary national staff and are led by Cluster Managers. Four districts were identified at the time as pilot sites to test both quality improvement methodologies and the FIT model, using the very first validated baseline audit results. The teams were formally introduced in the respective provinces by the Director-General of Health, and thereafter were able to provide support to the district and province to close the gaps identified during the Baseline Audit study. The FIT teams were later expanded to cover eight provinces and ultimately all 11 National Health Insurance pilot sites.

The introduction of FITs at the national level as part of the improvement strategy has strengthened communication between different departments at national, provincial and district levels, since the standards cut across all the units, and solving problems and blockages that lead to poor quality requires a team approach if it is to succeed. Some provincial departments were able to replicate the model of establishing FIT teams at provincial or district level. Facilitating meetings at district level has allowed for comparisons of the improvements that were taking place at the facility level, and teams and senior management in respective districts were able to escalate challenge scenarios appropriately. The FIT model used problem-solving approaches through identifying root causes in a collective brainstorming, which proved to be surprisingly creative. Overall, enhanced local support has been the primary result of the synergy of approaches, as partners are able to guide and support the district and facilities more effectively toward compliance with the NCS. Standards used as a framework together with systems improvement methods have allowed teams to focus efforts on critical areas needed to gain maximum results while maintaining focus on quality services.

However, concerns have been expressed as to the slow pace of change and the sustainability of the model, and the fact that the underlying contributory factors have not always been clearly identified and addressed. In a recent refinement therefore, the NDoH has been focusing intensively on a small number of clinics in order to bring about real improvement, while identifying and developing the support systems and inputs needed to achieve full compliance and improved quality in these "ideal clinics". The learning from these PDSA-type exercises will enable more rapid scale-up, while also quantifying more accurately the real impact of system weaknesses and resource constraints.

Using inspection reports and feedback to improve the quality of care

While the inspection teams are acutely aware of the need to remain objective and not become directly involved in "fixing things", as the mock inspections unfolded it became clear that the presence of the inspectors on site was a critical opportunity for learning on the part of those being inspected. In developing procedures and the training of inspectors, the inspectorate has therefore developed an assessment methodology that is designed to explain the intent of each standard being assessed, and how the measurement and corresponding criteria contribute to achieving compliance and improved quality. The assessment process itself and the underlying reasons for non-compliance are communicated in detail to every unit manager during the inspection, ensuring that they understand what is required of them to correct current practices and achieve compliance.

Another critical opportunity for the inspection process to contribute to change and improvement is during the feedback of the findings. The OSC encourages provinces and districts to attend the final feedback session of an establishment, during which the overall results and the areas of greatest concern or risk, as well as how the local management perceives the problems and solutions are communicated. In these sessions, it has become very clear that many of the weaknesses and gaps are indeed within the capacity of local management to solve, requiring a much greater degree of initiative and a sense of responsibility on their part than is often the case in practice. However, there are other instances in which local managers' hands are effectively tied – often because they do not have the authority to solve problems or ensure that others solve them.

The OSC has been focusing on a process of collecting basic information on all establishments that they inspect, in order to have more complete data on the degree to which workload and capacity are indeed markedly different across establishments showing different levels of compliance.

In addition, the OSC has been trying to encourage a higher level of engagement at the feedback sessions, whereby provincial senior management can reflect on their results and how they compare with other provinces. It is critical in these sessions that accountability is fairly accepted and shared, and that the fora do not result in blame-shifting. Such sessions should constitute an important opportunity for managers as a collective to identify and recognise success and effort, and to ensure that all the establishments for which they are responsible receive the kind of support and oversight they need and deserve (for example, in development of policies and procedures; sharing of contracts to enable monitoring; sharing of best practices; improving referrals). It is also critical that the high-risk areas identified as non-compliant (for example, those relating to emergency and resuscitation procedures) are corrected as a matter of urgency.

Scaling up and mainstreaming of the NCS

Despite prior efforts, the need to scale up training and dissemination of the NCS and accompanying materials was identified as an ongoing priority. In February 2013, a Primary Health Care (PHC) seminar involving nearly 300 district managers and support staff was used to catalyse a series of provincial workshops, where trainers were to be trained to assist with cascading information and skills targeting frontline workers, with the support of partners.[19] The provincial workshops were organised by the provinces, and the OSC team conducted the training for managers and other frontline workers to understand key quality concepts, principles and models, and to ensure skills development for relevant staff to pave the way for subsequent training of the frontline workers.

To ensure that the standards achieved are sustained and that improvement work becomes an ongoing process at facility level, the OSC has recommended that training on the NCS and the six priority areas be built into the provincial induction and orientation programmes of new staff. The OSC has also re-trained data capturers following revision of the NCS measurements based on input from provinces, and a revised database guide was also used as a practical guide during capturing of self-assessment data.[20] In the longer term, it is critical that the knowledge and skills required to achieve quality care should form part of basic training curricula, as well as of human resource management systems in general.

Quality improvement (QI) work is continuous and cross-cutting. The OSC therefore needed to engage other stakeholders and was able to mobilise additional support from non-governmental organisations (NGOs) working with provinces to support health system strengthening activities, in many cases funded by the US government. The OSC held several meetings with NGO partners to gain an understanding of their mandates, and to co-ordinate QI activities which maximised use of resources and understanding of the work of the OSC in order to effectively support QI activities at provincial, district and facility level. The NGOs were able to support the provincial departments with scaling up the training of frontline workers and dissemination of the NCS. It was important for the NGO partners to be involved in these endeavours, as they work closely with the facilities, in particular the primary health care clinics, on health systems strengthening and specific related actions and processes. Ongoing feedback from the NGOs has also been very helpful in ensuring continuous improvement regarding the work of the OSC.

Development of tools and guidelines

The implementation of the standards framework and six priority areas has highlighted gaps in different areas within health establishments. It is crucial that the measurement of quality does not become an end in itself, and that assessments are followed by intensive, carefully monitored quality improvement processes. The OSC has developed a set of training toolkits and a number of key guides to support provinces in complying with the standards.

The toolkits consist of a number of PowerPoint slide-sets and have been developed to support decentralised training and dissemination of information needed to operate at scale, and to ensure that similar standardised information is being communicated in a consistent and accurate manner by different trainers across the country.[21] The toolkits are updated and revised periodically as the situation evolves, and are designed so that users at any level can select the type of information and detail that is important for them. These materials thus support a multi-pronged communication strategy designed to secure buy-in from provincial, district and facility-based leadership and management, and to equip them with the correct information to relay to and train their counterparts. This entails a cascaded

approach whereby leadership and management (from national to provincial, district, sub-district, facility and frontline worker levels) are able to brief their staff about implementation of the NCS and associated quality improvement initiatives. The toolkit approach also provides up-to-date information on the legislative structure, including an overview of the legislative process leading up to the establishment of the independent OHSC, the legal framework, the NCS, the importance of compliance as a legal requirement, and the need to support training on the implementation of the NCS so that personnel understand the assessment process and tools.

The toolkits are accompanied by posters and key guidelines. Critical guidelines focus on quality improvement, self-assessment and the database which, when used together, provide managers with the knowledge and approaches needed for continuous assessment of their own performance and the appropriate methodologies for effecting change. The Quality Improvement guide demonstrates that, in practice, the process is about improved management and effective problem-solving. It sets out in simple language how a number of different methodologies and approaches share similar basic principles and can be used by managers and teams to improve quality of care.

Current work in progress

Major efforts have been invested in the process of reviewing the current NCS in preparation for the regulation of the norms and standards. Consultation with internal and external stakeholders included a focus on updating the standards with recent policy developments, re-wording and re-writing for greater clarity, and assessing their applicability to various types and levels of health establishments. The inspectors, in addition to ongoing mock inspections, have commenced the process of developing and piloting standard operating procedures, compliance procedures and revised measurement tools based on their broad experience.

The OHSC has continued to receive requests for support and guidance from the provinces. In March 2014, the OHSC together HST conducted District Health Management Team feedback meetings in four districts with completion of a questionnaire on the whole inspection and follow-though process by the participants. This feedback will be used to inform future support and guidance to health establishments, districts and provinces. The OHSC met with NGOs supporting health system strengthening initiatives in the provinces to share experiences and align efforts with respect to ensuring compliance with standards, with support from HST.

Conclusion

The NCS provide a useful mechanism for health establishments to measure their own performance. This process has had important additional benefits: it has introduced an awareness of the different dimensions of quality of care, it objectively identifies and prioritises gaps, and it allows facilities to measure their performance against other facilities within their district, province and nationally. Ongoing self-assessment enables management and staff to monitor improvements, assess changes made across each unit within a facility towards consistent positive client experience and delivery of quality service throughout the system, and ensure that gains are sustained.

The knowledge and establishment of the OHSC as a new regulator with powers to recommend needed changes and to enforce progressive sanctions constitutes a major opportunity to stimulate and strengthen a culture of Continuous Quality Improvement. This combined approach of quality improvement and assurance bolsters the health system as a whole to become more effective and responsive in making a real difference for patients and users of health services. In reality, this outcome is what National Health Insurance is designed to achieve for everyone in South Africa.

A case study:

The Benedictine District Hospital Risk Management Strategy

In implementing the standards, some health establishments have done well and have captured the process they followed to achieve this. The OSC has identified an example of best practice in relation to implementation of a specific methodology that can aid in improving quality and addressing shortfalls, namely that of risk assessment as implemented at Benedictine Hospital in Nongoma, KwaZulu-Natal. The experience presented below illustrates how a hospital can develop its own approach to improvement:

The objectives of the project were to:

- design, develop and integrate a risk management system into the management process at Benedictine Hospital;
- use this system as a vehicle for implementation of the National Core Standards; and
- monitor implementation of the National Core Standards.

Process

A baseline National Core Standards audit was conducted by Health Systems Trust for the National Department of Health in July 2011 and Benedictine Hospital scored 76% (24% non-compliant).

We worked on the assumption that all public and private hospitals need to comply with the National Core Standards to meet the requirements for National Health Insurance (NHI). Any standard with which Benedictine Hospital did not comply was classified as an "extreme risk". This drew on a process of risk management already started in 2010 (by our partners, the Centre for Rural Health, with the Benedictine Hospital's management team, the district managers, and the principal of the Benedictine nursing campus). Gaps identified were entered into the Risk Register, and action plans were developed, implemented and monitored. The Risk Register is a live electronic document that generates serial reports on the prevailing status of all risks in the database, and is used by the designated risk manager supported by a risk management committee.

Another mock inspection was conducted in July 2012, and the results showed that the hospital had improved its score to an 81% overall score (19% non-compliant). The leadership and corporate domain for the CEO scored 91%. The risk manager held regular meetings with lead managers with regard to progress on action plans and monthly updates of the Risk Register. In May 2013, a self-assessment process was conducted and the score had increased to 86%. To date, there are 58 risks on the live Risk Register which are divided into categories.

Using the approach of a risk management system has benefited Benedictine Hospital in that it has facilitated the review of the National Core Standards in a methodical way, enabled selection of risks for action, allowed for continuous monitoring of progress on key risks, and ultimately led to impressive compliance with National Core Standards.

Source: Office of Standards Compliance, 2014.

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4

Innovations in primary health care: considerations for National Health Insurance

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South Africa is undertaking major reforms in its health sector to prepare for the introduction of financing reforms under National Health Insurance (NHI). Central to this effort is improving the quality of primary healthcare services. With the work of the Office of Health Standards and Compliance (OHSC) having commenced, standards are being used to assess services, stimulate improvements and overcome the current inequities in access to high-quality care. The National Department of Health is establishing excellence in the health sector through a number of initiatives, and one of these – the "Ideal Clinic" initiative – has been designed to respond directly to the problems around quality of services, ascertained through OHSC inspections.

At this time of change, opportunities arise for innovation and experimentation in strengthening services and there is considerable experience in other countries that is of interest to South Africa. Concepts and approaches being used in the private sector may also be of use in speeding up the process by which quality of care is improved. Of particular interest is experience with social franchising, which applies a set of standards to a network of healthcare providers, to provide socially beneficial health services under a common franchise brand. This chapter concludes that the financing reforms under NHI, and the initial work of the OHSC, provide the context for more experimentation with regard to different approaches to expanding quality primary care services. The lessons from other countries, such as the application of social franchising concepts, are experiences from which South Africa can learn.

The National Department of Health is establishing excellence in the health sector through a number of initiatives, and one of these – the "Ideal Clinic" initiative – has been designed to respond directly to the problems around quality of services.

i National Department of Health

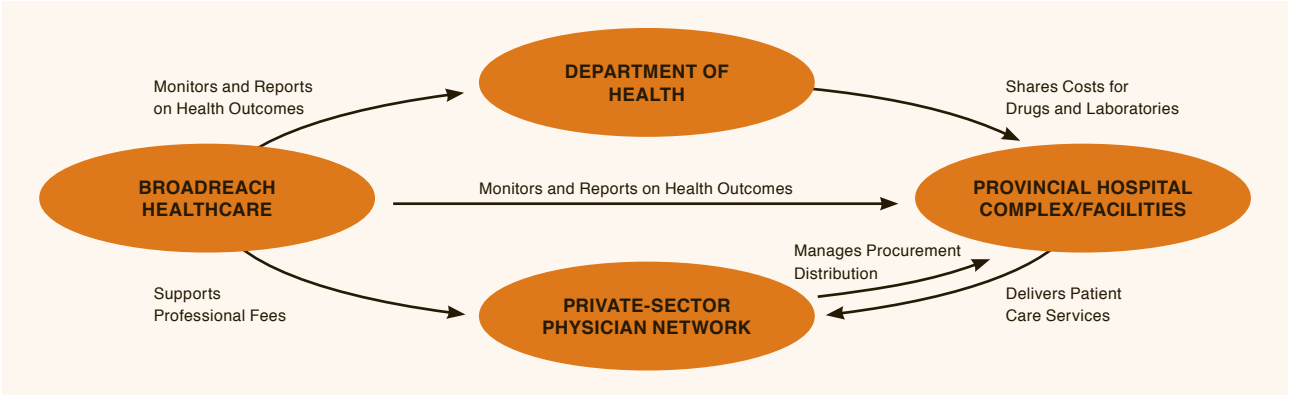
Introduction

The challenges in the South African health sector are well documented and acknowledged in the National Development Plan,[1] the Green Paper on National Health Insurance (NHI)[2] and other literature.[3-5] Improving the quality of services is central to health sector reforms in South Africa. In 2012, the National Department of Health (NDoH) completed a baseline audit of all 3 880 public sector facilities in all nine provinces using standardised measurement tools.[5] This included detailed assessments of Primary Health Care (PHC) facilities and provided the evidence for the changes required to improve the quality of services. In response to the findings, a nationally co-ordinated approach has emerged to develop a more efficient response to problems in facilities (the "Ideal Clinic" initiative). The primary aim is to systematically improve the quality of services in public sector PHC facilities, but in future this approach could also be used to set standards for public sector contracting of private sector services. In addition, the mock inspections[a] of the Office of Standards Compliance (OSC) began in 2013. The OHSC, now formally launched in early 2014, provides a regulatory environment that will encourage innovations to improve the quality of health services in both public and private health sectors.[6] Many other countries are exploring various mechanisms for improving universal access to high-quality, affordable health services.[7,8] One such approach is social franchising of health services, which involves providing incentives for the roll-out of services of standardised quality as part of a broader set of changes in the health sector. This chapter provides a summary of South Africa's experience with social franchising and recent efforts to scale up comprehensive quality services in primary care settings – the Ideal Clinic initiative. The chapter then reviews the current national and international literature on social franchising and discusses possible lessons for South Africa

Early experience of social franchising in South Africa

There is a considerable body of literature on contracting private providers to improve health services in South Africa.[9-11] South Africa is at an early stage with regard to considering "social franchise" approaches in the health sector. There is a limited number of innovations and lessons that may be of use for informing current efforts to improve PHC. One example is the current franchising of HIV and tuberculosis (TB) services through private general practitioners (GPs). In operation since 2005, this initiative involves a network of private sector GPs who are trained in HIV and TB management to support public-sector patients, operating in compliance with national government guidelines.[12] This was set up with the aim of increasing the capacity of the public sector health system to meet the demand for HIV care and treatment, while also adhering to national standards in clinical care. The initiative is mainly focused in urban areas, with 80% of funding coming from government and the rest from donor contributions. GPs are provided with training, mentoring and a monitoring system that includes quality of service and patient drug pick-ups, and are paid on a capitated fee system. All patients and treatment supporters must pass a comprehensive education programme with case managers monitoring adherence to patient drug pick-ups and visits to patients when problems arise[13] (see Figure 1). An evaluation comparing the initiative with the standard public sector model showed similar outcomes with lower costs due to fewer patient visits. With the move to minimising required patient visits in the national programme, the evaluation concluded that this model could ease the burden on the public sector without increasing costs.[14]

Figure 1: The BroadReach public-private partnership for HIV care



Source: BroadReach, 2012.[13]

a Mock Inspections were used to train new OHSC inspectors and to develop and refine tools and procedures.

Another example of a form of "social franchising" that provides useful lessons is that used for reproductive health services in South Africa. Since 1993, Marie Stopes South Africa (MSSA), a subsidiary of Marie Stopes International (MSI), has provided termination of pregnancy and post-abortion services and other reproductive health services in 19 clinics across the country.[15] MSSA has been working with government since 2007 and the MSI projects were recently evaluated in two provinces where their services were funded by the public sector.[16] The evaluation noted that services responded to reproductive health needs, were provided efficiently, and were of high quality. Services were mainly provided in urban areas, although the rural districts included in the study did have higher overall utilisation of services when compared with other rural districts. The review concluded that this form of outsourcing yielded increased accessibility and use of termination of pregnancy services. The intervention entailed two different types of relationships with the public sector, one with district management and one directly with public health facilities. The evaluation concluded that the contracts with the district management constituted the more efficient model, requiring less administration. The review noted that contracting relationships had evolved over time and needed to become formalised in line with standard government procedures if scaling up were to be considered.

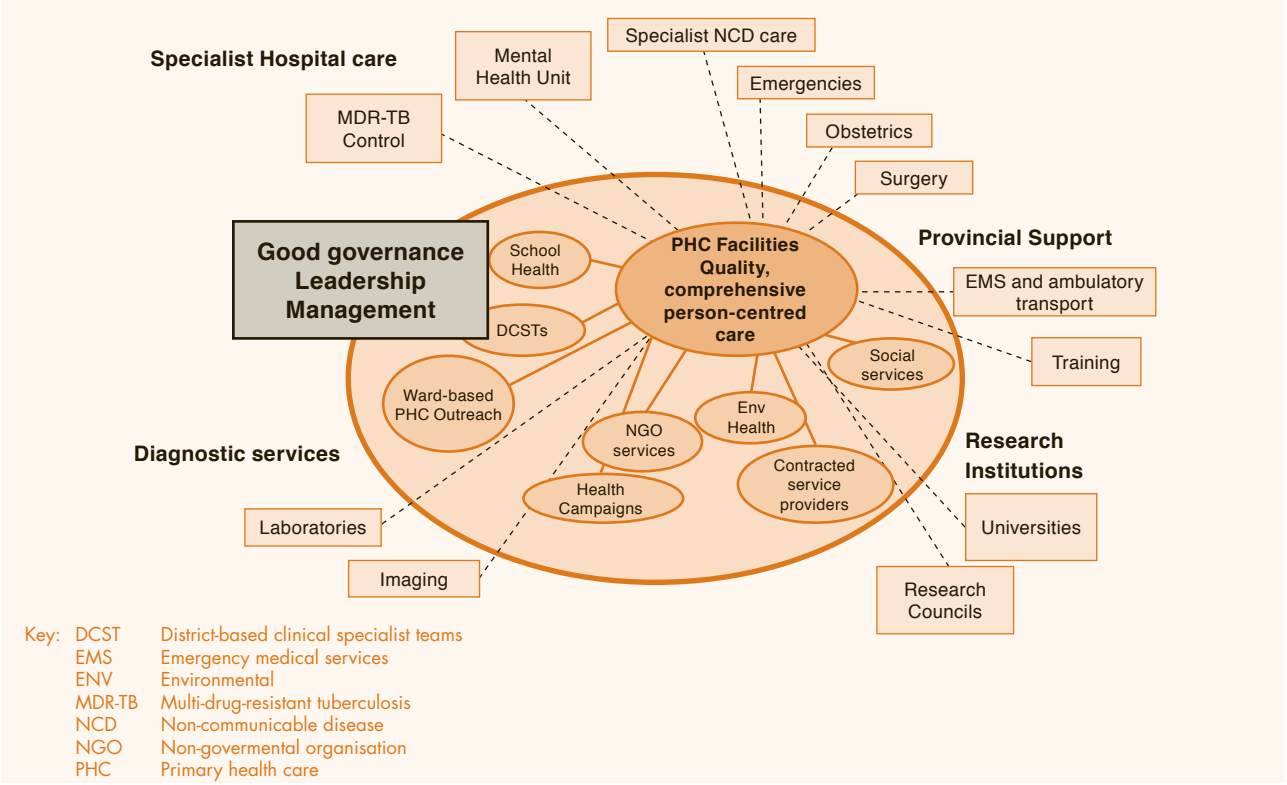
Improving quality in primary health care – the Ideal Clinic project

The NDoH has been developing various strategies to respond to the current deficiencies in the quality of PHC services. At the centre of this effort is the development of Ideal Clinics. These aim to provide a community-based, comprehensive range of integrated diagnostic, curative, preventive, promotive, rehabilitative and palliative services. This forms a hub within the larger PHC team that will ensure continuity of care over time, as well as across services, and if successful, will empower and bring more accountability to the local community (see Figure 2). The Ideal Clinic will focus on the local community but will also interact with the wider District Health System and the District Clinical Specialist Teams to improve their impact locally.

The initiative was launched in 2013 in an effort to speed up the strengthening of public sector clinics. It was clear that a number of major bottlenecks had to be removed. An early innovation was to use an action learning process with the aim of developing a systematic method of change in preparation for the financing reforms under the NHI.

The Ideal Clinic will provide services to communities in different settings. Central to the delivery of integrated, patient-centred care is the use of up-to-date clinical guidelines and protocols. The initiative has adopted the integrated clinical guidelines developed under the "Primary Health Care 101" initiative, which aims to equip nurses and clinicians to diagnose and manage common conditions at primary level.[17] Ten clinics were chosen across different settings in four provinces to undertake a study on how to strengthen facilities and the services they provide. For each clinic, a nurse-doctor team was engaged to work with the clinic staff and the sub-district and district managers. The process was overseen by the National and Provincial Departments of Health. All the elements for developing a high-quality service were defined, using all available national guidance and standards. The various obstacles to improving on these elements were identified, and mechanisms were identified to address them.

Figure 2: Graphic representation of the Ideal Clinic



Key:
DCST District-based clinical specialist teams
EMS Emergency medical services
ENV Environmental
MDR-TB Multi-drug-resistant tuberculosis
NCD Non-communicable disease
NGO Non-governmental organisation
PHC Primary health care

Table 1: Components National Core Standards and for establishing Ideal Clinic standards

National Core Standards Domains	DASHBOARD	
	Ideal Clinic Component	Sub-Component*
Domain 1: Patient Rights	Administration	1. Signage, Branding and Core Values
		2. Service Organisation
		3. Finance and Supply Chain Management
Domain 2: Patient Safety – Clinical Governance and Clinical Care	Clinical Guidelines and ICSM	4. Clinical Service Integration
		5. Clinical Management
	Availability of a Doctor	6. Doctor Services
Domain 3: Clinical Support Services	Medicines, Supplies and Laboratory Services	7. Medicines and Supplies
		8. Laboratory Services
Domain 6: Operational Management	Staffing and Professional Standards	9. Staffing
Domain 1: Patient Rights		10. Professional Standards
Domain 7: Facilities and infrastructure	Infrastructure and Support Services	11. Adequate Infrastructure and Maintenance
Domain 3: Clinical Support Services		12. Bulk and Waste Services
Domain 6: Operational Management		13. Support Services – Housekeeping
Domain 7: Facilities and Infrastructure		14. Essential Equipment and Furnishing
		15. Security
		16. Information and Communication Technology Infrastructure and Hardware
Domain 4: Public Health	Health Information Management	17. District Health Information System and Registers
		18. Data Cleaning and Use
		19. Computerisation of PHC Patient Information Systems
	Communication	20. Community Engagement
		21. Health Promotion and MindSet
Domain 2: Patient Safety – Clinical Governance and Clinical Care	District Health System	22. District Health System Support
		23. Patient Transport and Emergency Medical Services
Domain 5: Leadership and Corporate Governance	Partners and Stakeholders	24. Engagement
		25. Agreements

* **Each sub-component has several "elements" (not included here) against which specific questions (or criteria) have been defined to help guide improvements.**

In total, almost 200 elements have been defined that are specific prerequisites for a clinic to function optimally (see Table 1).

These have been classified into 26 sub-components within 10 components, namely:

- Administration
- Clinical guidelines and integrated clinical services management (ICSM)
- Medicines, supplies and laboratory services
- Staffing and professional standards
- Availability of a doctor
- Environment, infrastructure and equipment
- Health information management
- Communications
- District health systems
- Partnerships and stakeholders

This process has been used to help facilities develop quality improvement plans, clarifying the changes that can be brought about from within the clinic, and what requires action at higher levels of management. The nurse-doctor teams have continued to engage with the 10 clinics and have developed a set of instruments that can now be used to facilitate and monitor the process on a wider scale. The efforts are being scaled up alongside other efforts to strengthen district and facility performance, such as improving delegation of authority and more decentralised forms of management where capacity allows this. The baselines for the development of the Ideal Clinics were set by the audit of all public health facilities completed in 2012.[5] Since then, two systems for monitoring progress have been established: the internal system overseen by the NDoH, and the mock inspections performed by staff involved in setting up the OHSC prior to its launch in 2014. These monitoring arrangements have been operating in collaboration to ensure that future inspections and future responses are aligned and lead to improvements in the quality of services provided.

The internal NDoH monitoring system for the Ideal Clinic

The system for internal monitoring of the Ideal Clinics uses a simple tool covering the standards for each of the 200 elements in the 10 components. The tool is based on a set of questions or criteria for assessing the element, linked to a red/amber/green system of grading the response. There has been continuous monitoring of progress involving NDoH "nurse-doctor" teams working closely with district and provincial managers. This has shown overall improvements, and where improvements have been slow or, in a few areas, reversed, the monitoring tool has allowed for corrective action to be undertaken early.

Inspections of the Office for Health Standards Compliance

All of the 10 Ideal Clinic study sites have been subject to mock inspections in the run-up to establishing the OHSC. This has provided an opportunity for the OHSC and NDoH to calibrate their monitoring systems. It has also helped facilities to prepare mechanisms and approaches for building compliance with the OHSC standards. The inspections make assessments against the National Core Standards and the six domains of quality. All 10 clinics have had baseline audits, but only five of the clinics have completed more than one inspection, the results of which are shown in Table 2. The results of the previous baseline audit (using different methodologies from OSC) are also included, with adjustments to allow comparison. As can be seen, the results are that overall, four out of five clinics improved, with two clinics showing improvements across all domains. One clinic's scores deteriorated. The waiting-time scores all improved, but the scores for infection prevention and control and for medicines were mixed. This provides an example of the type of information that will increasingly be available for all national health facilities as the OHSC inspectors proceed with their work.

The lessons from these study clinics will now be used to scale up the approach, building in more rigorous learning and evaluation. The scale-up will eventually be conducted across all public sector PHC services in South Africa, starting with the 11 districts that are being prepared for the introduction of NHI. Resources to implement this have been committed by the NDoH and Treasury.

Given the intention of rapidly going to scale, the NDoH has been undertaking various consultations to consider what lessons could be learned from other sectors, including the private sector and other countries. The initial learning from social franchising is summarised below and is followed by a discussion on how this concept and approach might be of use in scaling up the Ideal Clinic initiative.

Table 2: Baseline audit and OSC scores by quality domain

Clinic	Data (BA = Baseline Audit)	Availability of medicines and supplies %	Cleanliness %	Improve patient safety and security %	Infection prevention and control %	Positive and caring attitudes %	Waiting times %	Aggregate Score %
Clinic 1	BA	92	24	48	57	72	53	57
	Sep-13	67	46	36	44	57	80	49
	Nov-13	99	92	73	71	78	100	82
Clinic 2	BA	95	67	60	93	97	87	78
	Aug-13	69	37	45	47	67	64	52
	Nov-13	90	69	82	88	72	100	83
Clinic 3	BA	58	77	33	52	43	86	49
	Mar-13	76	67	55	75	59	60	63
	Aug-13	37	69	53	59	54	73	54
Clinic 4	BA	57	60	39	40	80	40	46
	Mar-13	80	55	56	82	61	50	64
	Sep-13	43	50	60	67	61	90	59
	Nov-13	40	83	73	85	68	82	70
Clinic 5	BA	44	50	23	29	38	38	31
	Sep-13	37	40	44	57	41	18	42
	Nov-13	41	66	50	50	27	73	49

Final OSC score compared to first OSC score	
	Improved (>5%)
	Worsen (>5%)
	No change

Social franchising in health service provision

Social franchising of health services is seen as having the potential to transform key aspects of health service delivery.[18] Social franchising involves the application of business franchise concepts for community and social benefits. It provides an attractive addition to the available tools for leveraging existing resources, offering a system for standardising the outputs from a heterogeneous group of practitioners. The global literature focuses on how social franchising has been used to work with the non-government providers who are outside public health programming and where there are concerns about quality of care and non-adherence to national standards and guidelines. However, in the South African context, the relevance is how such an approach could be used in both the public and private sectors, using the national standards of the OHSC and the guidelines and protocols that are being used for the Ideal Clinic project. A social franchise has four primary goals[19] all of relevance to South Africa. These are to improve:

- access, by increasing the number of service delivery points (providers) and healthcare services offered;
- cost-effectiveness, by providing services at an equal or lower cost to other service delivery options;
- quality, by ensuring that the services provided adhere to quality standards and improve on the pre-existing level of quality; and
- equity, by serving all population groups, focusing on those most in need.

A franchise is a contractual arrangement between a health service provider and a franchisee organisation. Franchisees are trained in standardised practices for which prices are predefined and all benefit from advertising of the logo or franchise name. In return, franchisees may be required to comply with minimum service utilisation and quality standards and pay a membership fee to the franchisor. Providers are monitored by the franchise organisation, which in the context of public health is generally a government or donor-sponsored NGO that subsidises the network.

The Global Health Group defines a social franchise as a network of healthcare providers that are linked through agreements to provide socially beneficial health services under a common franchise brand.[20,21] A franchisor manages the brand and oversees the administration of the programme.

The concept of franchising for health services is similar to franchises in business. A franchisor develops a successful way to provide the health services, and other franchisees copy the model. However, each franchisee is required to follow the original model. There are usually specific training programmes, protocols and standards to follow, monitoring, and a brand name or logo which identifies that the provider is part of a franchise. In social franchising, belonging to a network is an essential element and in this network the co-ordinator (franchisor) has the mandate to harmonise the network and ensure consistency among the franchisees (health service providers). The elements that typify a social franchising package are:

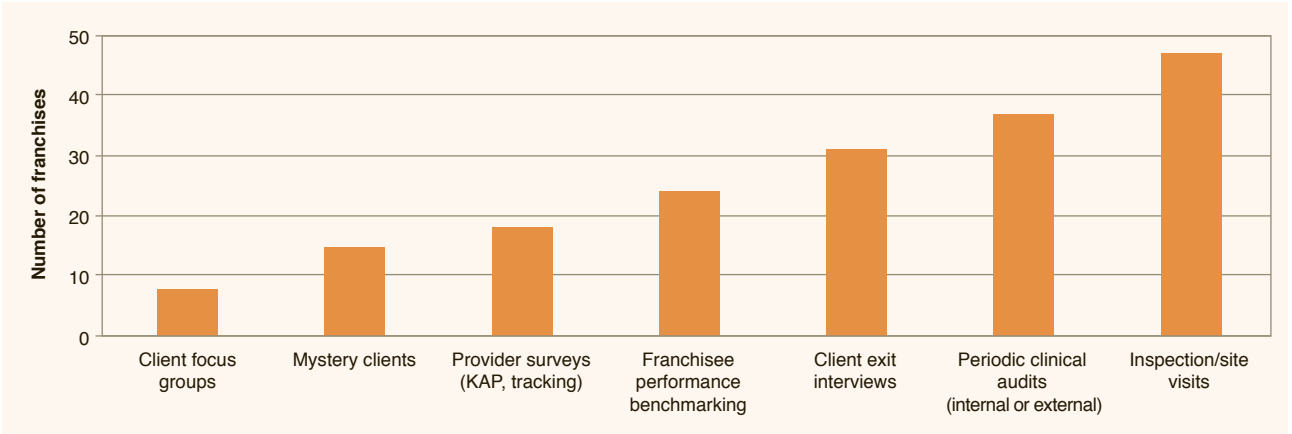
- training (e.g. in clinical procedures, service management);
- protocols used for management (e.g. for antenatal care, childhood diarrhoea);
- standardisation of supplies and services (e.g. birthing kits, HIV/TB tests);
- branding (e.g. standardised display of health promotion material, use of a logo on signs, products, or garments);
- monitoring (e.g. quarterly reports to franchisor, reviews); and
- network membership (e.g. more than one franchisee in the organisation).

As a method of organising unstructured service providers, franchising is attractive because it integrates within one system all of the interventions that have been shown to have some effect individually, namely training, oversight, performance-based incentives, accreditation and certification, vouchers or other external payment schemes, ongoing support relationships and monitoring.

Different models of quality assurance are used in social franchises. An international study of "high-performing" social franchises provides lessons for the OHSC and the Ideal Clinic initiative in South Africa, and identifies the capacities and mechanisms that may be required as these efforts go to scale.[22] The study concluded that successful social franchises conceive of quality assurance not as an independent activity, but rather as a goal that is incorporated into all areas of franchise operations. The successful franchisor has usually adopted a quality assurance (QA) framework that includes areas such as recruitment of the franchisee, training, monitoring of provider performance, monitoring of client experience and the provision of feedback. The most common QA mechanism entailed inspections, site visits and clinical audits (see Figure 3). The report noted that the use of "client feedback" was least well-developed, which reflected their conclusion that many franchises were not using the latest knowledge on quality improvement techniques.

Globally, social franchising has been most commonly used for family planning services in low- and middle-income countries. However, the recent review performed by the Global Health Group showed a wide range of other services included in the 52 initiatives that they identified in 35 middle- and low-income countries. These included services for sexual and reproductive health, maternal and child health, HIV, TB and malaria. In this survey, 80% of the social franchises were located in South Asia with only about 6% in Africa. The context varied enormously, and direct comparisons are difficult; however, the case studies do show the range of services provided in very different settings. Three are provided here, one from Rwanda and Kenya (The Health Store Foundation[23]), one from Vietnam, a public sector social franchising initiative in Vietnam (Tinh chi em, "Sisterhood") and the third from Ghana (Health Keepers[24]).

Figure 3: Quality assurance activities as reported by 50 global social franchises



Source: Schlein et al., 2013.[22]

The Health Store Foundation
"Child and Family Wellness" Shops, Kenya and Rwanda

Basic facts:

- Target clientele: low income, children/youth, caregivers of children under 5, people living with HIV and AIDS, men, women
- Location of outlets: 10% urban and 90% rural
- Payment sources: In Kenya, 100% out of pocket; in Rwanda, some out-of-pocket payment but main payer is prevalent community-based health insurance schemes
- Number of clients served per year: 400 000

Background: Since opening its first outlets in 2000, The Health Store Foundation® has developed a network of franchised medical clinics and drug shops now totalling 71 locations serving approximately 33 000 patients and customers per month in Kenya and Rwanda. Clinics are owned by nurses and drug shops are owned by community health workers (CHWs).

Service details: Malaria testing and treatment, TB referrals, oral contraceptives, male condoms, injectable contraceptives, water purification, vitamins, long-lasting insecticide-treated nets, net retreatment, ante-natal counselling, HIV testing, etc.

Quality assurance highlights: Each franchisee is trained on the Child and Family Wellness (CFW) system and is contractually obligated to follow the CFW system; if they fail to comply, their franchisee rights are revoked; this is a powerful incentive that ensures the maintenance of basic clinical and business standards across the CFW network.

Community health workers: Some CHWs are paid on commission, and some receive salaries paid by the franchisee. They provide outreach services, over-the-counter sales, health education services, marketing and referrals to CFW or the government.

Demand-side financing: The programme plans to develop a subsidised third-party payment mechanism in Kenya. In Rwanda, the prevalent community health insurance scheme ("Mutuelles de Sante") is reimbursing CFW outlets for care provided to patients.

Operational research: The 2011 Harvard Business School case study focused on Health Store's internal discussions surrounding the possibility of making a transition to using a for-profit operating entity in Kenya to carry out the CFW business in Kenya, and the potential operational and fundraising implications of such a decision.

Successes: Serving approximately 400 000 people per year in Kenya; signing a formal agreement with the Minister of Health in Rwanda; solicitation of advice on operations from major franchise industry leaders; bridging franchise expertise with global health expertise and targeting both at the CFW network.

Challenges: Establishing a business format franchise in an environment with little exposure to business format franchising.

Future plans: Introduce vaccines and basic laboratories to two new CFW clinics in Kenya; improve the delivery cycle in Kenya including using phone orders and M-PESA payments; develop business plan and launch the first wave of new-style CFW clinics in Kenya under new for-profit entity; continue expanding CFW network in Rwanda under Public-Private Partnership with the Ministry of Health.

Tinh chi em ("Sisterhood"), Vietnam

Basic facts:

- Target clientele: Low income, migrants/refugees, men, women
- Location of outlets: 10% urban and 90% rural
- Payment sources: 10% out of pocket, 50% insurance, 40% government reimbursement
- Number of clients served per year: 887 412

Background: "Tinh chi em" is the first government-run social franchise model in Vietnam. With technical assistance from MSI Vietnam (MSIVN), the provincial Department of Health (franchisor) formed and operates the model at community health stations (franchisee). Currently the EU, Atlantic Philanthropies, MSI-UK and the government of Vietnam are matching resources to support the government social franchise network.

Service details: Oral contraceptives, female condoms, injectables, Copper T, sterilisation, emergency contraception, counselling on family planning, sexually transmitted infections testing and treatment, medical and surgical abortion, breast and cervical cancer screening, antenatal care, labour and delivery, postnatal care, and counselling on reproductive health.

Quality assurance highlights: As MSIVNs work in partnership with the public health system, there is strong involvement from the government side at provincial, district and community levels in the franchisees' activities. Monthly reports on service provision prepared by the franchisees are submitted to the district health centres for verification before sending to MSIVN. Monitoring occurs through two channels – provincial master trainers as trained by MSIVN, and MSIVN project staff. Findings are discussed together with service providers immediately after every monitoring visit in order to gain a common understanding about strengths and areas for improvement. Points given to every franchisee at the two last monitoring visits are presented at quarterly meetings.

Community health workers: Brand ambassadors are selected from the community. They receive a monthly allowance to participate in the project (to cover transportation costs). Incentives are also provided based on referrals (about US$5 per month).

Demand-side financing: A voucher scheme provides reimbursement for transport.

Successes: Strong partnership with local authorities; training on cervical cancer screening, emergency preparedness, basic management; skills for the head of franchisees; Refresher training on service quality, demand generation, monitoring and evaluation for provincial master trainers.

Challenges: Lack of approval mechanism for the health staff working at the (government) franchised commune health stations to collect fees from clients; the voucher scheme is new, and it took time for it to work correctly; delay in re-construction of some government health stations caused launch delay.

Health Keepers, Ghana

Basic facts:

- Target clientele: low income, children/youth, sex workers and clients, men, women
- Location of outlets: 10% urban and 90% rural
- Payment sources: 100% out of pocket
- Number of clients served per year: 520 000

Background: The "Health Keepers" network brings innovative and sustainable self-help market-based solutions to the fight against disease, chronic hunger and poverty. The programme integrates private sector business approaches to serve a public health need by addressing the bottleneck in the delivery of health products and information, and offering a smart business opportunity for local entrepreneurial women. The programme is based on a network of women known as Health Keepers. Health Keepers go from door-to-door to sell reproductive health products and offer advice on their proper use, and provide health information and linkages to referral points.

Service details: Oral contraceptives and condoms

Quality assurance highlights: The network provides feedback to franchisees and refresher trainings. Quality is evaluated based on the number of community-based women who are trained, sales, and "Couple Years Protected". A Community Impact Assessment tool assesses quality.

Community health workers (CHWs): CHWs earn income from door-to-door sales of health protection products.

Successes: Expanded geographically, added youth and adolescents as target groups; initiated micro-savings as a strategy for addressing attrition and a product financing mechanism for the Health Keepers.

Challenges: Balancing the social and commercial goals of the programme; ensuring regular monitoring and supervision to bring about the needed behaviour change; inadequate funding.

Future plans: Introduction of zinc tablets for diarrhoea case management (oral rehydration salts plus Zinc tablets); peer-to-peer distribution of oral contraceptives and condoms in tertiary institutions.

What is the evidence that social franchising is effective?

The literature is generally positive about social franchising but until recently there were mixed views among researchers, mainly due to the lack of rigorous evaluations.[25] Context and local details around implementation seemed to account for many of the differences in previous research. If a social franchising service is properly targeted at poorer and disadvantaged groups, it is likely to improve on inequities in service delivery.[26] Recently, there have been a number of more rigorous assessments of social franchising as an intervention to improve access to and quality of health services. One review included 23 studies that focused on reproductive health services;[27] results varied widely, but social franchising was positively associated with increased client volume and client satisfaction. The review result was mixed regarding the impacts on utilisation and health, and was negative in terms of cost-effectiveness and equity. In Myanmar, a cross-sectional study showed that social franchising improved the knowledge retained by community health workers for dealing with malaria.[28] Another study on the same franchise showed that women chose franchised health service providers because of their perceived higher quality associated with the availability of effective, affordable drugs. A pro-poor focus was achieved in urban areas in terms of TB services, but less so in rural areas.[29] In Vietnam, a social franchising initiative focusing on nutritional counselling based in government primary care facilities showed improvements in clinic infrastructure and knowledge.[30] A study in Pakistan assessed the use of vouchers for expensive forms of contraception, with positive results. The study concluded that there were a number of different aspects key to the project's success: generating demand through counselling, overcoming financial constraints by offering vouchers, training, and accreditation, branding of the service providers, and ensuring uninterrupted supplies.[31]

A common criticism of social franchises centres on their rather simple measures of performance. Most define success through the numbers of users and facilities, rather than in measuring health outcomes and health impact. Efforts are being made to change this so that impact measures can be used to assess impact across different services.[32-34] Innovative techniques such as using the "observed simulated patient" could be explored.[35] Performance should also focus on the ability of programmes to reach the poorest and those most in need, as serving these groups is often the rationale for setting up social franchising programmes. However, reaching the poor can be difficult and requires constant monitoring in all social franchises.[36]

Are these experiences of use for scaling up Ideal Clinics?

Underlying all of these experiences are some common principles. All the examples of social franchising demonstrate some system of accountability for delivering results and have increased autonomy for local decision-making. There was a need to ensure sufficient capacity to implement new ways of working, and transparency to monitor results. The combination of more accountability, adherence to standards and adapting services to local needs improves the responsiveness and efficiency of health services. However, these social franchising initiatives may not have brought about change on their own, and often are part of a wider set of initiatives that contributed to changing or strengthening the health system.

Whilst the international case studies are of interest, the contexts in all these other countries are very different, and it is notable that social franchises that are part of an international network have to customise their approach to the specific country in which a programme is being implemented. This signifies the need to be consistent with national policies, regulations and management arrangements being introduced with the move to NHI. Such an initiative would also need to be manageable within existing capacities, given that decentralised contracting is already proving difficult with the capacities currently available. The studies also show success with specific programmes and services with specific outcomes, whereas the Ideal Clinic initiative is a comprehensive service that is currently driven by standards that are largely input-based.

Any such model in South Africa would need its own terminology. For example, the local Department of Health would be the "franchisor" co-ordinating the network of providers of "branded" services. The OHSC would undertake the independent verification of the quality assurance efforts and outcomes, and would assess whether clinics retain their Ideal Clinic "brand". Moreover, the Ideal Clinic initiative, with its focus on quality improvement, is an innovation in itself and may develop its own terminology and approaches based on experience. Innovations may also be required in other areas, such as building on the experience of using incentives to improve rural coverage of health services.[37]

Are there any risks?

The advantage of going to scale quickly through a social franchising approach would have to be linked to the considerable investment into management capacity required to set up and oversee such an arrangement. However, there are potential risks that could result in failure of scaling up if these were not addressed. Some key risks are as follows:

- **Evidence:** The review of international evidence shows that any expansion of existing initiatives would need to be accompanied by rigorous evaluation and "implementation science" as recommended by the World Health Organiza-tion,[38] and there is a risk that these areas do not receive the required attention by researchers and their sponsors in South Africa.
- **Stakeholders:** Health workers working in primary health care would be those most affected by the types of changes envisaged here and could be resistant to change. They would need to be involved in the design process from the outset so that they could help shape the changes. Reforms that are centrally driven should not undermine local management and innovation, and should maintain a balance between local and central accountability.[39]
- **Management capacity:** The public sector has to have the capacity to take on change. This has long been recognised as a major constraint in developing more effective relationships between, for example, "purchasers" and "providers" of services.[40]
- **Monitoring:** Regular monitoring is crucial, and without this, new innovations could lead to scaling up of low quality services.[41]
- **Equity:** Innovative reforms often only provide more services for those who are relatively well served. Any innovation aimed at expanding healthcare services in South Africa would have to

specify the need to reach under-served rural areas for example, preferably using workers drawn from local communities.

Conclusion

The launch of the Office of Health Standards Compliance provides an environment in which monitoring and improving on quality standards in both the public and private sectors should stimulate more innovative approaches to overcoming local problems. This will need to be linked to more accountability, locally to users and centrally for adherence to standards, and more delegation of authority. This requires sufficient management capacity and more efficient support systems, for example around procurement, medicines and supplies, and information systems.

Health systems evolve over time and there is a growing consensus globally that major changes in any health sector require local evidence to be developed on what works, and what does not. Empirical evidence relating to a specific situation should guide decision-making in that situation.[38,42] This in turn requires effective collaboration between all stakeholders (users, health workers, managers, researchers and policy-makers). In some situations where there are different options to be explored, it is possible to design different approaches to allow for a comparison of progress and outcomes. A number of methodologies can be utilised for quality improvement, such as the Plan-Do-Study-Act cycles and Participatory Action Research. The way forward is to debate the options, create the space for innovation and learning, and keep a close watch on quality, access, equity and costs.

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District Clinical Specialist Teams

5

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In its commitment to the Millennium Development Goals, South Africa has embarked on significant health reforms to reach the targets set. Integral to achieving the targets has been the adoption of a three-stream approach to primary health care (PHC) re-engineering, which includes municipal ward-based outreach teams, integrated school health teams, and district clinical specialist teams.

The authors describe the developments and progress in the implementation of the District Clinical Specialist Team (DCST) stream of PHC re-engineering. The concept of a DCST being responsible for supporting health service delivery at district level, through the provision of clinical leadership and mentoring, and through facilitating health system strengthening for quality care, is new in South Africa. This chapter is thus largely descriptive, outlining the policy and strategic background underpinning the DCST stream; describing the DCST composition, roles and responsibilities; providing an update on DCST recruitment and appointments; discussing DCST induction and orientation; and documenting early DCST achievements.

The authors conclude by offering reflections and recommendations based on DCST implementation to date, and highlight the need for strengthened mentoring and coaching practice for sustainability, the integration of the DCST stream with other PHC strengthening endeavours and district-level co-ordination of programmes for improved maternal and child health outcomes.

The concept of a District Clinical Specialist Team being responsible for supporting health service delivery at district level, through the provision of clinical leadership and mentoring, and through facilitating health system strengthening for quality care, is new in South Africa.

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Introduction

In its commitment to the Millennium Development Goals (MDGs), South Africa has undertaken significant reforms to reach the MDG targets. With regard to achieving the health-related MDGs, South Africa has embarked on health sector reforms specifically aimed at strengthening the primary health care system and district-level interventions, recognising their critical role in achieving the MDGs by December 2015.[1] Reducing maternal and child mortality and strengthening health system effectiveness are strategic outputs in the Negotiated Service Delivery Agreement (NSDA) signed by the National Minister of Health with the President, and between the Minister and each of the members of the Executive Councils responsible for health.[2] Integral to achieving the NSDA strategic outputs has been the adoption of a three-stream approach to primary health care (PHC) re-engineering, which includes the establishment of municipal ward-based outreach teams, integrated school health teams, and district clinical specialist teams.

The District Clinical Specialist Team (DCST) stream of PHC re-engineering was formally launched by the National Minister of Health at a two-day national workshop in September 2012. The Minister's presentation outlined the central role of the DCSTs in improving the quality of care and health outcomes at district level for mothers, newborns and children. Through the initial recruitment process in 2012, 172 DCST appointments were made, comprising 47% of the estimated 364 posts to be filled nationally.3 Since then, scaling up the implementation of the DCST stream has been guided by the 10 recommendations set out in the Ministerial Task Team (MTT) Report.[4]

This chapter deals with developments and progress in the implementation of the DCST stream of PHC re-engineering by: outlining the policy and strategic background underpinning the DCST stream; describing the DCST composition, roles and responsibilities; providing an update on DCST recruitment and appointments; discussing DCST induction and orientation; and documenting early DCST achievements. The chapter concludes with reflections on DCST implementation to date, and recommendations for the further implementation, sustainability and strengthening of the DCST stream.

Policy and strategic imperatives underpinning the DCST

The policy imperatives underpinning the design and implementation of the DCST stream of PHC re-engineering in South Africa rest on international, continental and national initiatives, as does the initial DCST strategic focus on reducing maternal, newborn and child mortality.

Primary Health Care – now more than ever

The World Health Report 2008 entitled "Primary Health Care – now more than ever" and launched in Kazakhstan on the 30th anniversary of the Declaration of Alma Ata, called for a return to the values, principles and approaches of primary health care.[5,6] The Report compared countries at the same level of economic development and showed that those where health care is organised around the tenets of primary health care have better health outcomes for the same investment. Also highlighted was worldwide dissatisfaction with health systems and a call for reorientation of health systems to provide a full range of health care, from households to hospitals, and from preventive to curative care.[7] To address inequities in access to and quality of health care, and to achieve optimal health system performance, the Report recommended four broad policy directions: universal coverage; people-centred, quality service delivery supporting an integrated continuum of care; healthy public policies; and strengthened, distributed and facilitatory leadership.[5]

The transformation of South Africa's health sector around key strategic foci aims to operationalise the policy directions recommended by the World Health Report 2008.[5] Specifically, the DCST stream of PHC re-engineering is intended to improve the quality of care along a continuum, through: the provision of clinical leadership, mentorship and support; health system strengthening; and improved clinical governance.[8] Furthermore, DCSTs facilitate the integration of health programmes at the point of care.

Strengthening the District Health System

South Africa remains committed to the District Health System (DHS) as the vehicle for the implementation of PHC and its values, principles and approaches. South Africa has made significant access and equity gains in the implementation of the DHS, but has performed poorly with regard to delivering quality care and in achieving target health outcomes.[4,9] Major challenges identified as hindering performance are poor supervision and weak management, inadequate co-ordination, insufficient clinical oversight and weak governance.[9]

DCSTs are uniquely located in the District Health System to contribute significantly to enhancements in the quality of clinical services, strengthening the health system, providing clinical leadership, and promoting clinical governance.[8] Since the launch of DCSTs in 2012, provinces have been recruiting and appointing team members who are expected to work closely with district health management teams and district maternal and child health programmes[8] in overseeing the quality, and ensuring the integration, of clinical services provided by community-based, clinic-based, health centre-based, and district hospital-based health services.[9] It is also expected that the DCSTs will work closely with the other two streams of PHC re-engineering.[4]

Focus on maternal, newborn and child health

Following the 2010 country report on the MDGs to the United Nations General Assembly, which declared the unlikelihood of expected reductions in maternal and child mortality being achieved, PHC re-engineering was introduced in South Africa.[8] Furthermore, the Campaign on Accelerated Reduction of Maternal and Child Mortality in Africa (CARMMA) – introduced in the Fourth Session of the African Union (AU) Conference of Ministers of Health in Ethiopia in 2009 – was launched in South Africa in 2012, as was the 2012–2016 Maternal, Newborn, Child and Women's Health and Nutrition (MNCH&N) Strategy, with associated indicators to monitor implementation and progress.[8] The Ministerial Committees on maternal, perinatal and child mortality have continued to provide recommendations to address the major causes of death[8] and to deal with the modifiable factors contributing to avoidable mortality. These foundations have underpinned the initial strategic focus for DCSTs on reducing maternal, newborn and child mortality.

DCST composition, roles and responsibilities

To secure expert guidance on the composition, roles and responsibilities of DCSTs, the Minister of Health appointed a Ministerial Task Team (MTT) in 2011, comprising senior academics and clinicians in both medicine and nursing. The MTT recommendations were presented to the Minister and adopted in 2012. Key issues discussed by the MTT included: ideal and alternative models for DCSTs; the country's ability to recruit medical specialists to DCSTs, given the existing shortages of medical specialists in the public health sector; the need for appointed specialists to be employed on a full-time rather than part-time basis; issues related to working with private medical specialists, should they express an interest in support of the public health sector; remuneration and conditions of employment of DCSTs; induction and orientation of DCSTs; and monitoring and evaluation of the value added by DCSTs.

The standard, nationally accepted structure for a DCST, monitored by the National Health Council, is of seven specialists in each district, comprising three medical and three nurse specialists from obstetrics and gynaecology, paediatrics and family medicine/PHC, and one anaesthetist as listed in Box 1. The focus on maternal, newborn and child health is reinforced in the composition of the DCSTs.

Box 1: Recommended composition of District Clinical Specialist Teams

- Obstetrician and Gynaecologist
- Advanced Midwife
- Paediatrician
- Paediatric Nurse Specialist
- Family Physician
- Primary Health Care Nurse Specialist
- Anaesthetist

The MTT recommended the inclusion of an anaesthetist in an expanded role to oversee emergency and peri-operative care, given the large number of maternal deaths resulting from inadequate expertise in this area, especially in district hospitals.[4]

Towards the provision of clinical leadership, mentorship and support to health facilities and services within districts, the Handbook for District Clinical Specialist Teams outlines the roles of DCSTs in terms of team-work as follows:

- improving the quality of clinical services, through the provision and strengthening of clinical leadership and clinical supervision;
- providing clinical training, and monitoring and evaluation;
- supporting district-level organisational activities;
- supporting health systems and logistics;
- ensuring collaboration, communication and reporting; and
- conducting teaching and research activities, relevant to key issues hindering quality of care in their districts.[8]

The specific responsibilities of DCSTs are to support the clinical practice of frontline health workers through:[8]

- conducting a situational analysis of maternal, newborn, child and women's health (MNCWH) services;
- ensuring root cause analysis towards the identification of priorities;
- ensuring evidence-based planning;
- ensuring the implementation of the four tiers of clinical governance, i.e. ensuring clinical effectiveness; clinical risk management; professional development and management; and people-centred accountability;
- supporting the strengthening of management systems, including information management and supply chain management; and
- supporting the integration of the three streams of PHC re-engineering.

DCST roles and responsibilities are primarily intended to be implemented as teams. Some responsibilities may require DCSTs to operate as dyads, and/or as discipline specialists, depending on the task at hand. Critical to effectiveness are the co-ordination of team activities, and support provided by provincial specialists and by district managers.[8] With regard to team co-ordination, the MTT recommended that the family physician be the leader of the DCST.[4] This recommendation has been implemented in the North West Province, building on what existed in the province prior to the introduction of the DCSTs. However, due to the incomplete composition of many DCSTs, the leadership of the team has been decided on organically, depending on the actual composition of the team in a particular district, and on the experience and qualities of the individuals appointed to the team. In some districts, leadership of the team rotates every quarter.

The Minister proposed that each province appoint provincial specialists at least in obstetrics and gynaecology, and in paediatrics. Provincial specialists are to provide technical support to the DCSTs, and hold DCSTs clinically accountable. District managers are to provide administrative support to the DCSTs, and hold DCSTs administratively accountable.[8] District managers are to ensure a supportive environment for DCSTs by securing the necessary resources for the actualisation of DCST roles, and by managing the performance of DCSTs.[8] Furthermore, to facilitate the DCST clinical training, teaching and research roles and responsibilities, DCSTs are to have access to a fully equipped training/resource centre in their respective districts.

Provincial variations in the implementation of the DCST stream

In recognition of the potential difficulty in appointing a full team to each district, the MTT provided recommendations for a minimum DCST composition in the short term.[4] To suit provincial contexts and health service delivery needs, provinces have implemented varied approaches to realising the DCST stream of PHC re-engineering. Provinces with adapted approaches include the Western Cape, the North West and Gauteng.

In the Western Cape, the DCST component of PHC re-engineering has been integrated within the provincial clinical governance strategy of 2011.[10] To overcome the dearth of specialists in rural and outlying areas in this province, specialists are appointed to regional hospitals and are responsible for providing regular outreach to district hospitals, with a primary role of supporting clinical governance. Initially, the outreach support was provided solely by medical specialists, but more recently, the Western Cape

has adapted the approach to include the cadre of nurse specialists, in line with MTT recommendations.

In the North West, family physicians had already been appointed to all districts prior to the launch of the DCST stream of PHC re-engineering. With the launch of the DCST stream, these family physicians have taken on the role of DCST team leader. Additional family physicians have been appointed to the DCST to form a dyad with the PHC nurse specialist.

Gauteng is predominantly an urban province with a high population density. In districts with higher workloads, the obstetric and paediatric dyads have been augmented with additional members to meet the demands.

Progress on DCST recruitment and appointment

The National Department of Health (NDoH) commenced with the process of DCST recruitment in the latter half of 2011, with shortlisting completed by January 2012 and initial appointments made in July 2012. As per MTT recommendations, and acknowledging that the supply of specialists in the country would not meet the confirmed need, recruitment of medical specialists from countries such as the United Kingdom was also conducted through advertisements placed in international medical journals.

By September 2012, 172 appointments of the possible 364 had been made nationally, and of these appointments, 55% were for nursing specialists. After 18 months of implementation, by the end of April 2014, 206 appointments had been made, amounting to 56.5% posts filled, yielding a vacancy rate of 43.5%. The proportion of nurse specialist appointments remained higher than that of medical specialists. The proportion of advanced midwife, paediatric nurse and PHC nurse posts filled was at 88.5%, 76.9% and 75% respectively. Overall, the recruitment of medical specialists remained below 50%, except for the family physician cadre at 61%.

Table 1 reflects the status of DCST appointments across districts in the country, by specialisation. Table 2 presents the status of appointments in the National Health Insurance (NHI) pilot districts. Except for three districts in the Western Cape, which have no registered DCST members as they rely on outreach from neighbouring districts, 49 of the 52 districts have appointed DCST members. Only two districts – Tshwane in Gauteng and Eden in Western Cape – have achieved the ideal DCST composition of a full seven-member team, as recommended by the MTT. Considering the strategic focus of the DCST stream of PHC re-engineering in maternal, newborn and child health, it is imperative that alternative strategies be sought to recruit the services of appropriately skilled obstetricians and paediatricians, as per MTT recommendations.[4] Furthermore, with only six districts having filled the anaesthetist position by the end of April 2014, and given that anaesthetists have been listed as a scarce resource in the public sector,[11] recommendations developed to increase anaesthetic competence at district level need to be pursued, and alternative approaches to ensuring the expansion of anaesthetic skill and competence should be developed.[12]

Table 1: Number of DCST members, by district and speciality, April 2014

Province	District	Anaesthetist	Obstetrician	Paediatrician	Family Physician	Advanced Midwife	Paediatric Nurse	PHC Nurse	Total
EC	Alfred Nzo DM				1	1	1	1	4
	Amathole DM		1	1		1		1	4
	Buffalo City MM			1		1	1		3
	Cacadu DM					1		1	2
	Chris Hani DM					1	1	1	3
	Joe Gqabi DM					1	1	1	3
	Nelson Mandela Bay MM			1		1	1	1	4
	OR Tambo DM			1		1	1	1	4
FS	Fezile Dabi DM		1			1	1	1	4
	Lejweleputswa DM		1		1	1	1	1	5
	Mangaung MM				1	1	1	1	4
	Thabo Mofutsanyana DM				1	1	1	1	4
	Xhariep DM		1		1	1	1	1	5
GP	Ekurhuleni MM		1	1	1	1	1	1	6
	City of Johannesburg MM		1	1	1	1	1	1	6
	Sedibeng DM		1		1	1	1	1	5
	City of Tshwane MM	1	1	1	1	1	1	1	7
	West Rand DM		1	1	1	1	1	1	6

Province	District	Anaesthetist	Obstetrician	Paediatrician	Family Physician	Advanced Midwife	Paediatric Nurse	PHC Nurse	Total
KZN	Amajuba DM					1		1	2
	eThekwini MM		1	1		1	1	1	5
	iLembe DM			1	1	1	1	1	5
	Harry Gwala DM			1	1	1	1	1	5
	Ugu DM				1	1	1	1	4
	uMgungundlovu DM				1	1	1	1	4
	uMkhanyakude DM				1	1	1	1	4
	uMzinyathi DM					1	1	1	3
	uThukela DM		1			1	1	1	4
	uThungulu DM		1		1	1	1	1	5
	Zululand DM					1	1	1	3
LP	Capricorn DM				1	1	1	1	4
	Mopani DM			1	1	1	1	1	5
	Vhembe DM				1	1	1	1	4
	Waterberg DM			1	1	1	1		4
	Greater Sekhukhune DM				1	1	1		3
MP	Ehlanzeni DM	1	1	1		1	1	1	6
	Gert Sibande DM		1				1	1	3
	Nkangala DM					1	1	1	3
NC	Frances Baard DM				1	1	1		3
	John Taolo Gaetsewe DM			1	1	1		1	4
	Namakwa DM				1	1			2
	Pixley Ka Seme DM	1		1	1	1			4
	Zwelentlanga Fatman Mgcawu DM		1		1	1			3
NW	Bojanala DM		1	1	1	1		1	5
	Dr Kenneth Kaunda DM		1	1	1	1	1	1	6
	Dr Ruth Segomotsi Mompati DM			1	1	1	1	1	5
	Ngaka Modiri Molema DM		1		1	1	1	1	5
WC	City of Cape Town MM	1	1	1					3
	Cape Winelands DM	1	1	1	1				4
	Central Karoo DM								0
	Eden DM	1	1	1	1	1	1	1	7
	Overberg DM								0
	West Coast DM								0
Total		6	21	22	32	46	39	40	206

Source: National DCST database, April 2014.

Table 2: Number of DCST members in NHI districts by speciality, April 2014

District	Anaesthetist	Obstetrician	Paediatrician	Family Physician	Advanced Midwife	Paediatric Nurse	PHC Nurse	Total
OR Tambo DM			1		1	1	1	4
Thabo Mofutsanyana DM				1	1	1	1	4
City of Tshwane MM	1	1	1	1	1	1	1	7
Amajuba DM					1		1	2
uMgungundlovu DM				1	1	1	1	4
uMzinyathi DM					1		1	2
Vhembe DM				1		1	1	3
Gert Sibande DM						1	1	2
Pixley Ka Seme DM	1		1	1	1			4
Dr Kenneth Kaunda DM		1	1	1	1	1	1	6
Eden DM	1	1	1	1	1	1	1	7
Total	3	3	5	7	9	7	10	44

Source: National DCST database, April 2014.

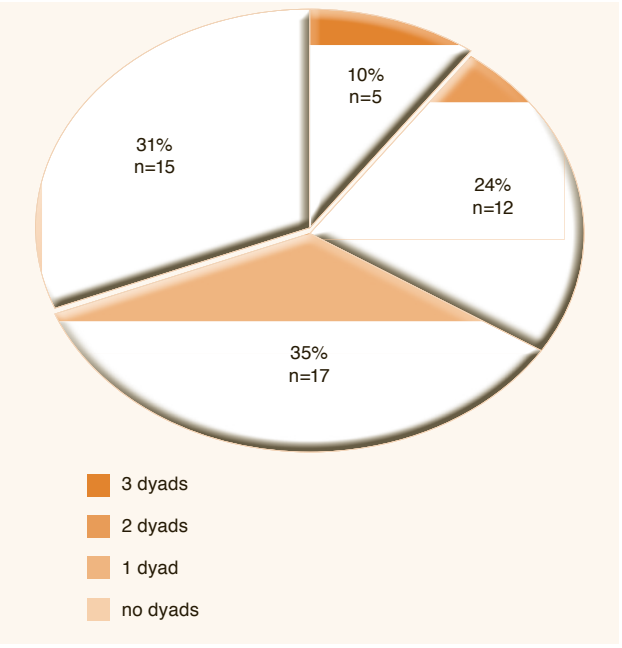
In the absence of a complete team in a district, a minimum composition of a nurse-doctor dyad from a single discipline was proposed by the MTT[4] in order for teams to achieve district functionality, comprising the following dyads:

- family physician and PHC nurse, or
- obstetrician and gynaecologist, and advanced midwife, or
- paediatrician and paediatric nurse

Of the 49 districts that have appointed DCST members, only five districts (10%) have complete dyads across the three areas of speciality listed above, 17 districts (35%) have only one dyad, and 15 districts (31%) have no dyads (see Figure 1). As anticipated by the MTT, challenges have been experienced in the recruitment and appointment of DCST members, with rural districts facing the greatest problem in meeting the minimum team composition requirements.

The three provinces with adapted approaches to DCST recruitment reflect a higher proportion of DCST appointments across districts, as shown in Table 3.

Figure 1: Percentage districts with a nurse-doctor dyad



Source: National DCST database, April 2014.

Table 3: DCST membership in GP, WC and NW by district and speciality, April 2014

Gauteng

District	Anaesthetist	Obstetrician	Paediatrician	Family Physician	Advanced Midwife	Paediatric Nurse	PHC Nurse	Total
Ekurhuleni MM		1	1	1	1	1	1	6
City of Johannesburg MM		1	2	1	1	1	1	7
Sedibeng DM		1		1	1	1	1	5
City of Tshwane DM	1	1	2	1	1	1	1	8
West Rand DM		1	2	1	1	1	1	7
Total	1	5	7	5	5	5	5	33

Western Cape

District	Anaesthetist	Obstetrician	Paediatrician	Family Physician	Advanced Midwife	Paediatric Nurse	PHC Nurse	Total
City of Cape Town MM	2	6	2					10
Cape Winelands DM	3	4	2		1			10
Eden DM	1	1	1	1	1	1	1	7
Overberg DM								0
West Coast DM								0
Total	6	11	5	1	2	1	1	27

North West

District	Anaesthetist	Obstetrician	Paediatrician	Family Physician	Advanced Midwife	Paediatric Nurse	PHC Nurse	Total
Bojanala DM		2	1	2	2		1	8
Dr Kenneth Kaunda DM		1	1	1	2	1	1	7
Dr Ruth Segomotsi Mompati DM			1	1	2	1	1	6
Ngaka Modiri Molema DM		1		1	2	1	1	6
Total		4	3	5	8	3	4	27

Source: National DCST database, April 2014.

DCST induction and orientation

The MTT recognised that for the DCSTs to be fully functional in their new role, teams would have to undergo induction and orientation. In the context of the DCST stream, "induction" referred to the initial introduction of the members of the DCST to their new roles, and "orientation" referred to the longer term capacity- and team-building required to enable the DCSTs to fulfil their roles and impact on maternal and child health at district level.[4] For the purposes of induction and orientation, an intensive one-year programme was recommended for the first wave of newly selected DCSTs.[4] The first induction and orientation programme was implemented from mid-August 2012 in KwaZulu-Natal (KZN) by a team from the University of KwaZulu-Natal (UKZN), funded by the United Nations Children's Fund (UNICEF). The induction and orientation in the remaining eight provinces was centrally managed by the Reducing Maternal and Child Health Mortality through Strengthening Primary Health Care (RMCH) Programme, and implemented by Health Systems Trust (HST) based on an adaptation of the UKZN programme, commencing in mid-November 2013 and funded by the Department for International Department (DFID) of the United Kingdom.

Purpose of the induction and orientation programme

The DCST induction and orientation programme was required to fulfil multiple purposes: firstly, in response to the overt DCST learning outcomes envisaged by the MTT; secondly, in response to structural adjustments to the health system, brought about by the introduction of a new team functioning at district level; thirdly, in response to the inherent identity and role-definition needs brought about by the introduction of a new professional in the health system; and fourthly, in response to the professional socialisation needs of the new cadre of workers.

The MTT outlined the DCST competencies that should be attained through the induction and orientation programme. The MTT envisaged that by the end of the induction and orientation, DCST members would be able to:[4]

- describe their vision and specific goals for the work of the team in their specific district;
- use a range of methods to improve the quality of clinical care;
- provide effective education and clinical training to individuals, and to small and large groups;

- identify weaknesses and improve the performance of the health system;
- support the development and implementation of community-based interventions;
- support district- and facility-level management activities;
- function effectively as a team; and
- evaluate and report on their work.

With regard to structural adjustments to the health system brought about by the introduction of a new team to function at district level, the purpose of the induction and orientation programme was to assist provinces, and each individual DCST, to take cognisance of the local context within which DCSTs were operating. Both in content and in process, the induction and orientation programme was required to assist DCSTs to analyse, be responsive to, and be effective within, their unique contextual challenges, in terms of: the actual composition of each appointed DCST; the availability of facility-based specialists at regional referral services; existing outreach programmes; the actual location and geographic area of operation of each DCST; and the designated accountability and reporting lines.

In response to the inherent identity and role-definition needs brought about by the introduction of a new professional in the health system, the challenge for the induction and orientation programme was to facilitate the definition and clarification of DCST roles in and of themselves, and in relation to other professionals in the health system. The definition and clarification of DCST roles in and of themselves, although guided by job descriptions, needed to be worked out in terms of: the individual professional roles; the roles of dyads, where dyads were present; and the roles of each individual within the team, particularly in the light of mostly incomplete teams being appointed to each district. The definition and clarification of DCST roles in relation to other cadres of workers in the health system needed to be worked out in terms of: the role of the DCST in relation to the district health management team, core and extended; and in relation to programme co-ordinators, operational managers, supervisors and service providers within the district. The particular purpose of the induction and orientation programme was to facilitate role clarification by identifying unique DCST roles and DCST roles that overlapped with others. The induction and orientation programme was required to facilitate the effective management of role conflict and role duplication.

Finally, with regard to the professional socialisation needs of the new cadre of workers, the induction and orientation programme was required to provide opportunity for: professional development in a range of clinical, health system and public health competencies; building professional networks; collaborative problem-solving; engaging in critical dialogue with colleagues to develop best practice; building commitment to whole-system improvement; and providing performance evaluation and feedback.[13]

Learning outcomes of induction and orientation

The literature on leadership and its impact on quality of care and health outcomes guided the design of the induction and orientation programme. Ineffective leadership has been identified as contributing to the varying quality of care being achieved within similar contexts and with similar resource constraints.[14,15] A systematic review examining the relationship between leadership quality and patient outcomes has provided evidence that improved leadership contributes significantly to reduced adverse events and increased patient satisfaction.[16] Leadership development programmes have been shown to provide important opportunities to improve quality of health care by:

- enhancing the organisation's educational and development activities;
- increasing the competency of health workers;
- improving health worker satisfaction and reducing staff turnover; and
- focusing organisational attention on specific strategic priorities.[17]

The greatest contribution of leadership is in managing the context, the staffing and the resources required to deliver effective care.[16]

Against this background of the relationship between leadership and quality of care, the primary emphasis of the DCST induction and orientation programme was to both build the leadership effectiveness of DCSTs and enable DCSTs to contribute to leadership effectiveness in their respective districts. The model of leadership development adopted was based on collaborative leadership, in appreciation of the need to enhance the capacity and unlock the potential of all people within the health system to contribute to the vision and mandate of the health sector.[18]

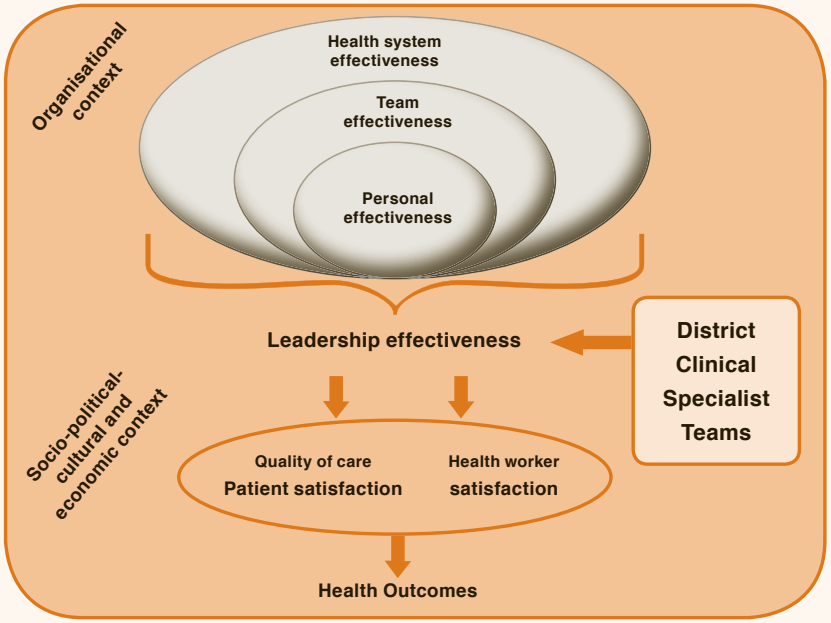
The conceptual framework depicted in Figure 2 shows the relationship between leadership effectiveness, quality of care, and health outcomes.[19] Leadership effectiveness is seen to comprise personal, team and health system effectiveness. Personal, team and health system effectiveness are seen as self-standing entities, but also as influencing each other, and influenced by the organisational context, which needs to be analysed to identify potential areas of required change. Leadership effectiveness contributes to the quality of care, as well as to patient and health worker satisfaction, which in turn contribute to health outcomes. Both quality of care and health outcomes are influenced not only by leadership effectiveness, but also by the socio-political, cultural and economic contexts, which should be analysed and well understood.

Towards enhancing leadership effectiveness, the learning outcomes of the induction and orientation programme covered clinical, public health, health systems, leadership, and management competencies. The learning outcomes planned for each session of the induction and orientation programme spanned individual and team learning. In content, the induction and orientation programme largely aimed to address technical competencies, while in methodology, it largely aimed to address process competencies; develop the capacity of DCSTs for context-specific responsiveness; promote an organisational culture based on trust, supportive mentoring and supervisory relationships, clinical governance and accountability; and promote collaborative leadership.[18,20]

Developing the induction and orientation programme

Action learning was adopted as a relevant adult education methodology for leadership development of the DCSTs and to equip the DCSTs to coach and mentor others.[18,21,22] Action learning is: based on a problem, task or issue; occurs within a small group or team faced with the same problem or task or issue; promotes

Figure 2: Conceptual framework underpinning the DCST Induction and Orientation Programme



Source: Voce, 2011.[19]

collaborative learning, activating prior knowledge and tapping into intrinsic motivations for learning; requires action, followed by critical questioning and reflection; contributes to further action; and is facilitated by an "action-learning coach".[23] Action learning, as an adult education methodology, enables the resolution of complex problems while facilitating learning at the individual, team and organisational level.[23]

Several challenges required resolution in the development of the curriculum. The challenges encompassed the scope of the learning outcomes, the diverse background of DCST members, the varying composition of teams, untested roles of the DCSTs, and the differing contexts within which the teams would need to operate. These challenges contributed to an iterative curriculum development process.[24]

With regard to the scope of the learning outcomes, the DCSTs were required to develop and enhance competencies in: the clinical sphere; clinical governance and quality assurance; health system leadership and management; monitoring and evaluation; adult education and adult learning; team effectiveness; and health systems research. The complexity of the curriculum development task was exacerbated by the diverse background of the DCSTs. This diversity lay not only in the professional background of DCST members, but in their experiential background, with some members being steeped in purely clinical roles, while others had been immersed in administrative or programme management roles. Furthermore, the full complement of DCST membership was not achieved in any district, with DCST teams comprising between two and four members, and with a dyad present in only a small proportion of districts. In addition, DCSTs were operating in varying contexts: some with more and others with less acceptance and support by district management; some well integrated with district maternal and child health programmes, and others less so; some with supportive specialists in referral hospitals and others with fewer or none; and some DCSTs being better resourced than others.

In order to respond effectively to this diversity, a multidisciplinary team of facilitators designed, implemented, reflected on and refined the content and processes of the induction and orientation programme. The team comprised medical specialists and technical experts, public health practitioners, organisational development experts, leadership and management professionals and consultants, and Department of Health advisors and leaders. In KZN, the designers of the induction and orientation programme were responsible for its implementation. For expansion to the other eight provinces, RMCH/HST was required to train trainers, conduct pilot training, and following refinement, roll out the programme to the other provinces.

Structure and content of the induction and orientation programme

The induction and orientation in KZN was conducted primarily in two phases, comprising monthly workshops. Phase 1 was conducted over three months, comprising two workshops separated by several weeks of field-based work by the DCSTs. Phase 2 was implemented through nine three-day monthly workshops, dealing in parallel with topics in maternal, newborn and child health, and in leadership and health system management. Additional general topics were included at the request of provincial programme managers. Between workshops, DCSTs completed field-based activities related to the topics of the previous workshop, with feedback on their activities being incorporated into the subsequent workshop programme. The induction and orientation for the remaining provinces was implemented using a modular approach, covering five modules, through a series of six three-day workshops as follows:

- Module 1 Orientation – one national two-day workshop.
- Module 2 Baseline Assessment and Planning – two three-day provincial workshops.
- Module 3 Clinical Governance – one three-day provincial workshop.

- Module 4 Leadership mentoring and coaching – one three-day provincial workshop.
- Module 5 Integration of Health Services and Programmes – one three-day provincial workshop.

Participation in the DCST induction and orientation was broadened to include additional participants: district managers, district programme co-ordinators and provincial programme managers. The inclusion of additional participants was motivated by considerations of the DCST as a new professional introduced into the district health system, and the concomitant need for role definition, clarification, distinction and negotiation in relation to existing district health system structures, as well as the need to develop partnership and support networks.

In KZN, in addition to the workshops, on-site mentoring and coaching visits were conducted with DCSTs in between workshops. Different approaches to on-site mentoring and coaching were implemented with different DCSTs: one-day monthly site visits; issue-based site visits; and incorporation of DCSTs into site visits planned for strengthening implementation of programme priorities.

Early DCST achievements

Although it may too early to expect major changes in health system effectiveness and in health outcomes, as a result of the implementation of the DCST stream of PHC re-engineering, there are promising signs of movement towards the intended results. The Handbook for District Clinical Specialist Teams, produced by the National Department of Health, documents several case studies of early achievements.[8] Shared here are snapshots of the approach to implementation of the DCST roles, adopted by various DCSTs around the country.

Towards **improving the quality of clinical services**, the DCST in uThungulu District in KZN has described their experiences of helping to save the lives of women following obstetric haemorrhage. The obstetrician on the DCST was able to provide valuable support to clinicians in district hospitals to manage two women, one with severe antepartum haemorrhage and one with a postpartum haemorrhage following a difficult Caesarean section complicated by severe adhesions. In the management of both women, the district clinical obstetrician was able to provide specialist consultant support and propose simple yet effective techniques to manage the obstetric haemorrhage – for the woman with the antepartum haemorrhage, this involved the use of a balloon tamponade, and in both women, this involved the use of a tourniquet. Both patients underwent a life-saving subtotal hysterectomy at the regional referral hospital, and both women had prolonged hypovolemic shock, intensive care unit ventilation and further surgery to remove the abdominal packs. Following the successful management of these women, the DCST made several recommendations which included: processes for early consultation; swift decision-making and early action; measures to deal with skill gaps in district hospitals; making consultant specialist support more readily available; redistribution of doctors in district hospitals; including sessional doctors in training sessions on life-saving skills; and harmonising services.

Towards the **provision of training**, the DCSTs in Gauteng, as in other provinces, have been conducting training in Emergency Steps in the Management of Obstetric Emergencies (ESMOE). As part of this training, they have conducted a series of emergency obstetric "fire drills" with staff in facilities to assess their skills in the management of obstetric emergencies, test facility logistics and systems, and motivate staff to learn and apply their new knowledge. In the City of Johannesburg, fire drills have been conducted in 10 community health centres and in the district hospital every month since August 2012. Over 400 midwives and 25 doctors have been trained. As a result of the fire drills, an advanced midwife located in a clinic in Soweto was able to successfully use the posterior axilla sling traction procedure to deliver a woman who experienced severe shoulder dystocia during the delivery of her 4.4kg baby. Furthermore, midwives' experience of the fire drills has increased their confidence in management of breech deliveries, postpartum haemorrhage and cord prolapse. The DCSTs are providing much-needed skills and knowledge on how to deal with obstetric emergencies.

Towards the **provision of monitoring and evaluation**, DCSTs in KZN, as in other provinces, have conducted a situation analysis of maternal, newborn and child health services in their district. They have engaged with the District Health Information System (DHIS), and the quality of the data that is generated and captured at facility level and transferred to the district level. DCSTs have actively promoted the establishment of regular audit meetings, utilising the Perinatal Problem Identification Programme (PPIP) and the Child Problem Identification Programme (CPIP). Audit meetings have focused not only on identifying the causes of deaths and the avoidable/modifiable factors, but also on remedial actions that need to be implemented. A template for recording the minutes of the meetings ensures that actions identified in previous meetings will be reported on and evaluated in subsequent meetings.

Towards **supporting district level organisational activities**, the paediatrician in the Tshwane DCST reports that the appointment of a DCST comprising different specialists and a combination of doctors and nurses, has been a winning combination.[25] The paediatrician reports that the DCSTs are "bridge-builders", helping to link currently fragmented district and municipal level services, and promoting equal access to a continuum of care. Because of its location and broad job description, the DCST is able to promote networking and collaboration between all levels of the district health system, from community level to tertiary-level care. The DCST continues to work with vertical programmes with the aim of providing high-quality, integrated, client-centred services. Working with hospital and clinic managers has facilitated benchmarking and ensured evidence-based practice. To deepen the gains made to date, the health system should increase its responsiveness to the demands identified by the DCST and their supportive supervision.[25]

Towards **supporting health systems and logistics**, the Nelson Mandela Bay DCST in the Eastern Cape has worked with Emergency Medical Services (EMS) to reduce the unacceptably high ambulance response time for referral of a patient from a Midwife Obstetric Unit (MOU) to hospital. Based on information available to the DCST that only 3.3% of ambulances arrived within the expected one hour, and that the average response time is almost four hours,[26] the DCST conducted an in-depth analysis of the distribution, utilisation and equipping of obstetric ambulances, and of the referral practices in the district. The DCST established that: dedicated obstetric ambulances were not based at the facilities where they were needed; obstetric ambulances were being utilised for non-obstetric-related cases; obstetric ambulances were not fitted with adequate

medical equipment; referral routes were not well defined; and referral processes did not adhere to standard referral protocols. Following a meeting with EMS managers and personnel, a mutual understanding of the challenges and their effects was developed, as well as a shared strategy for resolving the problems. The solutions developed included:

- EMS personnel participated in MOU meetings, and EMS issues were included as a standing item on the agenda.
- A memorandum of agreement was adopted between MOU and the EMS documenting the agreed requirements, roles and responsibilities of both parties.
- Obstetric ambulances were mandated to remain on site and be used for obstetric emergencies only.
- Referral routes and referral protocols were redefined to ensure consistency and efficiency.
- The contact details of all parties (EMS management, MOU management and the DCST) were shared to enable rapid contact with the appropriate parties, to rectify any problems that arise.
- The requirement was implemented that an incident report be written and discussed for any delay longer than an hour.

These measures contributed to a reduction in the proportion of ambulance response times of longer than an hour, from about 12 in a month to one or none in a month, over a nine-month period in 2013.

Towards **ensuring collaboration and team work**, the DCST in Mopani District in Limpopo has promoted a process of appreciative enquiry which, together with other supportive and training activities implemented by the DCSTs, has contributed to a 50% reduction in maternal deaths and a 30% reduction in perinatal deaths between January 2012 and September 2013. The appreciative enquiry process has contributed to improving morale and teamwork, which has in turn contributed to these improved health outcomes. Appreciative enquiry is an action-reflection process usually facilitated by a DCST member, in which the facilitator asks the health service delivery teams to: discover what they are doing well in their work; imagine what they would like to achieve in their work; design actions to achieve their aims; and deliver, reflecting in subsequent meetings on what has been possible to implement in pursuit of their aspirations. The appreciative enquiry process has ensured that service delivery teams remain solution-focused rather than problem-bound, which has generated high morale, enthusiasm and capacity for action.

Reflections on the implementation of the DCST stream

The following are reflections on the implementation of the DCST stream of PHC re-engineering:

Stewardship

Clear political leadership and stewardship were demonstrated through the establishment of the Ministerial Task Team, and by its members, who thoughtfully considered recommendations for the implementation of the DCSTs as reflected in the final report of the MTT.[4] Furthermore, DCST progress and outputs have been monitored by the National Department of Health and reported to the National Health Council – the highest-level health reporting structure.

Of the three streams in PHC re-engineering, the DCST stream has been the most rapidly implemented, showing early successes and changes. However, as the stewardship for the DCST stream is devolved to provinces, adequate financing within provinces needs to be ensured to comply with the compensation agreements for the DCSTs, and for further recruitment to vacant posts, especially in rural and under-resourced areas. Furthermore, ongoing financing needs to be provided to ensure that DCSTs have funding to perform their duties, and that the allocation to the DCST stream does not negatively affect district budgets.

Structure and co-ordination

The political leadership and stewardship demonstrated at the inception of the DCST stream must be intentionally sustained. Sustaining requires central national co-ordination, best achieved through the ongoing appointment of a National DCST Co-ordinator who would respond to provincial implementation challenges and constitute a central point for monitoring, feedback, reporting and support for the DCSTs. Furthermore, DCST co-ordination is also required within provinces. Provinces where co-ordination is strong, such as in Gauteng, KwaZulu-Natal and the Free State, have progressed at a faster pace than have those where the co-ordination may be weaker. At district level, co-ordination is required with other district-level programmes, in particular the MNCWH programme.

Induction and orientation programme

The introduction of new professionals into the health system was accompanied by a supporting induction and orientation programme, which enhanced the capacity of the teams to function in their role within the DHS. The induction and orientation programme provides a model for a rapid but effective national roll-out of a training package. The modular approach can be applied to other national training endeavours. An evaluation by the NDoH of the key components that led the successful implementation of the training of the DCST stream could inspire and catalyse principles and practices applicable to the school health team stream, and to the municipal ward-based outreach team (WBOT) stream. An effective induction and orientation programme supports the rapid implementation of a new policy direction. Towards supporting implementers to be more effective and efficient in making change, the induction and orientation must also comprise a clearly designed mentorship programme.

Mentorship

A substantive workshop-based induction and orientation programme for DCSTs was implemented in South Africa, with the implementation in KZN being supported by a limited, parallel on site mentoring and coaching programme.The limitations of only workshop-based learning in enhancing performance are well documented.[27] Effective, sustained DCST performance requires a complex interplay between the assimilation and application of new knowledge, skills and competencies, an ensuing change in practice, and sustaining the changed practice. The capacity for implementing and sustaining any change is context-bound[28] and requires effective leadership. Leadership is an emergent adaptive phenomenon,[29] associated with the interplay between leaders, followers and the prevailing

organisational and contextual dynamics. In order to deal with organisational and contextual complexities, DCSTs will need to refine and apply generic competencies in problem-solving, divergent and critical thinking, and in creativity and innovation. Mentoring and coaching, facilitated by provincial specialists in the longer term, can promote context-specific reflection, critical learning and transformation of leadership practices.

The induction and orientation training for DCSTs was a successful and useful endeavour, which warrants follow-up and enhancement for a time period of at least six months to one year post-training, accompanied by a mentorship and coaching programme. Consideration may need to be given to how the mentorship programme could facilitate the collaboration of DCSTs and multiple stakeholders operating at district level, particularly the MNWCH co-ordinators and managers, district managers and hospital Chief Executive Officers (CEOs).

Integration of the DCST stream

One of the core goals of PHC re-engineering is to develop integrated, efficient and well-supported PHC teams guided by and accountable to communities.[9,30] The implications of this extend beyond the functioning of PHC re-engineering teams, to existing team structures within the DHS responsible for public sector reform processes, including those driving the implementation of National Health Insurance and the quality improvement processes of the Office of Health Standards Compliance – all of which are critical for attaining and sustaining health system effectiveness, quality of care and improved health outcomes. Implicit in the PHC model for the DHS for South Africa[30] is the governance, leadership and management role of the district health management team, which holds overall accountability for district health service delivery. Towards fulfilling this role is the responsibility for ensuring integration of these three streams for effective PHC delivery, through coherent co-ordination, leadership and oversight.

Health systems readiness to implement the DCST stream

The DCST stream was introduced into, and expected to function within, an already weak DHS facing challenges in human resources, infrastructure, equipment and commodities. While some provinces have been able to commence implementation of the DCST stream rapidly, other provinces have experienced start-up challenges in recruitment and appointment of DCSTs. Some of the challenges include: lack of funding to appoint and support DCSTs, resulting from the absorption of available funds into the equitable share of the district health budget; lack of clarity regarding the roles and responsibilities of provinces in taking over the ownership of the DCST programme, resulting in slow integration of the DCST stream with the broader MNCH programme; inadequate number of clinical specialists, both medical and nursing; inadequate leadership among district managers to guide, support and manage DCSTs; and poor appreciation of the potential role-enhancement and relationships between DCST and specialists based at regional hospitals, which prevents collaborative functioning.

These health system-related challenges hamper the effectiveness of DCSTs. A synergistic intervention, using the induction and orientation programme to bolster the facilitation of health system readiness for the implementation of the DCST stream, may have averted some of these challenges. However, the health system challenges may yet be mitigated through the integration of plans and programmes by the DHS and MNCH Directorates at both national and provincial levels.

Recommendations

Drawing on these reflections, the following recommendations are presented:

- The National Department of Health should continue to advise and lead the consolidation of the DCST stream of PHC re-engineering.
- A National DCST Co-ordinator and provincial DCST Co-ordinators would contribute to the sustainability of the programme, by responding rapidly to DCST implementation challenges. Provincial DCST Co-ordinators need to work very closely with the provincial MNCWH managers and the provincial specialists.
- As the stewardship of the DCST stream is devolved to provinces, adequate financing within provinces needs to be ensured to support the ongoing appropriate appointment and employment of DCSTs, thus complying with the compensation agreements for DCSTs.
- There is need for DCSTs to have their own operational plans and budgets. These need to be linked to district MNCWH operational plans and preferably ring-fenced with the district MNCH budget. An integrated budget will eliminate implementation challenges related to lack of resources and will encourage accountability and integration.
- Provinces should develop plans for continued induction and orientation of newly appointed DCSTs, and should consider how to implement a mentorship programme to enhance DCST performance.
- Carefully devised strategies need to be developed for the integration of the three streams of PHC re-engineering at all levels of the health system. National, provincial and district-level steering committees may need to oversee the planning and implementation of integrated programmes.
- Recruitment and retention plans should be delegated to provinces and districts supported by human resource offices for better management and control.

Conclusion

The DCST stream of PHC re-engineering offers great promise towards the national endeavour of improving maternal, newborn and child health outcomes. As an initiative, it is underpinned by clear policy and strategic imperatives, and has the potential to advance the PHC agenda and to contribute to the strengthening of the District Health System.

Though only a small proportion of districts have a fully constituted DCST, district clinical specialists – as teams, as dyads (where these are present) and as individuals – are fulfilling key responsibilities towards improving the quality of clinical services. Based on a thorough situation analysis of MNCWH services in their respective districts, DCSTs have developed and are implementing plans

to improve the competencies of health workers, are supporting district-level organisational activities, are ensuring collaboration and integration between health services and programmes, and are providing strong clinical governance, supervision and leadership.

Measurable changes in health system effectiveness, quality of care and health outcomes are marginal and not yet consolidated. However, evidence is beginning to emerge of the important contribution of this stream of PHC re-engineering towards attaining the commitments expressed in the Negotiated Service Delivery Agreement.

Intentional, thoughtful planning and ongoing strategising must continue to support the co-ordination of the DCST stream to ensure its consolidation, and its integration with other endeavours to strengthen the primary health care agenda in South Africa.

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School health in South Africa: reflections on the past and prospects for the future

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School health has received unprecedented attention in South Africa over the past five years, evolving from relative obscurity into a national priority programme. This elevated status of school health was marked by the launch of a new Integrated School Health Policy (ISHP) in October 2012, which replaced the first National School Health Policy and Implementation Guidelines of 2003.

However, school health is a complex programme. It addresses multiple health needs of school-aged children across an age-span of 12 years and encompasses many different kinds of health interventions. Its successful implementation is dependent on the integral collaboration of multiple sectors, and manifold levels and components of the health system – a feat that requires skilful management and leadership.

This chapter examines the past performance and future prospects of the South African school health service, and considers its design and intentions against international models of school health services. The chapter considers the many requirements for effective implementation of the ISHP and posits that, without significant strengthening of the management and leadership infrastructure, the resource base and the staffing, school health implementation will not progress satisfactorily, despite the favourable political and policy reform environment.

School health is a complex programme. It addresses multiple health needs of school-aged children across an age-span of 12 years and encompasses many different kinds of health interventions.

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Introduction

School health has received unprecedented attention in South Africa over the past five years and has consequently evolved from relative obscurity into a priority programme on the agendas of both the Department of Health (DoH) and of Basic Education (DBE). In the Department of Health, school health is one of three priority streams in the re-engineering of Primary Health Care (PHC). In the Department of Basic Education, progress with school health now forms a regular part of the DBE annual report.

This elevated status of school health was marked by the launch of a new Integrated School Health Policy (ISHP) in October 2012,[1] which replaced the first National School Health Policy and Implementation Guidelines of 2003. The ISHP was jointly endorsed by the Ministers of Health and Basic Education, and officially launched by President Zuma, reflecting the high level of political priority that this policy enjoys. At the launch, all the major education bodies, including teacher unions, national governing bodies and principal associations, expressed strong support for the policy.

The renewed focus on school health is not unique to South Africa. A recent global review of school health services commissioned by the World Bank indicates that, across countries of all income levels, the dual role of school health in contributing to both the health and education status of children has been recognised.[2] Consequently, significant efforts are being made to develop and strengthen school health services globally.

However, school health services are complex, as they are offered across a wide spectrum of age groups, encompass many different kinds of interventions, and require integral inter-sectoral collaboration. The exact definition, scope and contribution of school health still require clarification. In the World Bank review, the contribution of school health is defined as: helping children to enter school at the right age by addressing health barriers to school entry; helping children to stay in school until completion; reducing absenteeism due to health reasons, and contributing to educational performance by minimising health barriers to learning.[2]

The World Bank review further indicates that, while school health had previously been primarily a Department of Health initiative, the Departments of Education in many countries now recognise the link between health and educational performance, and regard the health of the children they teach as an essential part of their responsibility. School health therefore contributes to the 2015 agenda for the Millennium Development Goal (MDG) of ensuring better health and education for children, as well as the World Education Forum agenda of Education for All (EFA) by 2015. School health also has a significant gender element, as it is well recognised that addressing specific health issues that affect girls can contribute to their enrolment and retention in school.

In South Africa, school health concerns the health and well-being of approximately 12 million school going children.[3] For these 12 million children, the South African Constitution, in Sections 28 and 29 of the Bill of Rights, entitles them with the right to: basic health care services; basic and further education; basic nutrition; and social services.[4] Defining how school health can contribute to attainment of these health and education rights of school-aged children, and the collaborations required to give full effect to these inter-related and indivisible Constitutional obligations, are important. This chapter aims to contribute to this discussion.

Fifteen years ago, the South African school health service typically encompassed a set of health service interventions led by the Department of Health that included health screening assessments, health promotion, preventative interventions such as vaccinations, and environmental health assessments of schools. Since then, two integrally linked initiatives have been added to the role and potential scope of school health:

- the Health Promoting Schools (HPS) concept introduced in South Africa in the late 1990s, that advocates for schools in all their facets to become sites of health promotion for learners, educators and the broader school community;[5] and
- the DBE initiative of Care and Support for Teaching and Learning (CSTL) adopted in 2008, which goes further by providing a framework for addressing all the dimensions – including the health – of schoolchildren's lives that enable them to enrol at, stay in, and complete school successfully.

This chapter expands on these definitions and applications of school health, and provides an overview of school health services and the ISHP in particular: its evolution and current implementation progress. The framework of the chapter covers:

- an orientation to school health by:
  - providing a profile of South African school-aged children in order to better understand the needs of the beneficiaries who require a school health service;
  - describing the South African school health service and relating it to international models of school health;
- a short history of how school health evolved from relative obscurity to its current priority programme status;
- an analysis of the growing inter-relationship between the Departments of Health and Education;
- analysis and key achievements of progress with the ISHP implementation; and
- future considerations for implementation of the ISHP.

The reflections in this chapter are drawn from: recent evaluations of the 2003 school health policy implementation; international analyses on school health, in particular the World Bank review in 2011 that examined school health in more than 50 low- and middle-income countries; and the experience of the authors with the development of school health policy and its implementation over the past two decades, including recent efforts in rethinking some of the ISHP requirements.

Demographic and health profile of South African school-aged children

School-aged children, ranging between ages 6 and 18, fall in the "middle" of the lifecycle continuum, between the early childhood period and young adulthood.[6] In South Africa, school enrolment and attendance is high in the primary school years.[7] Well-executed school health service interventions can therefore achieve a high

impact for these children, who spend approximately 200 days and a 1 000 hours in school each year.

Dropout rates increase among secondary school learners, especially after the age of 15, to the extent that 20% of 18-year-olds are out of school.[7] While socio-economic and education-specific reasons account for the majority of children who drop out of school, an estimated 7% and 6% of children leave school for reasons of health and disability respectively, and 13% because of pregnancy.[8] This emphasises the potential contribution of school health services to keeping children in school. Of note is that approximately 300 000 children of school-going age are not enrolled in school and would not derive benefit from a school health service.[9]

The socio-economic circumstances of the majority of schoolchildren are not optimal. According to the recent Child Gauge, half of all children live in three of the country's poorer, more rural provinces of the Eastern Cape, KwaZulu-Natal and Limpopo.[9] Almost 60% of schoolchildren live in income poverty. Almost one in five children in the Eastern Cape, and one in three in the Northern Cape, reportedly live in a household where child hunger has been reported. Unsurprisingly, almost 16% of children who enter school are stunted, some severely so, such that their ability to perform academically is already significantly compromised. In the General Household Survey of 2011, which focused on schooling, a reported 10.7 million learners received meals at school, with 9 million of these indicating that they received food every day – emphasising the role of schools as sites of care and support to children.[7] While the majority of children are able to access schools within half an hour of travel, at least a million children have to travel more than half an hour across dangerous and difficult terrains that expose them to potential drowning, pedestrian accidents, or violence and sexual assaults.

Age, gender and cause-specific data on the physical health status of school-aged children in South Africa are not readily available. Routine data on school health, until recently, have not been collected consistently.[10] In the 2011 General Household Survey: Focus on schooling, 38% of learners reported health-related absenteeism, but the nature of these illnesses is not known.[7] Nonetheless, the available data provide some insights into the health conditions of schoolchildren that require a health service response.

Oral health problems and skin infections are the most commonly reported health problems in school-aged children in South Africa.[10] Oral health problems manifest as dental caries and the associated dental pain and sepsis, with poor oral hygiene and bad diet as the underlying causes. Approximately 60% of six-year-olds have dental caries and almost 70% of children with caries miss school as a result of dental pain or sepsis, and/or live with daily dental pain.[11] The prevalence of dental caries is as high as 87% in some provinces.[12] Beyond oral health and skin problems, school nurses report social problems and lack of healthy and sufficient food (highlighting the need for addressing the social determinants of health), with the next most common problems being refractive error and wax in the ear.

On average, 2.5% of children experience refractive errors and require corrective glasses.[13] The prevalence of refractive error is relatively low at school entry, set at 1.9% among 5-year-olds, and peaks to approximately 9% in 15-year-olds.[13] Screening for refractive error is therefore more appropriate and cost-effective in older age groups.

Hearing loss (defined in South Africa as a loss of hearing greater than 25 decibels) ranges from 2% for permanent hearing loss that requires assistive hearing devices, to 14%[14-16] where hearing loss is transitory and due to treatable middle-ear infections or wax impaction.

Little is known about the extent and nature of chronic health conditions in school-aged children, or the extent to which these as well as acute health problems affect their ability to attend and perform in school. An estimated minimum of 15% of children have a chronic health condition.[17] Asthma reportedly affects more than one in every 10 children. Current estimates indicate that approximately 2.4% of children between the ages of 2 and 14 are living with HIV and up to 7.1% of young people between 15 and 24 years of age, a proportion who would still be in school, live with HIV'.[18] Having a chronic health condition means that children may have to take regular medication while in school and may miss a few days of school each year due to flare-up of their illness, or having to attend a health facility. The proportion of children with disabilities is not accurately known, but surveys estimate moderate to severe disability in the school-aged groups at 3.2% for the 6- to 10-year-olds, and up to 4.1% for the 16- to 20-year-olds.[19,20] Childhood conditions, such as overweight and obesity, that predispose children to future chronic illnesses in adulthood are a growing global concern. The prevalence of overweight and obesity is significantly higher in girls than in boys: 16.5% and 7.1% compared with 11.5% and 4.7%, for girls and boys respectively.[21]

Mortality in school-aged children is relatively low as compared to mortality in children in the birth to 5-year age group. The main cause of mortality in the 6- to 18-year-old age group is injury, both accidental and non-accidental. In teenage boys, homicide is an important cause of death, with increasing rates of teenage suicide reported in recent years.[22]

Concerning youth "risk-behaviour", various kinds of substance abuse and gang membership among teenage boys are the common concerns.[7,23] Among teenage girls, concerns centre on the prevalence, complications and sequelae of teenage pregnancy. This Youth Risk Behaviour Survey showed a 1% reported pregnancy rate among schoolgirls, with just over 51 000 having given birth to a live infant in the 12 months preceding the study. Excluding those who terminated their pregnancies, a significant number of girls – more than 4 000 – had lost their babies either during pregnancy or after birth.[23]

It is clear from the issues described in the preceding section that prevention and health promotion is the mainstay of the health service response for the kinds of health problems that emerge in schoolchildren, notwithstanding the need to support children with unavoidable chronic health conditions. It is also clear that many of the health problems that affect schoolchildren have their genesis in social determinants of health and would not be solved through health-specific interventions alone.

The next section examines the South African school health service and its response to these health requirements of school-aged children, in the light of how school health has evolved internationally.

The South African school health service

History

School health services in South Africa have been in place for almost a century. As early as the 1920s, the value of school-based nutrition schemes and the potential impact on children's health and educational performance resulted in the provision of school feeding schemes to poor white children.[24] Unsurprisingly, it took a few decades before these interventions were extended to children of other "classified race groups". Throughout its history, the South African school health service took the form of a school-based outreach service led by the Department of Health. Beyond the initial focus on nutrition, school health services later provided vaccinations and health screening assessments for vision and hearing problems to schoolchildren.

The provision of school health services remained differential in quantity and quality along racial, socio-economic and geographical lines throughout the apartheid period. Schools located in urban "white" areas maintained a consistently good quality of school health services, while the other spectral extreme of rural, homeland-based black children received no, or infrequent, services of indifferent quality.[25-28]

The school health service operated as a vertical programme alongside other similar programmes. This meant that it was delivered by nurses who were allocated exclusively to school health and who were managed through vertical school health structures. School health services under the various health administrations of the time also operated differently.

In an attempt to ameliorate these inequities and structural inconsistencies of the school health service, the first National School Health Policy and Implementation Guidelines were developed and released for implementation in 2003.[29] The development of this policy took six years, and involved extensive consultation of approximately 400 participants across several sectors and institutions country-wide.[30-33]

The 2003 National School Health Policy and Implementation Guidelines aimed to:

- address the prevailing inequities in school health service provision;
- integrate the vertical school health service into primary health care services, in keeping with national policy to move towards comprehensive integrated service provision at district level;
- create a uniform school health service; and
- develop norms and standards for good quality school health service provision.

However, many factors laid waste these policy goals, as demonstrated in two evaluations of the 2003 school health policy performance, one national and one conducted in two provinces.[10,34] In both of these evaluations, the picture that emerged was a deprioritised school health service with universally poor coverage, that was inadequately resourced, poorly understood and largely unsupported by managers across all levels of the health system.

Two sets of factors contributed to this poor policy performance:

- systemic factors such as the immaturity of the district health system, general nursing staff shortages and relative lack of referral services; and
- school health-specific factors such as poor relationships between key stakeholders, in particular the Departments of Health and Education; poor relationships between parallel health initiatives aimed at schools, namely that between health-promoting schools and school health; a lack of transport for this community-based outreach service; and poor managerial understanding of, and support for, the school health service.

These factors led the school health nurses to describe the school health service as the "stepchild of primary health care programmes".[10]

The only successful policy goal was the integration of school health into the managerial and service delivery structures at district level.

Recent developments

The failure of the 2003 policy implementation prompted a rethink of school health. In 2009, school health received renewed attention with the introduction of new health and basic education policy reforms. In the same year, the newly appointed Minister of Health prioritised the achievement of universal health care for all citizens through the introduction of National Health Insurance (NHI). He simultaneously announced the Re-engineering of Primary Health Care Strategy to bolster district-level health services in preparation for the NHI implementation.

Three priority streams were identified in the Re-engineering of Primary Health Care Strategy: school health, establishing ward-based outreach teams (WBOTs) and district clinical specialist teams (DCSTs). At the same time, several global and national imperatives refocused attention on maternal and child health. These included the Millennium Development Goals, and the expansion of HIV testing and treatment to all South Africans. School health was a potential vehicle for contributing to the achievement of these broader policy goals and in particular, sexual and reproductive health emerged on the school health agenda for the first time.

School health has also received strong attention within the DBE since 2009. The Minister of Basic Education focused on school health in her budget speeches and specifically called for the extension of Grade 1 school health assessments to all Quintile 1 and 2 schools. In keeping with international trends, the DBE extended its mandate through several policy initiatives beyond the academic terrain, in order to integrally support learners in all facets of their lives. Notably, the adoption of the CSTL framework provides for a multi-sectoral response, co-ordinated through the DBE, to address children's well-being through nine key areas of intervention (Figure 1).

Figure 1: The Care and Support for Teaching and Learning Framework

Source: Department of Basic Education, 2012.[3]

The Health Promotion priority area of the CSTL provides the point of intersection for the school health and health-promoting school programmes. Defining the respective roles and contributions of each of these three initiatives, and ensuring their effective and synergistic co-ordination, is essential.

The Departments of Health and Education aptly joined hands in initiating the development of a new school health policy, through which they could leverage the advantage of the favourable policy environment in which school health could flourish, and use the opportunity for "rethinking school health" in line with international initiatives. Hence a new Integrated School Health policy (ISHP) was developed. The ISHP enjoys the strong support of the Presidency, as evidenced by the explicit call in the President's 2010 State of the Nation address for the reinstatement of school health programmes and the launch of the ISHP in October 2012.

Policy transition: 2003 National School Health Policy to 2012 Integrated School Health Policy

It is important to reflect on the policy transition from 2003 to 2012, as this supports an understanding of some of the policy decisions that are reflected in the ISHP. The analysis of this policy transition draws on the policy triangle framework that recommends the consideration of four dimensions when conducting policy analyses: the policy context, its content, the policy process and the policy actors.[35]

Table 1 summarises the key similarities and differences between the two policies.

Table 1: Key differences in the 2003 and 2012 National School Health Policies

	2003 National Policy	2012 National Policy
Political support	Limited support and resource allocation to school health at a political level. Minimal media attention.	Strong. School health has featured consistently in the State of the Nation address since 2010. President launched the policy in October 2012. Strongly supported by Ministers of Health and Basic Education who co-signed the policy. Support from various national education, union and school governing bodies at the launch of the 2012 policy. Much media publicity, especially on sexual and reproductive health aspects.
Context	One of many child health policies developed in the post-apartheid period, and relatively low priority compared to other child health issues. Fledgling district health system with many challenges.	School health is one of the priority streams of health policy reforms. Strong efforts in the Department of Education to set in place frameworks and policies that contribute to the promotion of schoolchildren's health.
Relationships		
Between sectors	Tri-sectoral policy task team, with health the only active member.	Tri-sectoral policy task team, with Health and Education as active partners. Social Development Department is less involved.
Between health programmes	Inadequate co-ordination in particular between school health and health-promoting schools.	Co-ordination between health programmes not yet optimal.
Leadership capacity	National and provincial school health co-ordinator positions largely vacant for first five years of implementation.	Designated national, provincial and district school health persons in Health and Education largely in place.
Health service package		
Health assessment	Mainly for Grades 1 and R, roughly a million learners per year. Stated that disadvantaged schools must be prioritised, but not done in a structured way.	Expanded to one year in each educational phase, Grades R/1, 4, 8 and 10. Close to 4 million learners per year. Initial emphasis on schools classified socio-economically into Quintiles 1 and 2, representing the most disadvantaged learners. Anaemia and TB screening added.
Health promotion	Across all grades, but primarily in primary schools.	Across all grades. New focus on sexual and reproductive health, and risk behaviour in secondary schools. The provision of sexual and reproductive health services in schools requires the explicit permission of individual school governing bodies.
Prevention and Clinical care	Deworming. A Tetanus and Diptheria (tD) vaccine introduced six years into the implementation period for 6- to 12-year-olds	Deworming and the tD vaccination. Contestation on the provision of contraception in schools. The HPV vaccine for 9-year-old girls commencing in 2014.
Psychosocial and Mental Health	Mental health assessments to be introduced only if provinces had the necessary capacity.	Psychosocial and mental health assessments now a requirement.
Chronic diseases	Mentioned, but no specific implementation direction given.	Identification and support of children with chronic diseases a required part of the service.
Interaction with school community, educators, parents and caregivers	Left to individual nurses and school health teams to negotiate this with schools, with mostly poor co-ordination between school health teams and schools. Multi-partner teams to be established at district level for co-ordinated planning of school-based interventions.	This is now more structured between Health and Education Community-based implementation teams in health and school-based teams required to work together. Multi-partner teams to be established at district level for co-ordinated planning of school-based interventions.
Key Resources		
Staff	Districts had to fund school health posts entirely out of existing budgets. Staff support and training left to districts.	National grants have been made available to support the recruitment of additional nurses for school health. Standardised training manual for nurses and educators developed and initial training supported from the national level.
Transport	Mostly shared with other outreach services and often unavailable for school health.	Mobile vehicles equipped for eye, dental and general primary-level care provided to 10 National Health Insurance pilot sites, specifically for school health services. Providing transport incumbent on other districts.
Monitoring and Evaluation	Done poorly, with inappropriately aggregated indicators.	Indicators still under construction.

Source: Shung-King, 2013.[36]

The two policies were developed in very different health system contexts. The 2012 ISHP, in terms of both the high-level support and the positive advances in the district health system, probably has the most favourable implementation environment in the history of school health. The largest contextual "game-changers" are the integral involvement of the DBE in the ISHP implementation, the passionate advancement of the school health agenda by the Minister of Health, and the recognition of school health as a national priority programme in the Presidency. These conditions can potentially convert this "stepchild of primary health-care programmes" into a vibrant intervention. The involvement of the Department of Social Development (DSD), as an important third partner to the DoH and DBE, requires strengthening, as they have a crucial role to play in supporting children who experience psychosocial problems.

In terms of the policy content, the number and scope of the 2012 ISHP service package interventions increased exponentially in comparison to those covered in its 2003 predecessor: health screening assessments increased in number and were extended beyond Grade 1 to three additional grades; sexual and reproductive health interventions were added, and the new ISHP has a greater focus on psychosocial and mental health.

Amidst all the interventions, mass screening is still the most substantial activity. Of importance is that mass screening is subject to a set of international criteria, and a good mass screening programme should adhere to these standards.[37,38] Two important criteria pertaining to the school health service are the prevalence of the health condition and the ability to respond to the conditions that are detected. Currently, referral services are not readily available, and the available routine information on school health does not reflect whether children have been adequately managed by referral services.[10] The expansion of mass screening to three additional grades poses a huge challenge from both a service planning and an ethical viewpoint. This chapter cautions that the implementation requirements of the new ISHP are ambitious and, unless matched by concomitant resources and a functional referral system, might undermine the laudable intentions of the ISHP.

Whilst the newly added HPV vaccine, which is expected to be delivered through the ISHP, is welcomed, this programme could drain the already struggling school health service. Alternatives for delivery of this intervention without burdening or undermining the other ISHP services must be considered.

Importantly, the ISHP made its equity intentions very explicit by requiring that the initial implementation focus on schools classified into the two poorest quintiles, whilst not losing sight of the ultimate aim being universal coverage of the service.

Comparing the new ISHP to international trends in school health

In 2011, the World Bank review, which drew on years of experiences with school health service provision in a number of developed countries and examined more recent developments in school health services in over 50 low- and middle-income countries, highlighted many interesting findings on the structure and functioning of the service.[2]

Two main models of school health service provisioning emerged across different countries: a school-based model and a community-based school-linked model. The most common is a school-based model that takes two main forms:

- a school health service based permanently at the school and primarily run by a nurse who is allocated to that school;
- an outreach service that visits schools on a periodic basis and is akin to the current South African model.

The second model is a service specifically aimed at schoolchildren, but based at a site within the community. This model is commonly adopted for the sexual and reproductive health component of school health services, for which adolescents may prefer a service that provides better privacy, or for which the service is not acceptable to parents as a school-based service.

A third model, which is relatively unique, is an educator-driven service operating in the state of Chandigarh in India, where educators are trained on basic healthcare interventions and are provided with a school kit, including a manual and first aid supplies. These trained educators assist learners with basic health problems and refer them to health facilities as required. [39]

Across countries, school health services provide a range of interventions, from screening for conditions that may cause barriers to learning, to health promotion on various topics and disease prevention such as vaccinations and deworming, and from sexual and reproductive health services, including pregnancy testing and treatment of sexually transmitted infections, to the treatment of minor ailments by school health nurses. Japan, which has one of the best-equipped school health services, started off with only a deworming programme and now has a school-based service provided by a "hybrid" service provider trained in both nursing and education. This service is supported by a doctor and dentist on a regular basis. In the United Kingdom, the emphasis on screening is decreasing, with increasing emphasis on health promotion and education, in particular to secondary schoolchildren.[a]

The review indicated that school health services that are more focused, with fewer interventions, appear to have greater success. The review further revealed a general shift away from mass screening towards an increasing emphasis on health promotion and prevention. Available costing shows that specific interventions such as deworming programmes may be substantially cheaper when delivered through the educational platform, in contrast to provision through health teams, but sound economic evaluations of school health services are limited.

The lead government departments responsible for school health differ across countries, with health assuming the primary responsibility in some and education in others. On this matter, the review emphasised the need for close collaboration between health and education, regardless of which department led the service. It further stressed the integral role that educators could play in school health service interventions.

The review also highlighted many challenges with modes of delivery, resource constraints, and inter- and intra-sectoral relationships that are not dissimilar to those experienced in South Africa.

While the international studies yielded interesting lessons on models of service provision, the available literature has shortcomings. The main deficiencies are the largely descriptive nature of the research,

a Personal Communication: Professor David Hall, retired paediatrician, author of Child Health for All, October 2013.

with few full-scale evaluations of how school health services influence child health outcomes. Even more problematic is the absence of demonstrable links between health-specific interventions in schools and educational outcomes, and this area requires further research. At times the evidence is also conflicting, specifically with regard to the issue of deworming; some studies suggest a clear benefit, whilst a more recent Cochrane review shows little or no benefit from indiscriminate mass deworming programmes.[40] The lessons should be interpreted in cognisance of these shortcomings.

When considering the ISHP against international trends, the following emerge:

- The strong focus and involvement of the DBE in the ISHP is well in keeping with international trends. In fact, the integral involvement of educators in aspects of the ISHP service provision could be explored more substantially in the ISHP implementation.
- The inter-sectoral approach between health and education is desirable, necessary and in keeping with international thinking.
- The range of interventions contained in the ISHP is in keeping with the range of interventions described in international models, but requires greater focus and prioritisation. International trends suggest that fewer and more focused interventions would fare better.
- The significant increase in screening activities appears contrary to international trends, wherein screening activities are minimised in favour of stronger health promotion and education foci.
- Sexual and reproductive health services in schools appear to be provided more readily in a number of countries, whereas in South Africa, the permission for these services may be withheld by school governing bodies. South African adolescents are more reliant on clinic-based sexual and reproductive health services.

The South African ISHP therefore contains both favourable and potentially constraining elements when compared to international school health practices.

Progress with the ISHP implementation

This section provides an overview of progress made with the ISHP implementation since the launch of the policy in October 2013 and examines both structural and performance parameters.[b]

The implementation of the ISHP still focuses primarily on conducting Grade 1, and to a limited extent Grade 8, health assessments. School health teams administer Td vaccines and as of 2014, are also responsible for the provision of the HPV vaccine. Health promotion activities are fitted in where possible, and sexual and reproductive health services mainly take the form of some health promotion and education. The provision of a full suite of sexual and reproductive health services is determined by school governing body approval in individual schools, and not all schools have functioning structures in place to facilitate this. Most of the other required interventions are not yet active. Service coverage levels thus chiefly reflect the extent of provision of Grade 1 and Grade 8 health assessments.

b This update on the status of the ISHP implementation is based on: Department of Health data on coverage and staffing; recent engagements with the ISHP implementation by the authors; a baseline assessment of the ISHP implementation in 22 districts conducted by the 'Reducing Maternal and Child Mortality through Strengthening Primary Health Care' (RMCH) initiative (Baseline Assessment on School Health in 25 Districts in South Africa. Reducing Maternal and Child Mortality through Strengthening Primary Health Care (RMCH), October 2013).

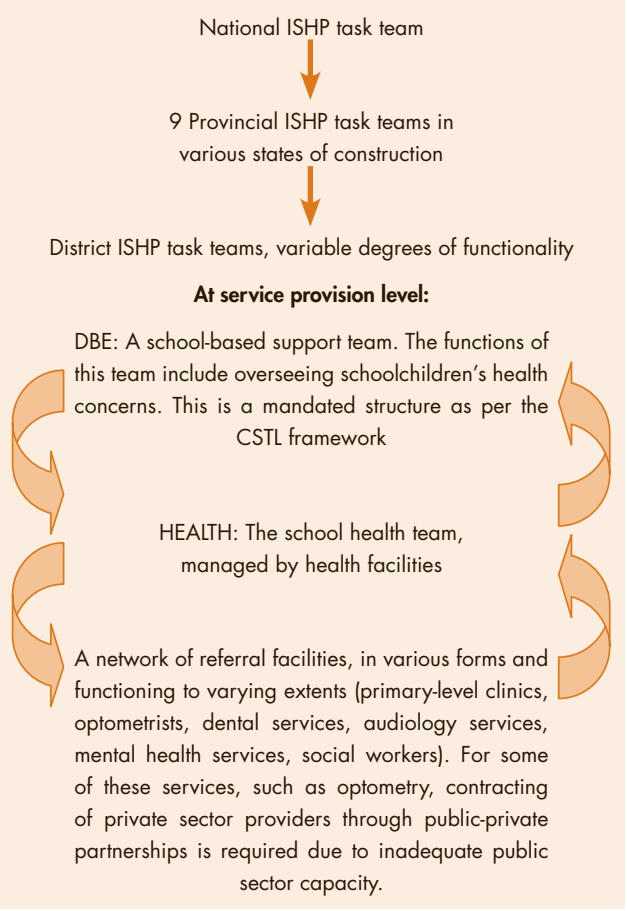
Management and co-ordination of the ISHP

Important strides have been made in setting structures in place at national, provincial, district, health facility and school level to support the management, co-ordination and implementation of the ISHP (see Figure 2). While not yet fully functional, of importance is the presence of health and education officials in these structures, which indicates a growing relationship between these two crucial sectors.

At a national level, an inter-sectoral ISHP task team is responsible for the overall planning and development of the ISHP, and for the provision of implementation support to provinces and districts. Each provincial health department has a dedicated co-ordinator for school health. There is an equivalent person in the DBE, but in a number of provinces this person has multiple responsibilities beyond health. Similarly, many but not yet all districts in both health and education have district ISHP co-ordinators in each department, although the DBE district co-ordinators are not exclusively allocated to school health.

At service-provision level, the school health team liaises with a school-based support team which co-ordinates all matters in schools, including health, that concern learners.

Figure 2: Organisational structures responsible for school health, South Africa



Since 2012, each province has produced an annual ISHP implementation plan and some provinces have five-year plans in place to guide ISHP activities.

Notwithstanding the progress demonstrated by these ISHP inter-sectoral structures, high-level political and decision-making mechanisms should also be in place to ensure the ongoing prioritisation and sustained resourcing of the ISHP.

Staffing and service coverage

Staff numbers and composition

Provinces allocate teams according to the required norm of one team to 2 000 learners who require a health assessment. Each team should have a professional nurse and an assistant.

Since the launch of the ISHP, all provinces have made progress in appointing school health teams, prioritising service provision to Quintile 1 and 2 schools in the initial implementation period. As indicated in Table 2, with the exception of Mpumalanga, provinces have sufficient numbers of teams to cover Grade 1 assessments in Quintile 1 and 2 schools.

With the exception of the Western Cape, Gauteng and KwaZulu-Natal, all provinces have a significant shortfall of teams to expand the screening assessments to Grade 8, and only the Western Cape has a sufficient number of teams for all four grades.

Even where there is a sufficient number of teams, the distribution and composition thereof is not uniform throughout provinces. In certain districts, a team may consist of a professional nurse assisted by several community health workers. In another, the "team" consists of only a professional nurse. In one district, for example, a team consisting of a professional nurse, aided by several community health workers, serves 10 schools. In another district, a single team serves in excess of 50 schools. This situation inevitably leads to inequitable coverage and quality of the services and in this respect is not dissimilar to the performance outcomes of the 2003 policy.

The current staffing norm does not fully take into account the many additional health activities required by the ISHP. The full set of requirements of the ISHP includes:

- managing and leading the school health team;
- co-ordinating the service across sectors;
- ensuring good linkages between the ISHP, clinics, referral services and schools; and
- implementing the ISHP interventions.

These activities are all crucial to the success of the ISHP but fulfilling them requires additional capacity. At present, professional nurses mostly conduct screening for health assessments, a task that does not require a high-level professional qualification and could be undertaken by well-trained alternative staff members such as community health workers. This would free the professional nurse to execute management and leadership activities, and the policy's more sophisticated service requirements. This task-shifting and redrafting of roles and responsibilities would have financial, training and recruitment implications and should receive due consideration.

Service coverage

Coverage of the service is reported on quarterly by districts. In 2013, provinces had to achieve targets of: 70% school coverage for Quintile 1 and 2 schools, 60% for Grade 1 learners in Quintile 1 and 2 schools, and 20% for Grade 8 learners in Quintile 1 and 2 schools.

Coverage levels for 2013 per province are reflected in Table 3. The coverage levels indicate that the ISHP implementation is not yet proceeding as envisaged. Nationally, fewer than half of all Quintile 1 and 2 schools have received the ISHP service. Only two provinces – Gauteng and the Free State – visited more than 50% of their Quintile 1 and 2 schools. The focus is still on primary schools, with limited coverage of secondary school learners.

Table 2: School health teams per province

Province	Number of learners in Quintile 1 and 2 schools					Number of school health teams	Required number of teams for Grade 1 learners	Required number of teams for Grades 1 and 8 learners	Required number of teams for learners in all four grades
	G1	G4	G8	G0	Total				
EC	113 083	89 502	75 763	69 520	347 868	60	57	94	174
FS	37 810	31 019	27 018	32 996	128 843	19	19	32	64
GP	52 052	37 857	34 003	40 462	164 374	58	26	43	82
KZN	134 902	102 725	104 243	111 806	350 951	148	67	120	175
LP	94 613	81 112	78 582	113 415	367 722	50	47	87	184
MP	78 673	61 834	67 491	70 979	278 977	16	39	73	139
NC	13 934	11 634	9 720	8 403	43 691	6	7	12	22
NW	38 578	33 495	25 728	29 259	127 060	21	19	32	64
WC	27 789	21 963	13 161	12 729	75 642	45	14	20	38
Total SA	591 434	471 141	435 709	489 569	1 885 128	423	295	513	942

Source: National Department of Health, Maternal, Child and Women's Health Directorate, March 2014.

However, this is only part of the school coverage picture. In every quarter and across all provinces, significant numbers of schools that are not classified as Quintile 1 or 2 are also visited. In the first quarter, the number of schools visited was 2 013, of which 24% were schools classified into higher quintiles. The limited availability of vehicles for use by school health teams reportedly results in teams visiting schools nearest to their clinics, thereby reducing visits to Quintile 1 and 2 schools further afield.[c] While learners from poor socio-economic circumstances may be enrolled at schools in higher quintiles, the intended focus of the ISHP in the initial implementation period was to be on schools that are located in the most disadvantaged areas.

The Table 3 also illustrates significant differences between school coverage and learner coverage rates, and indicates that even though school health teams visit schools, not all eligible learners benefit from the ISHP interventions. This demonstrates the importance of using both school and learner coverage rates to assess progress in providing access to the ISHP interventions.

The discrepancy between the number of school health teams to conduct visits to Grade 1 learners in Quintile 1 and 2 schools as shown in Table 2, and the relatively low coverage of these learners as shown in Table 3, requires further investigation.

Table 3: Projected[d] annualised ISHP coverage per province for 2013/14 financial year

Province	Projected school coverage of Quintile 1 and 2 schools Target 70%	Projected coverage of Quintile 1 and 2 Grade 1 learners Target 60%	Projected coverage of Quintile 1 and 2 Grade 8 learners Target 20%
EC	24	12	5
FS	65	45	40
GP	88	62	62
KZN	49	36	13
LP	49	48	12
MP	24	29	5
NC	36	27	11
NW	29	19	33
WC	44	29	0
Total SA	40	32	15

Source: National Department of Health, Maternal, Child and Women's Health Directorate, March 2014.

c Personal communication: National Department of Health official, 17 March 2014.

d Coverage levels are provided by quarter. Data obtained from the DoH contained coverage levels for quarters 1-3 for 2013, with the exception of Gauteng where data were available for quarters 1 and 2 only. Based on the quarterly coverage levels, a projected annualised coverage was calculated and is reflected in the Table. Coverage levels for each quarter are calculated from the number of schools and learners covered, as a proportion of the total number of schools and learners that the ISHP should cover.

Staff training

Excellent training and supervision of, and support for, the ISHP staff are essential. School health teams across all provinces have been trained using a school health resource manual.

Further training should include:

- specific skills on health screening to ensure that children are correctly identified and referred;
- competence in health promotion, especially working with adolescents on sexual and reproductive health issues;
- basic training for educators on how to handle learners with health problems; and
- leadership and management skills for school health team leaders.

Transport and referral services

As indicated in Table 1, the lack of regular transport significantly affects the ability of school health teams to reach schools. This outreach service requires a permanent vehicle for each team, particularly for reaching Quintile 1 and 2 schools, which are often located in far-flung and rural areas. In numerous locations, school health nurses use public transport at their own expense to get to and from schools.

With the launch of the 2012 ISHP, the Minister of Health allocated three mobile clinics to each of 10 NHI pilot districts, to assist with referral services: one for eye care, one for dental care and one for general primary health care. The intention was to take referral services closer to children. While the purchase of the mobile clinics reflects a deep commitment from government to improving access to health services, their functionality was fraught with logistical and administrative problems and the vehicles were grounded in the first year of implementation. The feasibility of the mobile clinics as a viable service option requires further consideration.

Transport of children to referral services, and the availability of referral services throughout all districts, require significant strengthening. The relative paucity of appropriate referral services in the public sector remains an obstacle to the full roll-out of the ISHP. In some provinces, optometry services are provided through contracts with the private sector and similar arrangements may be required for other referral components. Whilst general referral services may be strengthened through the re-engineering of PHC, specific consideration of school health referral requirements is essential.

Financing of the school health service

The school health service does not have specific nor sufficient budget allocations in national, provincial or district DoH budgets. School health competes against many other priorities, and although some staff and transport costs are covered, the shortfall remains significant. With the launch of the ISHP, some national allocations provided for the recruitment of retired nurses in the first year, but provinces are expected to plan for these posts in future budgets. The DBE provides equipment and First Aid kits.

Increasing the numbers and composition of teams will have further budgetary implications. Based on the experience with the 2003 policy, implementation of the ISHP is unlikely to progress satisfactorily without dedicated funding, akin to a conditional grant,

until provinces and districts can provide the full costs for school health services.

The Finance Ministry announced a specific allocation for the HPV vaccine for R400 million over two years in 2014, but this favours only one of the ISHP interventions, and does not address the numerous staffing and infrastructural requirements essential to making the entire programme work.

Monitoring of the ISHP implementation

Until recently, school health service data had been inconsistent and of poor quality, which disabled monitoring of progress and impact. School health coverage data are now collected through the District Health Information System and once this system is well established, it is expected to yield good quality data.

School health teams now report on referrals per health condition, and this will help to monitor the health profiles of school-aged children. However, the extent to which children who are referred receive the required interventions is one of the important outcome measures of the school health service, but is still not known.

Given these challenges in monitoring, many of the intended outcomes and impacts of the ISHP can only be assessed through periodic evaluations.

Conclusion

The 2012 Integrated School Health Policy is an advance on its predecessor in terms of the commitment and efforts made to facilitate implementation. Nonetheless, the complexity of this multi-sectoral policy, which spans an age-continuum of 12 years and has multiple interventions, cannot be underestimated.

In order to refine and improve the implementation in a sustained manner, this policy requires excellent and skilled leadership at various levels of the system. Leadership emphasis should be on the building of strong, formal, structured relationships between stakeholders at all levels in the Departments of Health, Basic Education and Social Development. The prospects of fostering greater integration of school health initiatives into the CSTL framework of the DBE, and in particular to involve educators in the delivery and monitoring of the ISHP, are particularly promising. This integration will have to be planned carefully, with the correct guidelines and support to educators, and with periodic reviews.

Leadership efforts must also focus on acquiring well-trained staff with the correct skills mix to deliver the service; ensuring that interventions are evidence-based and consistently evaluated; and procuring and managing the necessary resources to make the ISHP work. In line with international trends, the ultimate goal should be for a smaller, focused set of interventions, with an increasing focus on health promotion and prevention rather than on screening. Notably, the health and education reform initiatives provide a conducive context in which to test aspects of the ISHP through pilot initiatives, using the lessons gained to guide refinement of this complex policy.

The current climate of solid political support for this cause lends itself to improving the ISHP implementation across all of these levels.

Of importance is the strengthening of referral services, without which the school health screening activities have little utility. Where public sector referral services are inadequate, interim measures through public-private partnerships, with good oversight to avoid the pitfalls of over-servicing, may help to resolve referral service gaps.

Careful planning is required for improving the coverage and staffing of school health teams, and here the emphasis – for the next two years at least – should remain on the Quintile 1 and 2 schools, until the service delivery to these disadvantaged groups is consolidated. Reflections on the 2003 policy experience have taught us that dedicated finances for school health are required to enable full and good-quality provision of this service.

One of the key requirements is that a selection of key indicators must be collected and monitored routinely within existing school frameworks. It is important to keep these indicators to a minimum, and ensure that reliable and regular information on the coverage at school and learner level and on referral responses is produced.

Specific suggestions include:

- injecting significant human resources into the delivery of this service if it is to reach the desired coverage and quality;
- reconsidering the role of the professional nurse who spends too much time doing basic activities that do not require high levels of professional qualification (such as screening of children) that could be done by well-trained cadres of staff such as community health workers;
- focusing on interventions that have yielded sound evidence for their impact, thus prioritising the use of scarce resources;
- carefully considering additions to the ISHP service package given the existing capacity constraints; and
- inviting the integrative participation of educators in ISHP activities that are appropriate for educator involvement, such as the early identification of learners with potential health problems, and supporting health teams in the monitoring of progress with learners who require referral services.

School health services, by intention and design, form a quintessential primary health care programme. School health embraces all the elements of the Alma Ata primary health care philosophy of health promotion and prevention, of acknowledging the social determinants of health, and of its inter-sectoral architecture.[41]

For the first time in the history of South Africa's school-based health programmes, this service is now correctly prioritised in the broader terrain of primary health care and the education agendas of the country. However, for the 12 million children who stand to benefit from the ISHP implementation, the success of this complex health service is dependent on the continued strengthening of the district health system wherein it operates and of the inter-sectoral relationships that are at its heart, and on the availability of the required resources.

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7 Progress in the establishment of Ward-based Outreach Teams: experiences in the North West Province

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This chapter briefly describes the implementation of the Ward-based Outreach Teams (WBOTs) in the North West Province. The authors then highlight some of the findings of a rapid assessment of provincial and district implementation of Ward-based Outreach Teams conducted in the province during December 2012 and January 2013. The purpose of the chapter is to describe features of implementation that enabled the early uptake of the WBOTs in the province and to identify factors impacting on sustainable implementation that have relevance across the country.

There has been a steady growth in roll-out and implementation of the PHC re-engineering strategy since 2011. By March 2014, 227 WBOTs (involving 1 643 community health workers and 201 team leaders) were functioning across the province. Implementation strategies included the establishment of a provincial task team, planning which was informed by a number of data-gathering exercises, a piloting process, implementation of a monitoring and evaluation system, development of supportive partnerships, and training of teams and team leaders.

The rapid assessment found high levels of knowledge and ownership of the strategy across the province, but also concerns around its future. Based on the North West experience, the authors draw out a set of factors which will influence the sustainability of the WBOT strategy across the country. These strategies include making provision for: adequate financing, evidence-informed planning and implementation, provincial and district governance, communication and dialogue, appropriate partnerships and operational research on WBOTs.

Although it is too early to comment on sustainability or impact, pilot Ward-based Outreach Teams have been established in all 19 sub-districts of the province, household profiling and registration completed, and the process of household follow-up visits initiated.

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Introduction

Following the Alma Ata Conference in 1978,[1] a number of countries formulated policies to entrench the principles of "health care for all" and align their plans with that of the primary health care (PHC) framework, albeit with considerable diversity in country experiences and approaches.[2]

Common features of these policies included coherent and consistent efforts towards the development of integrated health systems, the participation of communities through structures at different levels, deployment of community health workers (CHWs), and a focus on intersectoral actions to address the determinants of targeted major health problems.

In 2010, the Minister of Health proposed the Re-engineering of PHC[3] in South Africa through a strategy constructed around a three-pronged approach to achieving a population-based family health programme. In this model, the focus of healthcare delivery would be on communities and families with a specific emphasis on health promotion and prevention. Three streams form the backbone of the PHC Re-engineering Strategy, namely: Ward-based PHC Outreach Teams (WBOTs), School Health Teams and District Clinical Specialist Teams, with District Management Teams, Sub-District Management Teams and the Chief Executive Officers (CEOs) of district hospitals being the drivers of health service delivery to communities.

The guideline for Ward-based Outreach Teams recommends that a team comprise six community health workers (CHWs), a Professional Nurse (as team leader) and one environmental health and health promotion practitioner, all of whom are linked to a PHC clinic. The intention is for these teams to work together to promote health and prevent disease through a variety of interventions based on the concept of a healthy individual, a healthy family, a healthy community, and a healthy environment.[3]

The successful implementation of a policy with such system-wide effects entails developing new goals, forms of engagement with households, service delivery roles, and relationships between players within the primary health care system.[4] Achieving such changes requires the buy-in of a considerable number of actors, the mobilisation of additional resources, development of new systems, and significant changes in the orientation and everyday practices of frontline providers.

This chapter briefly describes the implementation of the WBOTs in the North West Province (NW) and then highlights some of the findings of a rapid assessment of provincial and district implementation of WBOT conducted in the province in December 2012 and January 2013. As an early adopter of the WBOT model of the National Department of Health, the North West Province offered an opportunity to explore key successes and challenges of the model. The chapter concludes with a reflection of critical issues related to the sustainability of WBOTs.

Profile of the North West Province

The North West Province has a population of approximately 3.5 million people and is largely a rural province. The province is divided into four districts (Dr Ruth Segomotsi Mompati, Dr Kenneth Kaunda, Ngaka Modiri Molema and Bojanala) and has a well-established district health system, more than 300 clinics and community health centres, and 22 hospitals. Expenditure on PHC is above the national average (R831 vs R780 per capita in 2012/13), even though total health expenditure per capita (and equitable share allocation) in the province is one of the lowest in the country.[5]

The North West's health indicators tend to be average by national standards: its inpatient early neonatal mortality rate in facility is 10.475 per 1 000 live births, slightly higher than the national average of 10.2 per 1 000 live births, while its TB treatment completion rate in 2010 was slightly lower than the national average: 74.8% vs 78.9%, prompting a number of interventions in the province in 2011.[5]

Implementation process

The PHC Re-engineering Strategy was officially introduced in the North West Province in May 2011 at a high-level meeting attended by senior staff at district, provincial and national levels. Strategic partnerships were also developed with non-governmental and donor organisations working in the province. A provincial PHC re-engineering task team with set terms of reference was established. The provincial task team consists of the Chief Director (CD): District Health Services (DHS) from each district, and provincial managers from the Directorates for Strategic Programmes, District Health System (DHS), Hospitals, Finance, Communication and Human Resources (HR). The team was initially responsible for spearheading a number of initiatives in preparation for the implementation of the strategy and continuing to plan and recommend for all three streams. These initiatives included developing selection criteria for nurses and CHWs to lead and participate in the outreach teams respectively, identification of implementing wards as pilot sites and developing a provincial communication strategy. It was decided to establish at least one WBOT in all sub-districts and a total of 24 pilot sites, were identified in October 2011.

Related working groups and subcommittees were also established to advance the application of the task team's decisions. While the task team was empowered to take relevant provincial-level decisions, a channel for reporting and escalating problems through the management chain was also developed.

The structure and organisation of the task team, particularly the inclusion of district managers, and the identification of dedicated champions at provincial level and in each district, provided focal points for project management at all levels of the system and facilitated the effective communication of a uniform message across health structures.

A costed provincial PHC re-engineering plan was drawn up with districts taking responsibility for developing their plans and activities. All four districts integrated the PHC re-engineering project into their District Health Plans (DHPs) and identified a focal person to co-ordinate the activities of the three streams and contribute to the monthly reporting system.

Using evidence for planning

An evidence-informed approach to planning and roll-out was made possible by a number of specific data-gathering exercises at the start of implementation. One of these was a baseline audit of all categories of health caregivers linked to the North West Department

of Health through non-governmental organisations (NGOs). The audit established that there were 5 167 health care givers providing mainly home-based care and TB DOTS (Directly Observed Treatment Strategy), 80% of whom had no accredited qualification, and 25% of whom had received no stipends.[a] Using the audit findings, an electronic database of CHWs was created for the provincial DoH Human Resources (HR) directorate to enable selection of CHWs for pilot sites. The database information also facilitated the development of costed operational and training plans, to ensure smooth disbursement of stipends.

GIS maps indicating geographic location of wards, available local services and health resources of all wards being serviced by WBOTs were created by a health systems strengthening NGO, Health Systems Trust. These were used to inform the household profiling and registration process, using nationally developed M&E tools. The registration process allowed for the profiling of basic household demographic and socio-economic status, and included simple household screening to identify "vulnerable" households for referral and/or follow-up. The tools also include reporting forms that are used to document follow-up visits, referrals, daily counts and monthly summaries. Eighteen community dialogues were also conducted as part of the social mobilisation to introduce WBOTs and market the services in all areas where pilot sites were established.

When the province started implementing the PHC Re-engineering Strategy in 2011, 24 functional teams were established as a pilot. One thousand five hundred CHWs were trained in Phase 1 Orientation Basic Foundation Training: Maternal, Neonatal and Child Health (MNCH), HIV and Aids and TB, and Basic Skills. Seventy-eight Professional Nurses were trained to be Team Leaders on Phase 1 Basic Foundation and supervision, performance management, mentoring and coaching. Nine Master Trainers and 25 Trainers for CHWs were trained and a two-day workshop on leadership and supervision was conducted with support from development partners. As at March 2014, 227 Ward-based Outreach Teams (1 617 CHWs and 206 PNs/TL) had been established.[b]

Most of the 24 team leaders selected for the initial pilot phase were released from clinical work to lead their teams on a full-time basis and CHWs were appointed on a 12-month fixed-term contract as of April 2013. Challenges around communication between CHWs and team leaders and travel for team leaders into communities were resolved by an allocation of R100 per month for telephone calls and reimbursement for transport.

Monitoring and evaluation

With the Department of Health's National Health Information System (NHISSA) as the focal point and overall steward of the process, a consortium of organisations (University of the Western Cape, Health Information Systems Programme, Health Systems Trust, Medical Research Council of South Africa) developed and piloted a nationally standardised M&E system for Ward-based Outreach Teams, integrated into the District Health Information System (DHIS).

The principle on which the monitoring and evaluation system was based was the need to integrate it with existing data and data flows, minimise data collection, focus on essential data, and avoid duplication of information already collected at facility level.

A standardised set of tools was developed, consisting of:

- A routine monthly reporting system, based on a one-page, simple tick sheet, aggregated on a monthly basis and submitted with the facility-level data into the DHIS. This system provides activity reporting along 15 indicators (Table 1) (of which seven have been included in the National Indicator Data Set – NIDS). This includes coverage of households (registration and follow-up) by outreach teams, head counts (<5 and 5+ years), supervisory rates, nature of activity (e.g. antenatal, child health, chronic diseases), and referral rates.

Table 1: Indicators from monthly reporting system

	Indicator Name
1	Outreach household visit registration coverage (annualised)
2	Outreach household registration visit rate
3	Outreach household follow up visit rate
4	Outreach household supervised visit rate
5	Outreach household antenatal care rate
6	Outreach household postnatal care rate
7	Outreach household child under 5 years health care rate
8	Outreach household adherence support rate
9	Outreach household clients home based care rate
10	Outreach household clients referred to health facility rate
11	Outreach household clients referred to social services rate
12	Outreach household clients referred to home-based care rate
13	Outreach household client 5 years and older coverage
14	Outreach household client under 5 years coverage
15	Outreach household – health facility back referral rate

- A two-sided household registration and screening tool, which provides the entry point into households, enables a profile of the household to be conducted and determines the nature and frequency of follow-up. This tool is part of service delivery but also provides valuable household information for planning and evaluation of the PHC Outreach Team Strategy. A DHIS database has been created for this purpose, although to date there has been limited entry of data into the DHIS.
- Tools that aid service delivery and follow-up of households (individual health records, referral forms), that are not intended for entry into the DHIS, but can serve as programme audit tools if so desired.

Both a paper-based and an mHealth version of the M&E system were piloted in the North West Province, with initial training conducted in 2011 and 2012.

In December 2013, an evaluation of the validity and quality of the M&E system in the province was conducted, assessing ease of use, and completeness and accuracy of data collected.[6] The evaluation found that by the end of November 2013, more than 300 000 individual household visits had been recorded in the routine DHIS for 2013.[7] The conclusions of this evaluation were that the forms were well understood by CHWs and for the most part well completed.

a Personal Communication: Ms R. Senokwane: Provincial Co-ordinator of Ward-based Outreach Teams in the North West Province. September 2014.

b Personal Communication: Ms R. Senokwane: Provincial Co-ordinator of Ward-based Outreach Teams in the North West Province. September 2014.

The most frequent sources of error were arithmetic: additions of totals (especially related to head counts) in tick sheets and accurate transfer of data from weekly to monthly tick sheets. This problem was largely overcome in the mHealth version of the system, where data transfer and additions are done automatically.[8] Quality and timely data flow were also dependent on the involvement and oversight by team leaders, and greatly improved with feedback and additional support.

Key remaining issues are the design of regular reports and use of data at a local level, and processes of entry of household registration data into the DHIS.

Findings from the rapid assessment

This section provides information on some of the key findings from the rapid assessment of provincial and district implementation of PHC Outreach Teams conducted in the province in December 2012 and January 2013.

The rapid assessment involved in-depth interviews with 27 provincial, district and frontline managers, a group discussion with the task team, and group discussions with CHWs. These interviews assessed, amongst others, knowledge of, attitudes to, and experiences of the strategy in the province.

Issues arising from the rapid assessment related to resources (financial and human) as key constraints to implementation, on the one hand, and a high level of knowledge and ownership facilitating implementation on the other.

Financial resources

The PHC Outreach Team Strategy in the North West Province was introduced as a re-organisation of existing service delivery. The implications of this are that no new or ring-fenced resources were allocated for implementation, and all expenses had to be absorbed into existing district and sub-district budgets. Interviewees described the absence of dedicated financial resources from national or provincial government as a key weakness of the PHC outreach team implementation. Additional resources needed included vehicles for supervisory staff, supplies for the CHW kit bags, transport and cell-phone allowances for CHWs, stationery, filing cabinets for storing records, and most significantly, the deployment of Professional Nurses as team leaders, most of whom were reassigned to outreach teams from existing clinic staff establishments. The low level of remuneration and frequently interrupted stipends of CHWs was raised by many respondents as a significant threat to sustaining the work of teams.

Senior managers indicated that under the prevailing fiscal climate it was unlikely that additional resources would be made available, and that districts were being encouraged to "work differently" within the PHC re-engineering framework and obtain necessary budgets accordingly.

At the time of interviews, access to these resources was constrained across teams, with at best some sub-districts offering reimbursement of travel costs. A number of teams did not have access to dedicated space in health facilities, and were unsure about what to do with large volumes of accumulating paperwork. In some instances CHWs kept patient records with them.

There were subsequent efforts through the task team to address uneven resourcing and standardise access to transport, cell-phone and uniform allowances in the province.

Human resources

Respondents suggested that expecting Professional Nurses to be in charge of outreach teams was unrealistic and that in the long run, enrolled nurses should be trained for this purpose. As one District Director commented:

> The number of nurses that are exiting the public service is more than those that are entering. There is also natural attrition where people are dying or fall sick. [We should] train and use another cadre of health workers such as the enrolled nurses. If we train them to be team leaders, or at least if we group wards so that one professional nurse supervises a number of wards, because we are running out of professional nurses.

Knowledge and ownership of the strategy

One of the findings of the review process was the high level of knowledge and ownership of the outreach team strategy among stakeholders in the province, and their willingness to integrate and adapt their work accordingly. Interviewees spoke of the tangible benefits of the community dialogues and proactive household approaches as expanding access, improving relationships with communities, and increasing knowledge and uptake of services. Both the CHWs and the outreach team leaders articulated their roles in ways that were consistent with the PHC Re-engineering Strategy.

The CHWs interviewed were also in support of the new approach to improve access to care, and believed that the status of their work had been considerably enhanced. As one stakeholder commented, CHWs are now able to:

> come up with a very comprehensive picture of health care… so you don't have the CHWs saying I only deal with DOTS, or mental illness etc., but they are taking ownership of their areas/communities and get to know what exactly is happening in that area. They have become the ears of the department and have the information about the community on their fingers. They would tell you, they have so many people suffering from certain illnesses, so many people who need child grants etc. It is a wonderful thing to get all this information that we are able to use across all departments. That has also made the CHWs very important in the community.

Through the briefings they received from provincial and (in some instances) national players, CHWs were aware of plans for future training phases, and expressed a willingness to expand their scope of work to include HIV counselling and testing, general counselling, and taking blood pressure measurements.

PHC facility managers expressed varying levels of support for PHC re-engineering and the WBOTs. Possible reasons for this include the fact that the orientation of facility managers was only starting at the time of the interviews, occurring long after that of other players (team leaders, local area managers and CHWs). An area of concern for the facility managers was that they felt they had been inadequately

briefed on how to manage the allocation of professional nursing staff from their staff establishment to the outreach teams.

Facility managers also suggested that the policy had increased their burdens – not only did they have to release a Professional Nurse from the clinic, and provide space and supplies for CHW kits, but the household profiling process had uncovered pockets of unmet needs as well as under-utilisation of their clinics – both of which were not planned for.

This led to a situation where team leaders were sometimes held responsible for seeing referrals from outreach teams whereas in other instances patients were seen by the remaining clinic staff. Team leaders reported facing pressure to return to clinics. In several instances, support to team leaders and teams was primarily from the local area manager rather than through the facility managers.

The biggest challenge for implementation, both for sustaining what has been achieved to date and for further scale-up, is ensuring the adequate resourcing of WBOTs. Without stable and adequate CHW stipends, maintaining the motivation and momentum of teams will be very difficult.

Recommendations

Drawing on the experiences of the North West Province, for a sustainable PHC Outreach Team Strategy, the following key areas for system strengthening are proposed:

Adequate financing

- Ward-based Outreach Teams are a fundamental requirement for successful implementation of the envisioned PHC Re-engineering Strategy and lack of adequate financial resources will continue to pose a major risk to the successful implementation of the strategy. Plans for allocating ring-fenced districts budgets accompanied by clear accountability and reporting mechanisms are required.
- The establishment of outreach teams as a key component in the implementation of the PHC Re-engineering Strategy is being done within a context of general under-resourcing and poor functioning of community-based services. Existing challenges to the stable and adequate provision of stipends for CHWs will threaten sustainability and quality of services and should be addressed with urgency.

Evidence-informed planning and implementation

- An evidence-informed approach to planning and implementation, building on the standardised information systems, supplemented by regular audits and evaluative research, needs to be implemented at both provincial and national levels.
- While the core DHIS indicators for WBOTs provide an assessment of coverage and a broad profile of their household activity, the monitoring of WBOT impacts is only possible when combined with an assessment of facility-based indicators that are sensitive to community-based action. Such indicators would include early antenatal booking, retention in care and immunisation coverage. Routine reports and regular review of these indicators in sub-district and district-based reports are key to further implementation and for holding stakeholders accountable.

Provincial and district governance

- Effective provincial governance is key to implementation of outreach teams. This includes the setting up of special implementation support and co-ordinating structures such as the PHC re-engineering task team, and the integration of planning and monitoring of outreach into existing district and sub-districts planning and review processes.
- A clear strategy for roll-out/scale-up involving effective planning, regular engagements and critical reflection is also key.

Communication and dialogue

- Comprehensive communication and consultation strategies have been vital to the success in the NW in terms of expanding access, improving relationships with communities, and increasing knowledge and uptake of services. Forums for constructive engagement between community members, local managers and facility staff – brainstorming main health problems, discussing root causes and identifying recommendations to address these – are important.
- Active and ongoing involvement of key players in the frontline of the PHC system, especially PHC facility managers and area managers and supervisors is key.

Ongoing partnerships

- The experience in the NW suggests that openness to and engagement in partnerships that provide relevant technical and implementation support to the district and province were essential for facilitating a responsive and effective process for implementing the PHC re-engineering strategy. However, the sustainability of such partnerships may need to be evaluated further.

Further research

While the key question for policy-makers relates to the effectiveness and sustainability of community health workers and the adopted Ward-Based Outreach Team approach, there is also a need for operational research that investigates factors that influence and support community health workers. These factors include community support structures, health systems support, service delivery platforms, referral mechanisms and the use of technology, such as mHealth. Further research is needed on realistic norms for household coverage by CHWs. For example, the mHealth pilot in the North West, involving a team of 10 CHWs in a rural setting, found that the average size of the CHWs' catchment population was 146, ranging from 86–237 households per CHW. These numbers are lower than the national norms (250 households per CHW).

Conclusion

The findings of the rapid assessment of the WBOT implementation in the North West may provide valuable lessons for PHC Outreach Team implementation in other provinces. The deliberate and process-rich nature of the implementation strategy, bolstered by strong leadership and vision, and the commitment to community and frontline provider participation, provide a good case study of what is required in the early stages of implementation of a policy "with system-wide effects". The next challenge is sustaining the initial momentum and ensuring further scale-up. Addressing these will require new strategies and cycles of learning – the capacity to renew and adapt – and most significantly, addressing the challenge of resource mobilisation and finding ways to achieve further gains through existing resources.

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Challenges and constraints at district management level

8

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This chapter explores the constraints and challenges faced by District Health Management Teams (DMTs) as they strive to ensure the delivery of quality public health care in a rapidly changing environment characterised by major national reform initiatives, such as the re-engineering of primary health care (PHC) and the introduction of National Health Insurance (NHI).

The main difficulties faced by this group of public health managers were identified through surveys and interviews conducted with a cross-section of managers from urban and rural districts. Data were collected using three methods. Firstly, individual semi-structured interviews were conducted with nine district managers regarding the district planning process. Secondly, quantitative data using a structured questionnaire were collected from 233 operational and district managers within these nine districts regarding their qualifications and their length of service within the health department. Thirdly, this information was supplemented by interviews with representatives of the United States President's Emergency Plan for AIDS Relief who provide technical assistance to DMTs.

Most of the problems identified relate to obstacles preventing the effective implementation of various steps in the management model. These originate from within and beyond the DMT, and include issues such inadequate delegation of authority to DMTs, defective budgeting processes, staffing issues, lack of managerial skills and vacancies in key managerial positions, and ineffective use or absence of quality management information systems to support decision-making. Despite these constraints, DMTs take on ambitious national programmes with a positive attitude, and there are promising indications that the hindrances identified are being successfully addressed through policy reforms.

Inadequate delegation of authority, defective budgeting processes, staffing issues, lack of managerial skills, vacancies in key managerial positions, and ineffective use or absence of quality management information systems to support decision-making were identified as challenges facing District Management Teams.

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Introduction

The District Health System (DHS) is the organisational entity around and through which the provision of healthcare delivery should be organised as mandated by the National Health Act (61 of 2003).[1] A DHS approach entails a geographic and population-based approach to the planning and management of health services, and South Africa's DHS has been a core component of the post-1994 strategy to create a decentralised and unified healthcare system. The role of the DHS was first articulated in the White Paper for the Transformation of the Health Sector in South Africa published in April 1997.[2] It is based on a DHS Policy that was drafted in 1995 by an inter-provincial National District Health Systems Committee, established in August 1994.[3] In essence, these documents address the need to reorganise the inherited, highly fragmented healthcare delivery system into a unified system managed by District Management Teams (DMTs) with a focus on primary health care (PHC) and in line with an overarching government policy of decentralising government services.

The World Health Organization (WHO) defines a DHS based on PHC 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. A District Health System therefore consists of a large variety of inter-related elements that contribute to health in homes, schools, work places, and communities, through the health and other related sectors. It includes self-care and all health-care workers and facilities, up to and including the hospital at the first referral level, and the appropriate laboratory, other diagnostic, and logistic support services.[4]

As originally envisaged in 1995, the DHS would be a highly autonomous system, functioning not in isolation but as an integral part of the National Health System, and comprising three major levels:

- National Department of Health (NDoH), responsible for the overall co-ordination and determination of policy for the country's health system, and for monitoring and support of the provinces;
- Provincial Departments of Health (PDoH), responsible for the co-ordination of the health system within each province, for the provision of specialist health services, and for monitoring and support of the districts; and
- District Health Authorities, responsible for the provision of non-specialist health services within each district.[3]

The National Health Act of 2003 largely preserved this three-tier system while accommodating the role of municipalities in providing certain health services, with co-ordination taking place at the district level through a District Health Council, to which the respective district and municipal managers would report.[1]

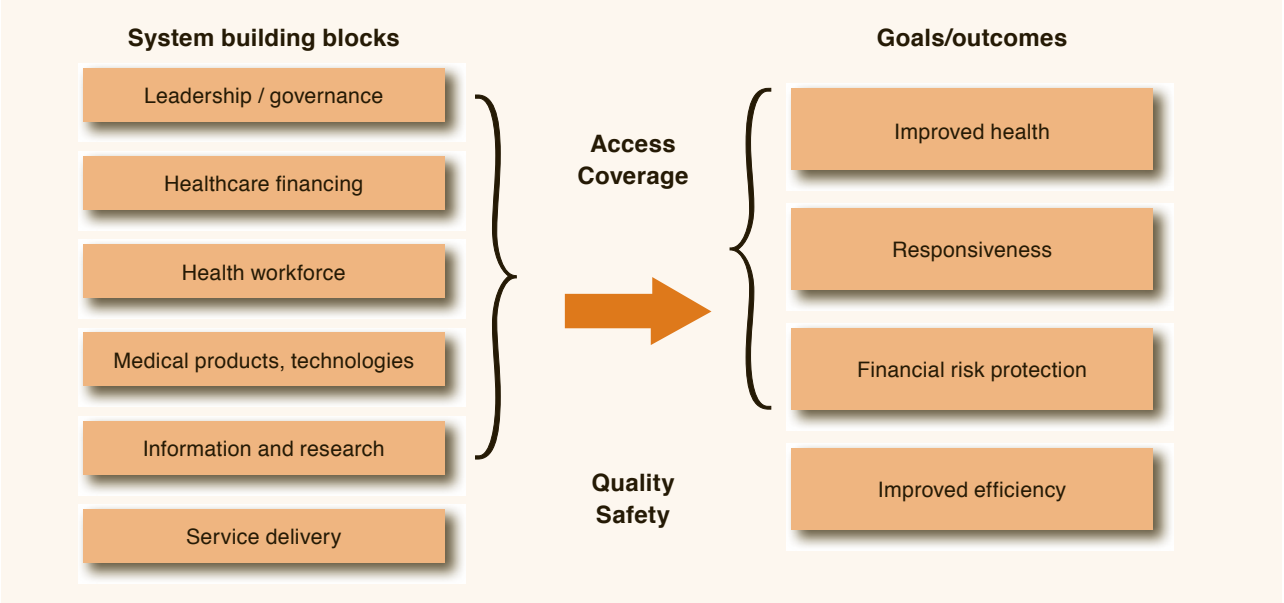
The commitment to establishing a well-functioning DHS must be viewed as one of the key reform initiatives of the democratically elected government, which identified a DHS as a priority in 1994 with a policy rapidly following in 1995. However, implementation has lagged behind intention.[5] A 2008 Development Bank of South Africa (DBSA) report entitled *A roadmap for the reform of the South African health system*, suggests that the reason for South Africa's deteriorating health outcomes lies in flawed institutional design, and stresses the need for institutional design to be a central theme for health system reform.[6] It recommends that "restructuring health districts to improve performance is an essential prerequisite for achieving any improvement to the public health goals."[6] The report further cites problems around governance frameworks, specifically the lack of decentralisation of authority to district or hospital management level that lack the mandate to carry out their functions effectively.[6] The report concludes that "a dysfunctional district system will never be able to effectively carry out programmes assigned to it, and consequently represents an obstacle to improvements in the achievement of key health goals".[6] Similar obstacles to implementing the DHS were identified by McCoy and Engelbrecht in 1999, such as the different understandings of the managerial roles and relationships between the three tiers of the healthcare system.[7]

The National Health Act was promulgated in 2004, and 2009 heralded the beginning of an increased focus on health systems strengthening. Barbara Hogan, during her brief term as Health Minister, appointed a series of Ministerial Advisory Committees tasked with finding solutions to various health system weaknesses.[8] This systems-strengthening approach has continued under the current Minister of Health, Aaron Motsoaledi, who has driven a specific focus on improving the managerial competence of public sector health managers. In 2012 he launched the Academy for Leadership and Management in Health Care, which is tasked with developing a managerial competency framework and an inventory of available training courses, accrediting and commissioning providers, and conducting competency assessments of key post-holders.[9]

Lack of managerial skills within the public health sector attracted media attention in 2011 when an assessment of managerial competency among hospital Chief Executive Officers (CEOs) and District Managers (DMs) was conducted. Subsequently the Minister of Health initiated a process whereby a large number of hospital CEOs had to reapply for their posts. As at February 2013, 86% (102) of the 118 new CEO positions were filled.[10] The institutional design reforms recommended by the DBSA to ensure that competent managers have the decentralised authority to implement policies and programmes are, however, still lagging.[11]

The NDoH has renewed its commitment to devolving greater autonomy to the district level and to ensuring that "the re-engineering process does not detract from the need to strengthen the district health system" and "in particular … District Management Teams (DMTs), Sub-DMTs and district hospital CEOs must be responsible and accountable for all the services that take place in all the facilities and communities in the districts".[12] This commitment is being translated into action through a project currently underway in Tshwane District, as part of the National Health Insurance (NHI) pilot programme that is assessing the policy and legislative changes required to achieve full decentralisation of authority to the DMT. In July 2013, the Minister of Health also announced increased autonomy for the CEOs of certain categories of government hospitals in Gauteng Province, with expansion to all provinces being planned.[13]

Figure 1: Health Systems Strengthening Building Blocks



Source: World Health Organization, 2007.[4]

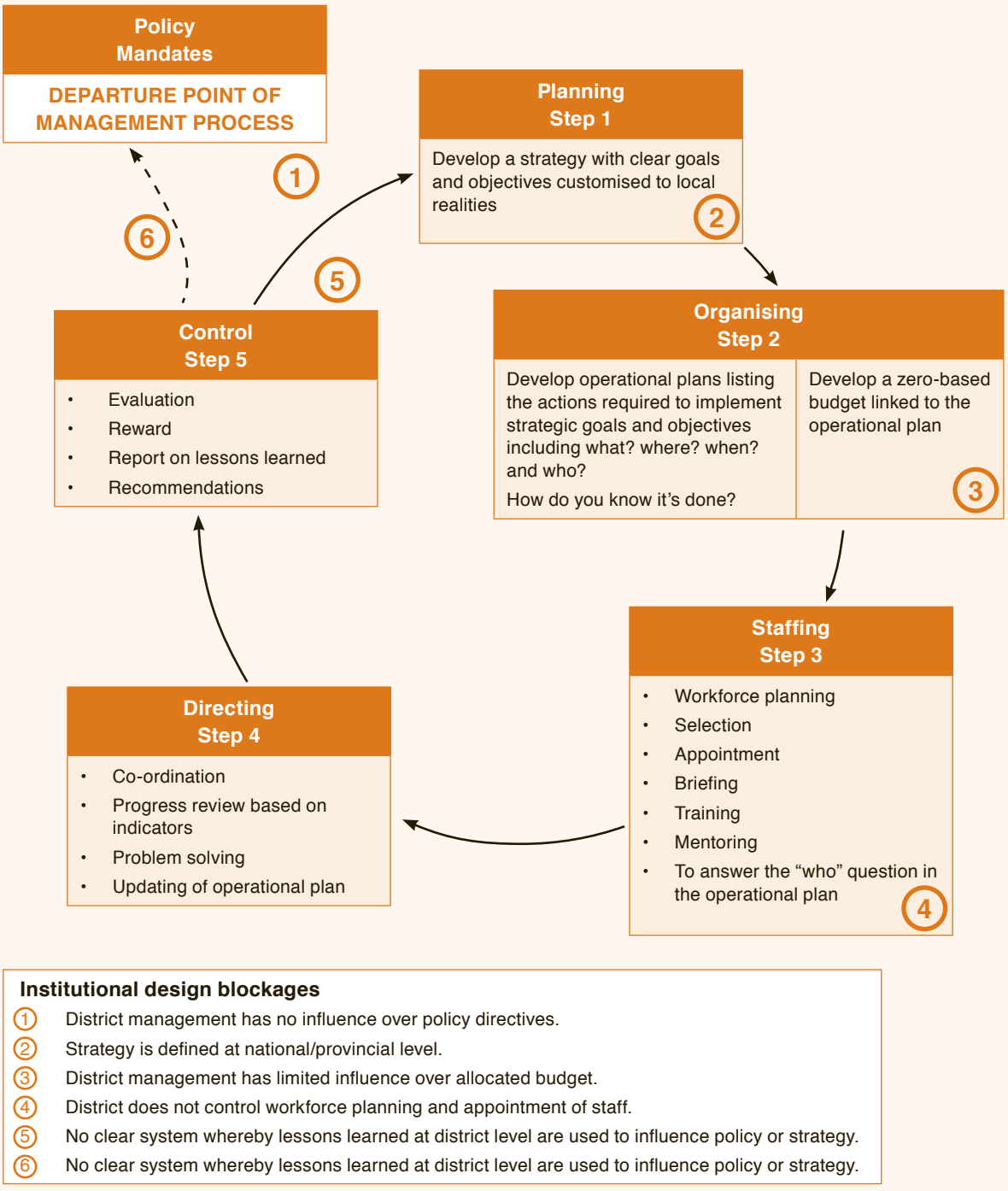
An important step to support the strengthening of district health management was initiated in 2012 with the transition of bilateral health co-operation between South Africa and the United States of America away from support for direct AIDS and TB service provision through the US President's Emergency Plan for AIDS Relief (PEPFAR) and towards supporting health systems strengthening (HSS).[14] Under this new five-year strategy, a number of civil society organisations have been contracted to provide technical assistance (TA) to health districts. Through this process, each district has been allocated a TA partner who supports district and facility management through providing consultant support, training and mentoring. The specific focus of TA support is customised on a district-by-district basis to respond to targets contained in the Minister of Health's Negotiated Service Delivery Agreement and annual performance plans. Deficiencies identified through national benchmarking exercises, such as the District Health Barometer and the 2012 National Health Care Facilities Baseline Audit, are also addressed.[15,16]

To better understand the current challenges faced by district managers, face-to-face interviews were held with a convenience sample of nine DMs representing a cross-section of urban and rural districts. An additional structured survey was carried out with 233 operational and district managers within these districts regarding their qualifications and their length of service within the health department. PEPFAR TA partners were also surveyed on their impressions relating to the constraints and challenges faced by DMTs. Although not exclusive, this approach provided a snapshot of 25 districts (both urban and rural) covering all provinces. Through this approach, the most common hindrances that impact on the ability of the DMT to deliver high-quality healthcare services in a number of selected districts were explored.

Constraints and challenges

The most common constraints identified are those that hamper the ability of DMTs to effectively translate national policy into district-specific strategies. These strategies need to be supported by detailed work plans specifying the actions required with related roles, responsibilities and deadlines, and linked to reliable management information systems that provide regular overview of progress. These plans should also be supported by well-constructed budgets and sufficient dedicated human resources for implementation. In essence, the cycle of management activities that underpins any project management model involving such basic steps as planning, organising, staffing, directing and controlling is currently ineffective in the public health sector due to a multiplicity of factors originating from national, provincial and district-specific levels. An overview of the limitations on the autonomy and authority of the DMT that results in constrained managerial capacity is provided in Figure 2.

Figure 2: An overview of the limitations on the autonomy and authority of the DMT that results in constrained managerial capacity



In essence, the institutional design flaw identified in the DBSA report still hinders the ability of districts to deliver the healthcare services they are mandated to provide.[6] District managers are deeply aware of these constraints and express a sense of frustration regarding their inability to overcome them, but despite these challenges, they remain largely positive about and committed to improving healthcare delivery.

In the section below the constraints and challenges faced by DMTs are discussed from a health systems strengthening perspective using the health systems strengthening (HSS) building blocks framework as defined by the WHO.[4]

Service delivery

Service delivery is directly influenced by the other HSS building blocks, but the primary issue that undermines health service delivery is the inability of the DMT to translate national policies into district-specific strategies, work plans and budgets. Findings yielded in interviews with district managers show that the process of developing annual district health plans (DHPs) is well-defined and districts receive good guidance from the NDoH on the required format. However, institutional design flaws around budget and human resources weaken the implementation of these plans.[6] Interviewees were mostly satisfied with the district planning process and expressed a strong conviction that planning was important, as was reviewing the implementation of plans. Specific benefits of planning at district level that were cited included:

- improved ownership by managers of plans they had contributed to developing;
- better understanding of timelines and higher probability of services being delivered on time;
- improved compliance; and
- ensuring stability from year to year, especially in an environment where there are often changes in senior district management.

The DMs interviewed were divided on the ideal length of the planning cycle. While some managers believed that the current cycle of developing annual plans is effective, others expressed a preference for longer planning cycles. An innovative approach advocated by one of the DMs involves district planning taking place in a two-tier system of developing a three- to five-year strategic plan supported by annual operational plans.

The majority of the DMs interviewed believed that their management team members did not have the required skills to undertake effective planning. As expressed by one of the DMs: "You can't do this thing with junior people."

There was a strong sentiment that management teams would benefit from additional management training and mentoring. This finding correlates with those of a survey of public and private sector hospital managers showing that public sector hospital managers were more likely to indicate the need for further development and training.[17] In this context, the DMs commented favourably on the technical assistance support they receive from the PEPFAR-funded TA partners.

Other process difficulties cited were:

- securing commitment from all managers to commit to the plan and poor implementation of the plan. As one DMs put it: "What gets planned for does not necessarily get done";
- vacant posts at managerial level were seen as constituting an impediment to effective planning; and
- national and provincial plans were considered unworkable because national strategic plans do not take into account realities on the ground, and generic plans were unsuitable for the specific needs of each district.

It was also clear from these discussions that planning for service delivery at district level is focused only on service delivery by the public sector, which does not take into account the WHO definition of a health district that "includes all institutions and individuals providing health care in the district, whether governmental, social security, non-governmental, private, or traditional".[4] The exclusion of other stakeholders within a health district results in a serious lack of co-ordination of resources and initiatives falling within the ambit of a unified structured district plan. Notably, this omission is not caused by limitations in the policy environment, as the 1995 DHS Policy specifically acknowledges the importance of leveraging all possible resources from all sectors by stating that it is only possible to make maximal use of the relatively limited resources available for health care in South Africa if the combined resources of the public and private sectors are efficiently utilised and co-ordinated.[3]

Lack of guidance from provincial government regarding the prioritisation of service improvement surfaced as a challenge during this study. One of the TA partners describes their experience of supporting the planning process in a number of districts thus:

> Probably the biggest challenge is determining priority. Each health interest assumes its niche to be the most important and the DM has to respond to the broad noisy crowd with a harmonised approach, e.g. HIV, TB, NCDs (non-communicable diseases), MCH (maternal and child health), PHC, NHLS (National Health Laboratory Service), PHC re-engineering, NHI, CQI (Continuous Quality Improvement), emergency services, NGO agendas, audits, arbitrary political promises – how do you plan to meet all these competing agendas without imploding?

Health workforce

DMs identified health workforce issues as one of the major constraints hampering service delivery. The challenges faced by DMTs in this regard predominantly revolve around the key issues of workforce planning, recruitment and retention, and were articulated as follows.

- Where do health workers with a specific skill-set need to be deployed in order to have maximum impact (workforce planning)?
- How does one bring new health workers into the system (recruitment)?
- How does one retain health workers in those positions for as long as possible (retention)?

The shortage of skilled health workers and managers was one of the most cited constraints. However, workforce planning is an area over which district management feel they have little control; as a result, district human resources plans seldom exist and human resources management is seen as an administrative rather than a proactive managerial function. Although DMs reported that they were participating in a national initiative to determine facility staffing norms, their interpretation was that planning to meet this staffing requirement would be a provincial and not a district responsibility. DMs often referred to what they perceive as a standard cost-control intervention by the province of freezing posts when there are resignations, irrespective of the impact this has on service delivery. Consequently, key clinical positions remain unfilled and management positions are sustained by an acting manager. One district reported that 50% of hospital managers were in "acting" positions. Ratios of managers to service-level staff can also be a challenge, in that budget allocations for management positions exceed the related operational budget. A major problem described by DMTs was the lack of responsive human resources information systems at district level to support planning.

Recruitment is another area in which districts have very little autonomy. Although DMs reported district-level participation in the interviewing of potential candidates, the actual appointment processes are usually centralised at provincial level. This approach is protracted and subject to postponement if the province is under budgetary pressure. A common effect is the collapse of clinical teams especially in rural hospitals. When clinical staff numbers fall below a certain critical level, the workload overwhelms the remaining team members, often resulting in all or many of them resigning in rapid succession. The effort to re-establish a clinical team will be disproportionately onerous.

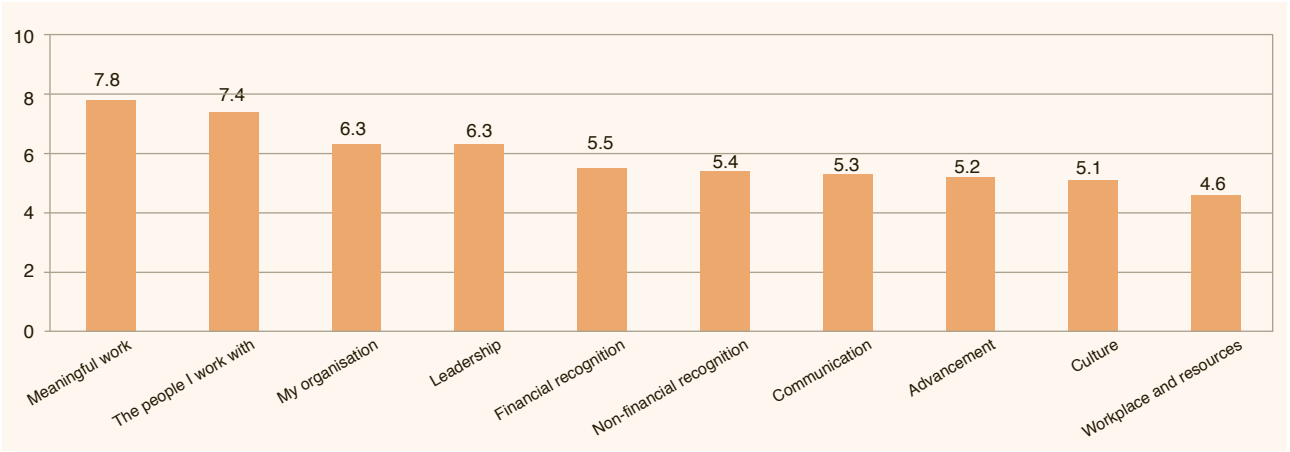
In 2013, Africa Health Placements, a non-governmental organisation working on issues of HR in health, conducted a survey of health workers and managers in nine rural districts and one urban sub-district in six of South Africa's nine provinces. Retention factors were examined from the health worker's perspective, where retention is dependent on the value they experience in their role, this factor being defined as the Employee Value Proposition (EVP). EVP is articulated as "a set of associations and offerings provided by an organisation in return for the skills, capabilities and experiences an employee brings to the organisation".[18] These associations and offerings can be described as leaders, organisation, people, workplace, communication, people processes (including work, opportunity and reward), and culture (central to all of these attributes).

Information relating to each of the EVP attributes was collected. The purpose of the survey was to enable district management teams to select their priority focus areas for HR capacity-building initiatives. Figure 3 presents the aggregated results.

EVP attributes, such as workplace and resources, financial recognition, co-workers and the organisation itself, create dissatisfaction in health workers if not addressed. EVP attributes, such as culture, recognition, advancement, meaningful work, communication and leadership, are those that drive engagement. It is important to note that satisfied employees do not equate to engaged employees. Engaged employees are those who are so enthusiastic about their work that they will behave in a way that acts to advance the goals of the institution, e.g. a doctor who works through lunch-breaks.

Encouragingly, and perhaps unsurprisingly, "meaningful work" received the highest rating. Health workers in the public sector clearly feel that their work adds value and makes a difference. This is a key engagement driver and a much more intractable attribute to institute when absent. Of the satisfaction drivers, workplace and resources were rated the most poorly, due to lack of hospital equipment and accommodation. However, more concerning was that three of the four most poorly rated attributes were those related to engagement and, thus, retention of health workers. The most foundational of all EVP attributes – culture – received the lowest rating. Perceptions regarding "disrespect", "favouritism", "management do not listen" and "lack of clear goals and vision" emerged as significant issues which were borne out by discussions with individual managers, all of whom expressed the desire to achieve high-quality health delivery. The core problem, then, seems to be one of a schism between intended purpose and visible behaviour. Of concern is a perception among some managers that if their district is in a popular city, and therefore an attractive destination for healthcare professionals, a focus on retention is not required. Overall, the impression is that management is distant from clinical staff in particular, and that a

Figure 3: Aggregated survey results measuring health worker satisfaction



Note: Employee Value Proposition attributes in nine rural districts and one urban sub-district in the South African public healthcare system (1 = least satisfied; 10 = most satisfied)

focus on creating an environment that is conducive to staff retention is not a priority.

Professional development of staff is a priority for districts, and resources are channelled via regional training centres for this purpose. Training is an area in which partnership with civil society organisations leverages substantial additional training resources. DMTs feel that staff have adequate access to professional development opportunities, although these tend to favour HIV-related clinical subjects due to the availability of donor funding. Fewer opportunities exist for other clinical subjects and management training, which were key gaps identified by DMs.

Management of staff around absenteeism and productivity was raised as an overarching problem, and addressing such issues is regarded as being dependent on facility managers' competency in human resource management, which is generally perceived as poor.

Information and research

South Africa's District Health Management Information System (DHMIS) encompasses the people, policies, procedures, hardware, networks and datasets, in addition to software solutions, to capture, process and manage required health information.[19] Despite widespread consensus regarding the importance of good monitoring and evaluation (M&E) and the "use of data to improve health systems performance, to respond to emergent threats and to improve health",[20] many DMTs concede that managers do not consistently and effectively use data for evidence-based decision-making, particularly with regard to planning and performance management. Although there are routine reports and datasets to promote information use (e.g. the annual District Health Barometer, National Health Laboratory Services laboratory results reports, 3-tier HIV cohort reports, and data extracts from DHIS), continued poor performance against key health service delivery indicators and gaps in adequate resource allocation highlight more systemic problems within the information building block for health systems strengthening. Reasons for sub-optimal use commonly cited by DMs include the lack of data availability and timeliness, poor data integrity and data validity, as well as the sheer quantity of data and their presentation format. Some managers also concede uncertainty relating to how data are and should be presented, as well as principles for correct interpretation and use in decision-making. Data quality is undermined by a multiplicity of data collection tools and a large number of data elements, inadequately trained data staff, poor data verification and validation exercises from facility to district level, changes in policy and reporting which do not necessarily coincide with updated data collection tools, and off-line data flow resulting in poor version control. In what can be likened to a vicious cycle, poor data quality contributes to sub-optimal use of data, and in turn, sub-optimal use of data perpetuates poor data quality.

Having recognised gaps in the implementation and interpretation of the DHMIS, the NDoH has clarified the vision of the DHMIS in the DHMIS Policy with its associated processes and standard operating procedures (SOPs).[19] These strategic documents provide clearer and more comprehensive guidance and standardisation in terms of the co-ordination and leadership of health information, indicator sets, data management, data security, data analysis and information products, data dissemination and use, as well as the DHMIS resource requirements (including human resources, hardware and interfaces between other information systems). In line with the standardisation of the DHMIS, the NDoH has taken a stance to streamline, harmonise and align the various tools and systems that contribute to the DHMIS. Most notably, the NDoH has clearly signalled that the only health information system tools to be used in public sector facilities will be the South African government's HIS tools, in particular DHIS, TIER.Net and ETR.Net and the affiliated stationery, registers and tick sheets. Parallel systems – the legacy of PEPFAR partners' roles in supporting public sector HIV clinics – are no longer permitted for use. The DHIMS policy establishes the framework for a strong and robust information system in South Africa.

However, there are three significant threats to successful implementation of the DHIMS policy: inadequate data ownership by all levels of management; insufficient planning and resourcing for information systems (human and information technology); and cumbersome data sets that inhibit easy use and dialogue around the meaning and implications of the data.

With regard to data ownership, the DHMIS policy articulates that the DM and not the information manager is responsible for mobilising the required resources to ensure the provision of strategic information, ensuring adaptation and adoption of provincial and national targets for the district, and enforcing that M&E forms part of every manager's performance agreement. Furthermore, managers' accountability for data is reinforced through the data flow process and SOPs, which stipulate that health establishment managers, sub-DMs and DMs must sign off that data submitted constitute a "true reflection of the situation".

For any information system to succeed, skilled data personnel and sufficient information technology infrastructure, including networking capability, should be in place. Unfortunately this is often not the case, as historically, data-capturer posts have not been designated as permanent and/or critical posts for recruitment. As one TA partner remarked:

> Some districts have adopted an internship approach to data capturers which would require recruiting and training and releasing a new cadre of data capturers on an annual basis. This seriously undermines quality as it takes three to six months for an adequately supported data-capturer to be fully functional in his/her role to feed quality information into the various HIS.

The transient nature of data-capturer posts also often results in contracts not being renewed in time, long-term vacancies and the added burden of training new data staff.

Concomitantly, the eHealth strategy and the DHMIS strategy are rapidly moving South African data onto electronic platforms (see Chapter 2). However, the requisite information technology (IT) support structures do not adequately follow pace. Existing IT departments at district level are often unable to respond to this strategy as they are usually understaffed, typically with only one individual responsible for IT management in a district. In addition, progress is hampered by limited operational budgets to roll out and maintain IT systems in an environment of outdated and/or non-functional computer equipment, poorly enforceable IT policies, non-existent and/or faulty networks and rampant computer viruses.

The importance of quality strategic information in managing implementation is integral to project management, as coined in the maxim: "What gets measured gets managed."[21] Unfortunately, most

DMs are compelled to manage programmes in an environment in which they do not have access to quality information; this scenario was summarised by a DM thus: "Decisions are not based on any evidence."

Medical products and technology

The availability of medical products and technology at facility level is dependent on a complex system that involves acquisition, procurement, storage, distribution, dispensing and in the case of medical technology, training and maintenance. Linked to this are the important issues of quality assurance, such as compliance with Good Pharmacy Practice and the implementation of effective and functional stock control systems to manage stock movement and prevent stock losses. Sustainability of reliable operational systems in the districts depends on continuous training of dedicated personnel, maintenance and regular upgrades.

Procurement is not a district-based function, as it takes place through national and/or provincial tender processes to procure and supply medical products to provincial pharmaceutical depots, stores or facilities. Although the benefits of central procurement, especially in reducing purchase prices, is acknowledged by DMs, the fact that district pharmaceutical management is seldom involved in item forecasting or budgeting exercises was identified as a constraint, as it creates a disconnect between procurement and actual need.

Management of medical products at the district level is envisaged to be the responsibility of district pharmacists; however, these posts do not exist in all districts despite these positions being essential for managing all pharmaceutical-related matters and supporting compliance with South African Pharmacy Council (SAPC) regulations in terms of the registration and accreditation of facilities and tutors. These incumbents are also needed to implement and monitor effective supply chain systems in collaboration with the provincial medical depots, oversee implementation of sound pharmacovigilance systems, and co-ordinate functional pharmacy and therapeutic committees and pharmacist forums.

Pharmaceutical stock control and dispensing technology at district and facility level are often outdated, poorly maintained, or do not exist. Manual stock card systems are used in all primary healthcare facilities and at some hospitals, placing strain on understaffed pharmacies, which in turn contributes to the drug stock outs frequently reported in the media. To address these problems, the NDoH has introduced a programme instituting direct delivery of identified high-volume medical and related surgical supplies from the manufacturer/distributor to hospital facilities, with the objective of relieving pressure on provincial medical depots. However, this might require additional storage space and stock control systems at hospitals to ensure that buffer stocks are available should suppliers be unable to adhere to contracted lead times. Efficient stock control systems will be required as hospitals will serve as "sub-depots" for PHC facilities.

Dispensing takes place within a highly regulated environment, as both the NDoH and the SAPC require all pharmacies (hospital and community health centres where pharmacists are deployed) to be licenced and registered with the SAPC. PHC facilities are required to be recorded by SAPC for quality purposes, although the South African government is mostly not compliant in this regard. The purpose of such registration and recording is to ensure the standardisation of infrastructure, storage conditions, equipment, material and procedures to support quality services to the public. SAPC accreditation of pharmacies is also required for the training of pharmacist assistants. Moreover, some provincial depots and public sector pharmacies are not registered and/or accredited for training of pharmacist assistants with the SAPC, which restricts the ability of these facilities to train pharmacist assistants.

At PHC facility level, dispensing and procurement of pharmaceutical and related surgical items usually falls on the shoulders of overburdened clinical nurses, often resulting in poor supply chain management. To address this problem, most districts are in the process of training and deploying post-basic pharmacist assistants. This process is being hampered by a shortage of pharmacies accredited as pharmacist assistant training facilities, and a general shortage of pharmacists to supervise training.

Healthcare financing

While districts do go through an annual budgeting process (District Health Expenditure Reviews) linked to developing DHPs, in general most DMs felt they had minimal actual control over their budgets, as decisions regarding budget allocation are made by the Provincial Treasury. These allocations appear to be done on the basis of historical budgets rather than on the budget needs presented by the districts, these being typically developed from a zero-based budget perspective linked to their DHP. The most cited constraint by DM respondents was that the budget allocations are insufficient to implement the annually developed DHPs, especially as new strategic objectives with additional service delivery requirements are introduced by the NDoH on a regular basis. These new activities were rarely accommodated in the previous year's budget, such that Treasury's use of a historical budget allocation fails to make provision for these new activities. In addition, there appears to be no system allowing the DMT to amend DHP objectives based on the actual resources secured. Consequently, implementation of the DHP proceeds with the DMT being fully aware that the budget is insufficient, as expressed by one respondent:

> Around the third quarter (of the financial year) you are in the position where you are out of pocket and you have to bring in austerity measures and the plan grinds to a halt.

Another challenge faced by DMTs originates from managing year-on-year adjustments to over- or underspending. Overspending in one year is deducted from the following year's budget, making it difficult for DMs to deliver consistent service levels and perpetuating the cycle of shortfalls at the end of each financial year. Underspending is generally viewed by DMs as a poor strategy:

> You will be punished in the next budget if you do not spend your money this year.

This creates a disincentive for DMTs to be frugal. The fact that allocation of budgets to PHC facilities is inconsistent across districts is often a major reason for overspending. Hospitals generally have an allocated budget, but this does not always apply to smaller facilities such as PHC clinics, where managers authorise expenditure without any indication of their budget limits.

The opportunities to generate additional income for the fulfilment of new activities are limited. One option is to apply for conditional grants; however, some districts reported that their management team does not have the ability to generate such applications. Another

option is to form strategic partnerships with NGOs active in the district, and although the DMTs are aware of such role-players, the possibility of drawing on the resources of NGO partners to make up for shortfalls in the district budget is not robustly considered or factored into the districts' budget planning processes. Drawing on NGO resources occurs either as an ad hoc initiative or at the instigation of NGOs.

Financial management is intended to occur through a process of quarterly reviews of expenditure against budget, but districts have limited mechanisms to manage over- and under-expenditure, except for relocating funds between budget line items. Reallocation between programme budget lines sometimes takes place without consulting the affected line managers. Quarterly reviews are not always conducted and the format of meetings varies between different districts. Some managers regard the strategic information that is available to them as insufficient to manage the district's finances.

The interview findings reveal that most line managers take marginal ownership of, or are accountable for, expenditure, and that the district Chief Financial Officer is viewed as the person responsible for all financial management. One respondent said:

> Finance is received from Province, and is controlled at the district by the Senior Finance Manager and her managers.

Compounding this lack of ownership, there also appear to be limited consequences for line managers who overspend on their budgets. Vacant financial manager posts at facility level are regarded as another challenge to effective expenditure management. The quality of financial information available to management is also problematic in some districts.

Leadership and governance

Leadership is often emphasised as a key success factor in any change management situation, and district health management operates in a perpetual environment of change due to the major healthcare reforms emanating from the NDoH.[22] What is apparent from the surveys is that managers often lack the required managerial competencies to fulfil this leadership role. Healthcare managers at all levels in the district are recruited from health professional cadres, which provides appropriate context for their management functions, but seldom includes formal management training. Although managerial qualifications do not necessarily guarantee managerial competency, appropriate qualifications constitute a logical starting point. In a survey of the management qualifications of 233 district-based managers at district and sub-district level, 21% (n=49) reported having a management qualification (ranging from 5% to 43% across districts) and another 10% (n=24) were in the process of obtaining a qualification (ranging from 4% to 36% across districts).

Another constraint identified was the negative effect on programme implementation resulting from managers being in acting positions or key positions being vacant. The general impression from DMs and TA partners was that managers in acting positions often interpret their role as being a caretaker function complicated by real or perceived restrictions on their authority to implement change. Unpublished research by the University of Pretoria School of Health Systems and Public Health has shown that one of the three major predictors for a hospital not meeting the national core quality standards for healthcare delivery is that of CEOs holding acting appointments.[23]

In the survey of management qualifications, vacancy rates were low overall, with the exception of one district reporting a 30% vacancy rate. Where data were available, the average duration in the post (128 managers) was 47 months (3.9 years), suggesting a relatively low management turnover within the districts. One district was significantly low, with average time in post being 20 months (1.8 years). Overall, management turnover was relatively low with an average of 1.6 managers in a specific post over the past five years. However, those with a single manager in the post over the past five years ranged significantly between districts from 72% to 27%, suggesting that management retention and turnover differs drastically between districts.

Turnover in senior managerial and political positions at both provincial and district levels results in inconsistent leadership, as noted by one of the respondents:

> Regular change of political and executive leadership at provincial level causes paralysis.

Managing politically connected appointees who enter the management structure via "cadre deployment" was also identified as a challenge, as these managers are seen as untouchable and create major performance management challenges for their superiors, especially if they are not committed or competent.

At an operational management level, the effectiveness of monthly management meetings to monitor progress and institute remedial action varies across districts. There is no consistency around who should attend such meetings, what is reported, and how it is reported.

Holding district management accountable through governance systems that represent district-based stakeholders is envisaged in the National Health Act through a structure of committees ranging from district health committees to hospital boards and clinic committees. The interview results paint a fragmented picture of governance structures across districts. Governance does not appear to be a priority for most of the DMs; none of the districts surveyed had all the required governance committees in place and no objective evaluation of how committees were functioning existed. The composition of the various committees, despite being prescribed in the National Health Act, varied between provinces and as a rule seemed to have little representation from civil society health service providers (NGO and private providers).

Recommendations

General recommendations

- The institutional design problems identified in the DBSA report still exist and issues around delegation of authority and management autonomy need to be resolved.[6] Districts should be granted the authority to implement DHPs, as only under such a scenario will it be possible to hold DMTs accountable for service delivery.

Service delivery

- Districts should be encouraged to develop longer-term strategic plans that allow them to customise the national policies and strategies supported by one-year work plans.

- It is crucial that DMTs develop strategic planning skills and have access to all relevant national and provincial strategic documents, preferably from a single online directory that is regularly updated.
- Districts should be encouraged to take into account all possible healthcare resources in the district when developing strategies, including those available in the private for-profit and not-for-profit environment. Involving all stakeholders (NGO partners, municipalities and other functional departments) in planning initiatives could be beneficial to ensuring better co-ordination of services.
- Priority should be given to ensuring that key managerial and clinical positions are filled with competent and committed people whose performance is monitored with appropriate rewards and sanctions.
- All employees in the district health system should be acquainted with the contents of the DHP.

Health workforce

- Workforce planning should be a priority activity for district management, supported by reliable strategic HR information that should be made available at all levels of the healthcare system, based on indicators that are easy to update and easy to understand by facility managers.
- Ratios for the number of managerial and administrative positions in relation to service delivery positions should be established.
- Recruitment times should be shortened, and the issuing of employment contracts should take place within a reasonable time (30 days) through devolving authority for issuing such contracts.
- Line managers' HR skills should be dramatically improved and performance management systems should hold managers accountable on HR indicators such as staff satisfaction, staff turnover and productivity.
- Comprehensive induction programmes that address clinical, social, cultural and logistical orientation of newly recruited health workers should be developed.
- Professional and personal isolation of managers and clinical staff in rural areas should be addressed through Continuing Professional Development sessions that convene health workers and facilitate action learning sets for managers.

Information and research

- To ensure data ownership, three immediate interventions are recommended: orientating all levels of managers on their roles and responsibilities in accordance with the DHMIS policy; updating performance agreements to include data verification and data use; and requiring all managers (not only the information managers) to use data from the South African government's Health Information Systems for their monthly reporting against targets at programme and/or facility level.
- Districts should allocate a larger operational budget for travelling, basic equipment and networking, as well as for a solid contingent of junior IT technicians who, under the supervision of a senior technician, would respond to facility and district-based complaints.
- Districts should explore point-of-care reporting using simple phone-based applications to capture data and process information.
- The use of dashboards, barometers and other data interpretation tools should be implemented to assist managers in translating data into information for decision-making that should be analysed at monthly management meetings. Key indicators should include clinical indicators (such as those in the District Health Barometer), financial indicators, supply chain indicators (stock-out rates), HR indicators, equipment maintenance indicators and laboratory indicators (specimen adequacy rates).
- A research culture should be developed at district level to ensure that grassroots learning is captured and disseminated. Research methods such as action research that are designed to improve managers' own practice should be promoted.

Medical products and technology

- The DMT, in co-operation with the district pharmacist, should develop annual pharmaceutical budgets and item forecasts for submission to the PDoH.
- District pharmacist positions should be filled and these pharmacists should play an active role in preventing overstock and expiry of items at all facilities by re-distributing items within the district.
- The provisioning and standardisation of computerised, user-friendly stock control and dispensing systems in hospitals and community healthcare centres is essential. Training and maintenance contracts must be available to support and sustain these systems in order to secure and monitor supplies for primary healthcare facilities. These systems should interface with the NDoH database.
- The DMT should budget and plan to ensure compliance of pharmacies and PHC facilities with SAPC regulations, and should settle annual registration fees for the facilities and pharmacy staff.
- All pharmacies must be accredited for training of pharmacy staff as required by the SAPC.
- Districts should encourage the "adopt-a-clinic" concept for community service pharmacists, who should visit and support primary healthcare facilities on a regular basis to support the procurement of pharmaceutical items and monitor compliance with Good Pharmacy Practice.
- The deployment of post-basic pharmacist assistants at all PHC facilities should be prioritised.

Healthcare financing

- The financial management process should be improved vigorously across all aspects, commencing with budget processes. Zero-based budgeting should be encouraged, preferably using an indicative amount as a baseline provided by the Provincial Treasury so that DMTs have an understanding of the expected funding.

- Budgeting should be done according to district-specific priorities, with sufficient authority devolved to the DMTs to allow them to adjust district objectives based on actual funds received.
- There is a need to bail out districts caught in a revolving deduction of the previous year's overspend from the current year's budget.
- Accountability for expenditure and income (in the case of user fees) should be devolved to the lowest possible line manager, such that clinic managers' budget ownership, with accountability by line managers, is built into their performance plans.
- If national priority programmes are introduced during a budget year, such programmes should be fully costed to district level and implementation demand should be subject to additional funding being provided.
- Standardised financial management tools and procedures should be developed allowing line managers to review their income and expenditure on a monthly basis, with interaction between the Chief Financial Officer and line managers where under- or overspend exceeds defined criteria.

Leadership and governance

- Ensuring managerial competence should be a high priority for all DMTs and all senior managers should acquire a management qualification. Where required, mentorship programmes should be instigated. Competency should be ensured through effective performance management using an objective outcomes-based system such as Balanced Score Cards.[24]
- Acting managers should have the required authority to fulfil the requirements of the post.
- The composition, agenda and reporting tools of monthly district management meetings must be standardised.
- The private for- and not-for-profit sector should be included as representatives on governance systems in preparation for moving towards a NHI system wherein all available resources in a district will be brought in to provide services.

Conclusion

The current design of the healthcare system in South Africa creates a situation wherein the success or failure of healthcare reforms will largely revolve around the strengths and weaknesses of district management. As such, it is critical to ensure that district management has the delegated authority, competency and resources to implement national policy and strategy. If these institutional design issues are addressed, DMTs can be held fully accountable for the success or failure of service delivery at local level. With ambitious reforms such as the NHI being implemented, it has become a matter of urgency for policy-makers to commit to creating and sustaining a DHS characterised by effective decentralised decision-making and authority.

The thrust of this chapter is encapsulated in the following perspective expressed by management guru Peter Drucker:

> Effective organisations take it for granted that work isn't being done by having a lovely plan. Work isn't being done by a magnificent statement of policy. Work is only done when it's done. Done by people. Done by people with a deadline. By people who are trained. By people who are monitored and evaluated. By people who hold themselves responsible for results.[25]

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National Health Insurance and South Africa's private sector

9

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As limited information has emanated from government as to the role of the private health sector in the National Health Insurance (NHI), this chapter directs the enquiry towards the private health sector in order to establish what it perceives as its role in a post-reform healthcare industry. Private health sector stakeholders are identified and surveyed. The key issues relating to the private health sector are then considered thematically according to the key functions of the health care system: revenue collection, pooling, purchasing and delivery. South Africa is fortunate in having notably high-quality healthcare resources in the private sector; it is essential for these resources to be properly deployed in order to accomplish the ambitious objectives of the NHI plan in a timely and comprehensive manner.

South Africa is fortunate in having notably high-quality healthcare resources in the private sector; it is essential for these resources to be properly deployed in order to accomplish the objectives of the NHI plan in a timely and comprehensive manner.

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Introduction

South Africa has a dual healthcare system, with a public health-care sector funded through the national fiscus that operates in parallel with privately-funded healthcare provision. In the 2010/11 financial year, health sector expenditure in South Africa made up 8.8% of Gross Domestic Product (GDP), with approximately half (50.4%) of this expenditure occurring in the private sector.[1] However, South Africa's health outcomes fall below the quality standards achieved in comparable upper-middle-income countries,[2] and the country's healthcare system has been described as being both inequitable and inefficient.[3]

The inequity between public and private health care in South Africa relates to disparities in both financial and human resources, with the private sector being considerably better resourced.[3] Health systems debate in South Africa continues to be polarised along the lines of the roles of the "public sector" and the "private sector". It is important to recognise within this debate that, far from being a single entity with homogenous objectives, both the public sector and the private sector are exceedingly complex, comprising a large number of diverse stakeholders with differing perspectives.

The substantial size and financial importance of private healthcare delivery in South Africa is illustrated in a recent report by Econex estimating that the private sector held 37% of general practitioners (GPs), 59% of specialists, 38% of nurses, 35% of hospitals and 28% of hospital beds.[4] The delivery of private health care in South Africa is described as being "well developed, resource intensive and highly specialised".[5] A 2008 study by The Monitor Group on global healthcare system performance ranked South Africa's private sector as fourth-best after Switzerland, the Netherlands and Belgium.[6] This concentration of resources in the private sector, servicing a relatively small proportion of the population, poses a challenge in terms of equity and efficiency, but also an opportunity to make better use of the high-quality capacity that is available in the country.

In addition to healthcare service provision, South Africa has a well-established medical scheme and health insurance industry, which has roles in funding, pooling, managed care and administration. Medical schemes are the primary private health financing mechanism in South Africa, and provide near-indemnity cover to 8.8 million beneficiaries, representing 16.6% of the population.[7,8] This covered population, which includes a large number of state employees, relies almost exclusively on the private sector for health care. There is also significant out-of-pocket expenditure in the private sector: it is estimated that at least 28% of the population receive some care in the private health sector.[4]

Medical schemes are not-for-profit entities operated for the benefit of their members and regulated on social-solidarity principles. They form an important part of employee benefits in South Africa, with membership frequently being a condition of employment. Consequently, medical schemes and the for-profit entities that surround them have strong relationships with employers and organised labour. In 2013, there were 25 open-membership schemes and 64 restricted-membership schemes,[a,7] as well as 17 medical scheme administrators operating in the industry.[9] There has also been growth in other healthcare financing products offered by health insurers, which include hospital cash plans, critical illness cover, disability cover and gap cover.[4]

National Health Insurance (NHI) has been proposed as the solution to reform the healthcare sector in South Africa in order to decrease the prevailing level of inequality and inefficiency. At the time of writing, the NHI Green Paper,[10] released in 2011, provided the most recent official view on the potential roles to be played by private sector healthcare providers and funders in the envisaged reform of South Africa's health system. The Green Paper states that private sector providers (primarily general practitioners) may choose to contract with the NHI fund, and that medical schemes will be allowed to operate in conjunction with the NHI, possibly in the form of providing top-up insurance. On the whole, the Green Paper contains little discussion on the role of the private sector in NHI and areas for potential collaboration. The introduction of NHI is bound to have a significant impact on the private health sector, and despite the latter's economic importance, engagement between the National Department of Health and private health sector players on relevant issues has thus far been limited.

South Africa is fortunate in having notably high-quality healthcare resources in the private sector; it is essential for these resources to be properly deployed in order to accomplish the ambitious objectives of the NHI plan in a timely and comprehensive manner. For this to succeed, it is imperative that there be substantive engagement with the relevant private sector stakeholders so that their perspectives and concerns are properly considered and understood. Furthermore, engagement with the private sector is necessary in order to access its extensive expertise on a wide range of healthcare issues. As limited information has emanated from government as to the role of the private health sector in NHI, this paper directs the enquiry towards the private health sector itself in order to establish what it perceives as its role in a post-reform healthcare industry.

The paper begins by identifying private health sector stakeholders and outlining the methodology utilised for this investigation, namely a survey of key stakeholders and a thorough desktop search. The key issues relating to the private health sector are then considered thematically according to the key functions of the healthcare system: revenue collection, pooling, purchasing and delivery.

Private-sector stakeholders

Key private health stakeholders, listed by their functional role in the health system, include:

- Revenue collection: individual members of the public, employers, brokers and all taxpayers (including those paying income tax, value-added tax (VAT), fuel levy and customs and excise taxes);
- Pooling: medical schemes and medical scheme members;
- Purchasing: medical schemes, medical scheme administrators, managed care organisations; and
- Delivery: hospitals, pharmaceutical industry, medical practitioners, nurses, pharmacists and pharmacy owners.

a Restricted schemes are those schemes that do not compete in the open market but exist to serve certain groups, such as employee schemes. The Government Employees Medical Scheme (GEMS) is an example of a restricted scheme.

This stakeholder categorisation follows that used by Ramjee and McLeod in the 2010 edition of the *South African Health Review*.[11] Key stakeholders in each of these categories in the South African private health sector were identified and contacted so as to capture an overview of the private health sector response to NHI. Representatives of key stakeholder organisations were contacted via email in early 2014 to elicit information on their organisation's responses to NHI, framed around the following issues:

- the aspects of NHI implementation that will potentially have the greatest impact on the organisation;
- how these aspects will pose a challenge to the organisation;
- how the organisation has prepared for these challenges;
- the organisation's vision of how it sees itself contributing toward universal health coverage; and
- the obstacles that the organisation faces in fulfilling this vision.

Additional information regarding the organisation's participation in the development of NHI was also requested:

- participation in spaces for multi-stakeholder debate and discussion (workshops, forums and meetings with government);
- written submissions and proposals to government;
- involvement with the Ministerial Advisory Committee;
- other engagement with key decision-makers; and
- any other forms of public expression (creation of a web portal, academic publications, engagement with media, email lists, specific research, etc.).

The organisations were also requested to supplement their responses with any additional relevant documentation. The questionnaire was approved by the University of Cape Town Ethics Committee. Respondents were given the option of anonymity (although none of the respondents exercised this option). It was clear from the responses that the submissions were undertaken in a spirit of transparency and open engagement.

A total of 27 organisations from a number of industries were contacted, including healthcare providers (including the pharmaceutical industry), professional bodies, funders, medical scheme administrators, managed care organisations and research consultancies. Eight responses were received, representing a response rate of 29.6%. Whilst this is a relatively low response rate, the respondents represent a sizeable proportion of their respective industries, and they provided sufficient feedback for a comprehensive outlook on the private sector's perspective on the NHI to be gathered.

The respondents make up over 50% of the medical scheme administration and managed care market for both open and restricted medical schemes. In addition, the medical scheme representative body that responded to the questionnaire represents over 95% of all medical schemes in South Africa. With regard to health service delivery, the hospital group that responded represents over 20% of the private hospital industry. The medical practitioner associations that responded each have substantial membership bases. To complement the responses received, a thorough desktop search was carried out to identify relevant additional material, from those who chose to participate and from those who did not.

Revenue collection

The financing of NHI remains an area of uncertainty for stakeholders. There is lack of clarity over the financing mechanism, the level of the financing burden and the risk adjustment mechanism to be used between payers (whether these are medical schemes or health districts).[12,13] A discussion document on NHI financing mechanisms, initially expected from the National Treasury in April 2012, has not yet been made available.[14] The financing implications are a key issue for civil society, unions and employers.

Between May 2010 and June 2011, the Black Sash and its partners conducted workshops in each province with participants chosen from a broad geographical area and including representatives from human rights organisations and socio-economic rights organisations, as well as health and health-affiliated organisations.[15] There was a solid consensus, among all consultations conducted in the nine provinces, in favour of the introduction of a tax-funded NHI system "on condition that it would be able to provide a substantially improved and quality healthcare system which is accessible to everyone".[15] The majority of participants agreed that there was a need to improve the healthcare system and to provide quality healthcare even to the poorest of individuals without charge.[15]

The Black Sash community consultations[15] revealed that citizens on the ground perceive the South African healthcare system as needing to incorporate the following key (social solidarity) principles:

- Everyone should have equal access to healthcare, regardless of their ability to pay.
- Contributions to the fund should be linked with the individual's ability to pay (i.e. contributions based either on taxable income or payroll).

The participants also agreed that certain categories of people should not be asked to contribute to a health system. These categories included the unemployed, those receiving social grants, the elderly and those whose income falls below the tax threshold.[15] A preference was indicated for funding through Pay-As-You-Earn (PAYE) or the employer payroll tax or a combination of both, as opposed to funding through VAT (i.e. a progressive rather than regressive approach).[15] However, an alternative view was presented that everyone should contribute to the health system so that they could play an active and recognised role in it.[15]

The Innovative Medicines South Africa (IMSA) policy brief on the tax base in South Africa is a useful resource regarding options for financing NHI.[13] By way of illustration, the policy brief outlines the impact of a mandatory contribution of 8% of taxable income on those with taxable income in the band between R150 001 and R300 000. The results indicate an increased tax burden of approximately 50% on this group. The size of the personal income tax base, as well as the heavy reliance on the highest income groups, poses a challenge for sustainable financing of NHI. The policy brief also explains the difference in tax incidence if the NHI contribution were deducted as a percentage of pay-roll, due to the effect of excluding earnings such as commission, rental income, interest and investment earnings.

Without details of the financing mechanism for and the burden of implementing NHI, and the potential implications for other aspects of State spending, it is close to impossible for civil society engagement to proceed beyond the point of accepting the socially desirable goals of improving access to quality healthcare.

The Actuarial Society of South Africa (ASSA) NHI task team has constructed a model to assist with the evaluation of healthcare system financing outcomes.[16] Actuarial expertise is necessary to support the long-term sustainability of NHI.[17] Ongoing assessment of the budgeting and financing requirements will be required, allowing for:

- healthcare cost and utilisation drivers over the short and long terms;
- demographic transitions; and
- economic uncertainty.

As discussed in Ramjee and McLeod, a number of models were put forward to estimate the total cost of NHI earlier in the reform process.[11] In the period since the publication of the Green Paper, there have been no further public attempts to quantify the cost of NHI. It is anticipated that further technical work will emerge from stakeholders once more concrete financing proposals have been presented.

Pooling

The IMSA NHI policy brief describes pooling as "the accumulation and management of revenues in such a way as to ensure that the risk of having to pay for healthcare is borne by all the members of the pool and not by each contributor individually".[18] As stated, medical schemes constitute the primary private pooling mechanism in South Africa. Medical schemes have always been not-for-profit entities that are owned by their members and managed by boards of trustees. They are however, surrounded by (and confused with) a number of for-profit entities that provide a range of services such as administration, marketing, managed care, consulting and advisory services.[19]

Despite the size of the medical scheme industry and apparent demand for medical scheme cover, the medical scheme industry has been criticised on a number of fronts, *inter alia* the unaffordability of cover,[20] a lack of innovation, passive purchasing of healthcare,[19] and a failure to curb escalating healthcare costs.[21] These criticisms raise a number of questions:

- Is there a role for private health insurance in South Africa?
- To what extent is the current regulatory environment responsible for the failings of medical schemes?
- What strengths (if any) do medical schemes have that can be utilised in the reform of the health system?

A brief history of medical schemes

In order to frame the history of medical scheme funding, the concepts of mutuality and solidarity need to be outlined. These concepts are related but are fundamentally different in nature. Both speak to the mechanism of pooling, but with an important difference. Mutuality relates to the pooling of risks after being assessed, where contributions are paid according to the assessed risk (typically, insurance).[22] Solidarity is similar to the pooling of risk, but with the important distinction that contributions are made according to some other measure – typically, ability to pay.[22]

Reforms during the 1980s and early 1990s saw an industry based on principles of mutuality (i.e. lives were underwritten and risk-rated), with mandatory benefits removed in 1994.[23] The overall number of beneficiaries covered grew during this period[23] but there was a decline in access to cover for vulnerable lives.[19] The period was characterised by relatively weak governance, particularly for open schemes.[23] Schemes saw a rapid escalation in non-healthcare costs – particularly brokerage, reinsurance and managed care.[24] There was little innovation within medical schemes themselves during this period, other than the introduction of so-called low-income products in the late 1990s.[25] However, it is unclear how market forces would have played out given enough time and stronger governance.

The current regulatory environment for medical scheme funding (applicable since 1 January 2000) re-introduced key elements of social solidarity: open enrolment, community rating and the provision of a prescribed package of minimum benefits. The Regulations are regarded as being incomplete in a number of ways:

- Membership is voluntary, not mandatory.
- There is no mechanism for system-wide income cross-subsidies (although schemes are permitted to vary contributions by income), and the tax-expenditure subsidy applies only to those above the tax threshold.
- The proposed Risk Equalisation Fund (REF), which would have made monthly risk-adjusted payments to medical schemes, was never implemented.

A number of policy proposals for mandatory health insurance have been made since the advent of democracy in South Africa (see Ramjee and McLeod[11] for a history of the reform process). All the proposals envisaged that medical schemes would continue to play a role as financing intermediaries. The earlier vision of mandatory insurance was that cover would be provided for contributors and their dependants, whilst the more recent NHI proposals have argued for universal coverage. There has been a policy shift away from the retention of the current two-tier system (whereby formal-sector workers access a different package of benefits to those who receive their care from tax-funded public sector health services) to the creation of a single tier.[26] As stated earlier, the role of medical schemes in the most recent proposals has not been clearly articulated.

The current medical scheme environment

There is view among stakeholders[4,12,27-30] that there has not been sufficient regulatory attention paid to the current stability, sustainability and affordability of medical schemes. As such, these stakeholders feel that not enough is being done to ensure that the past and present criticisms of the medical scheme environment, as described earlier, do not continue. Although this issue is not directly linked to NHI, it is nonetheless a concern that NHI preparations may be compromised by increased instability of medical schemes. Some of the regulatory reforms envisaged, if implemented, to improve the sustainability of medical schemes in South Africa, are as follows:

The argument for risk equalisation

There are currently 90 medical schemes covering approximately 8.8 million people.[9] All of these schemes are able to offer a range of benefit options, each of which is required by regulation to be self-sustaining and separately community-rated – effectively causing multiple small risk pools as opposed to one large one,[19] although this is offset to some extent by the scheme-wide solvency requirement. With a total of 323 benefit options on offer, this results

in an average risk pool size of fewer than 30 000 people.[9] The proposed (and subsequently shelved) Risk Equalisation Fund (REF) would have enabled community rating for Prescribed Minimum Benefits (PMBs) to occur on an industry-wide basis, and would have ensured that members of a particular pool would be neither advantaged nor disadvantaged by its risk profile. Without REF, the extent of risk cross-subsidisation, and hence solidarity, is limited to members of the same (on average, rather small) risk pool. The REF presents a genuine opportunity to learn about sustainable cross-subsidisation on a national scale.

To ensure their sustainability, open schemes predominantly compete on their ability to attract the right risk profile of members. This imperative for schemes has become the predominant factor driving their strategy, with consequent negative implications for the vulnerable members the legislation is intended to protect. Community rating, together with risk equalisation, can reduce the benefits to insurers that compete on the basis of "cream-skimming", encouraging instead competition based on efficiency and service delivery.[26]

Demand, affordability and growth

Medical schemes offer, to those who can afford them, products that are generally valued by those covered and by employers. This is evidenced by inelasticity in the demand for medical scheme cover[31] and high levels of coverage among higher income groups.[21] A pay-roll tax to finance NHI has been estimated to have a minimal impact on the demand for medical scheme cover.[2]

However, medical scheme cover is unaffordable for the vast majority of South Africa's citizens[32] and the rising cost of cover has been put forward in numerous fora as part of the motivation for the introduction of NHI.[21] From 2001 to 2011, contribution increases exceeded the Consumer Price Index by, on average, 3.9% per annum.[33]

The affordability pressure undermines social solidarity in two key ways: it limits the extension of cover to a larger portion of the South African population, and it results in (both existing and new) beneficiaries purchasing lower cost-benefit options or deregistering dependants (particularly children).[19] Younger and healthier beneficiaries tend to be more price-sensitive and are therefore more prone to the "buy-down phenomenon".[33] Deregistration of dependants is evidenced by a declining dependant ratio, currently 1.3 dependants per member in open schemes as compared to a ratio of 1.6 in 2005.[9]

The current environment offers limited income cross-subsidisation. Those earning above the tax threshold receive a tax credit to partially offset medical scheme contributions – but there is nothing in place for those earning below the tax threshold. Medical schemes are also permitted to vary contributions by income. However, this practice has declined in open schemes due to the risk of anti-selection, with approximately 20% of open scheme options offering income bands in 2013. Restricted schemes are better placed for some degree of social engineering.[19]

This scenario bolsters the argument that implementation of REF would have enabled industry-wide income cross-subsidies to be achieved. Mandatory participation of persons earning above a certain threshold would assist in containing costs (by limiting anti-selection) and entrenching social solidarity principles. There is also an opportunity to align the package of PMBs that medical schemes are required to offer with the values of the NHI Green Paper, particularly in terms of primary and preventative care.

A medical scheme is primarily a fiduciary vehicle with no shareholders, and with 50% of the board appointed by member election. This means that the board's strategy is likely to be predominantly conservative in nature, and will act in the interests of the current members as opposed to the broad population, including the currently uncovered. Unlike a profit-driven organisation, a medical scheme is not specifically incentivised for growth. Actions are therefore driven by the sustainability of the scheme, in particular – given community-rating regulations and the absence of risk equalisation – attracting a sufficient number of new members of the "right" profile to ensure the continued financial wellbeing of the scheme. Linked to this, the current solvency requirement for medical schemes is 25% of gross contributions. This formulation, in combination with the non-profit nature of medical schemes, creates disincentives for scheme growth.

Demarcation

Demarcation between medical schemes and other health insurance products is a persistent area of contention.[34] The contested space between medical scheme cover and health insurance has implications for the sustainability of medical schemes in the preparatory phase of NHI. Other health insurance products are permitted to be sold on a for-profit and risk-rated basis, making clear demarcation necessary to prevent "cherry-picking" by insurers. This demarcation means that other health insurance products are not permitted to offer indemnity or near-indemnity cover. The key products are hospital plans, which pay out claims based on the length of a hospital stay, and other limited top-up insurance products, which purport to pay for some out-of-pocket medical expenses. Whilst medical schemes provide greater protection than health insurance products, they are also more expensive.

Twin-peaks regulation and risk-based capital

Medical schemes are regulated by the Council for Medical Schemes, whilst responsibility for oversight of the rest of the financial services industry currently lies with the Financial Services Board. South Africa is moving towards twin-peaks financial-services regulation, whereby the Financial Services Board will maintain responsibility for market-conduct regulation whilst the South African Reserve Bank (SARB) will provide prudential regulation.[35] Currently, solvency requirements for medical schemes are at odds with a move towards risk-based capital in the rest of the financial services industry.[36] The current solvency formulation discourages growth, and advantages small schemes,[36] however there may be other factors at play that offset this dynamic as evidenced by the growth of Discovery Health Medical Scheme and GEMS.

Multi-payer systems and a pluralistic approach to financing

The case for the continued existence of medical schemes in a post-NHI healthcare environment rests on the ability of schemes to contribute to national social solidarity goals and on the promise of subsidiarity (i.e. that medical schemes can provide an efficient and sustainable insurance solution). The ability of medical schemes to contribute effectively to social solidarity is severely hampered by the partial implementation of social health reforms. The policy shift to NHI has meant that this "unfinished agenda" is set to prevail,

in effect creating an industry that is a "regulatory orphan".[37] Ultimately, the policy environment robs medical schemes of a fair opportunity to demonstrate their potential to contribute more widely to social solidarity.

Both the International Labour Organization (ILO) and the Organisation for Economic Co-operation and Development (OECD) recognise a potential role for private health insurance. According to the OECD:

> Governments in several OECD countries have used or considered using private health insurance (PHI) as a policy lever to promote certain health system goals, such as reducing financing pressures on public health systems, promoting individual choice and improving efficiency.[38]

The ILO Social Security Department suggests optimising existing forms of social health protection in order to achieve universal coverage (referred to as a pluralistic approach).[39]

The ILO pluralistic approach ties in with the concept of subsidiarity. Subsidiarity need not exist separately from solidarity, as illustrated in the history of the Dutch medical funding system.[40] The NHI Green Paper sees the introduction of NHI as a means of introducing more social solidarity into the system, without examining the possibility that this could be delivered (at least partially) by medical schemes. It is evident that South African policymakers view subsidiarity in contrast to social solidarity, and not as a mechanism for achieving it.

There is a variety of potential models for the role that medical schemes could play under NHI. Key examples include substitutive cover, duplicative cover, complementary cover and supplementary (top-up) cover.[11] Under a substitutive-cover model, people may choose to belong to NHI or to a medical scheme providing the equivalent of NHI as a minimum set of benefits.[41] Duplicative cover entails private cover being offered as an alternative to the central system on a form of "opt-out" basis, with contributions to the central system still required.[38] Supplementary insurance offers a choice of cover for either a better experience of services covered by the public scheme (e.g. shorter waiting times, greater comfort and convenience, etc.) or for benefits that are not covered by the public scheme.[38]

If medical schemes were to provide duplicate cover under NHI, it is likely that there will be, over time, an opting out of current medical scheme members due to affordability constraints. Opting out is likely to be selective in nature (as the young and healthy are the least likely to pay twice for cover), which will increase the cost of private cover due to deterioration of the risk profile.[30] A situation where medical schemes provide top-up cover will facilitate a transition mechanism during the incremental implementation of NHI, as schemes can offer greater or lesser top-up cover.[42]

There is strong support from private-sector stakeholders for a multi-payer system.[28,30,42] South Africa could establish a single fund with its advantages of risk pooling and cross-subsidisation, and utilise the advantage of stronger negotiation and buying power, whilst retaining multiple payers and/or administrators.[12,41] The Green Paper proposes devolving at least some of the purchasing functions to District Health Authorities.[10] The uncertainty as to whether the government will facilitate a single- or multi-payer model is fundamentally important for the medical scheme industry in order for entities to define an appropriate strategic direction.[30] The extent of and manner in which skills and systems developed in the private sector over time will be utilised is uncertain and is heavily reliant on this aspect.[30]

A multi-payer system harnesses competition to control costs and create incentives for payers to improve quality and fulfilment of consumer rights.[42] Such a system also facilitates improved accountability and overall governance, and allows for the continued involvement of employers and organised labour.[42] However, effective competition is critical to the success of a private market. International experience points to low levels of mobility between insurers, spurred by high barriers to entry for new players, and product complexity which makes price comparisons difficult.[38] South Africa, by contrast, has relatively high levels of mobility between medical schemes, driven by broker activity.[5] The authors utilising Council for Medical Schemes data estimated the overall level of movement of members (non-renewal rate p.a.) in the industry to be 12.74% in 2012 (although this shifts to 21.37% p.a. if Discovery Health Medical Scheme is excluded, as it has a particularly low non-renewal rate of 4.73% p.a.). International experts have recommended that a limited set of standardised benefit packages should be offered by medical schemes.[43] Standardised benefit design has also been shown to improve mobility and therefore competition; however, this should be offset against allowing providers to "innovate in response to market changes".[38]

Whilst it is possible to create a multi-payer system that is not inconsistent with a single-tier system (whereby all South Africans would have access to exactly the same range of services and types of healthcare providers), there remains support for a multi-tiered system.[29] It is important to note that universal coverage does not necessarily equate to a single-tier system.[11] Universal coverage can be achieved through a combination of funding methods, as in the pluralistic financing approach supported by the ILO.[39] The equity and risk implications of merging risk pools with very different characteristics (the currently insured vs. those that are uninsured) into a single risk pool have not yet been adequately considered.[28]

The continued existence of medical schemes once NHI is implemented will reduce the burden on the fledgling NHI, particularly given that the medical scheme market is skewed toward an older population with a heavier burden of chronic disease.[28] If setbacks are experienced in terms of NHI implementation, medical schemes could carry some of the health funding burden.[42] A tax incentive to subscribe to a medical scheme (such as the current tax credit) will assist in supporting medical scheme coverage.[28] Progressive employer subsidies, such as those implemented by the State for members of GEMS, also have an important role to play in supporting coverage.

Purchasing

The purchasing function in the private health sector in South Africa is currently fulfilled by medical schemes, and by administrators and managed care firms on behalf of medical schemes. These entities play a key role in acting as intermediaries between providers and members, as well as in purchasing services on members' behalf. Principally, this involves two roles, namely that of making the trade-off between cost and value for members (essentially product development), and that of containing those costs.

In this section, we discuss the effectiveness of medical schemes in these two roles, and proceed to explore the relationship between

medical schemes and their service providers. Lastly, we detail the considerable expertise and experience held by administrators and managed care organisations in the pooling and purchasing functions of a healthcare system.

Product development and cost containment

Internationally, a strong private health insurance industry has been shown to foster innovation in improved funding structures and in rapid adoption of new benefits.[38] To some extent, product design innovation in South Africa is constrained by the requirement that schemes offer a package of PMBs. PMBs account for a large proportion of a scheme's actuarial liability (approximately 60%) and therefore dominate product design. There is strong contention from stakeholders that PMBs increase the contribution rates for medical schemes, due to poor benefit definitions and unregulated medical prices.[44,45] As they stand, the PMBs encourage hospitalisation through members bypassing the lower levels of treatment such as general practitioners and going directly to specialists. In addition, medical schemes are required to cover the full cost of treatment without limit. Consequently, claims for PMBs have increased more rapidly than for non-PMBs.[24] A revised set of minimum benefits has been proposed which would be much cheaper to provide and hence increase contribution affordability.[46] The Council for Medical Schemes argues that PMBs are not a cost-driver, despite evidence to the contrary.[9,33]

The statutory open-ended liability created by PMBs makes it difficult for schemes to contain costs, placing upward pressure on claims costs.[37] Schemes do have some tools available to them to manage costs: they can contract with designated service providers to limit price risk, and they can make use of clinical protocols such as formularies and treatment plans. However, schemes cannot offer significantly reduced-premium options that offer limited coverage of PMBs (even if explicitly marketed as such). This means that members and potential members cannot make the trade-off between coverage and affordability. One detrimental effect of this is that a scheme aimed at offering a solution for medical cover to lower-income markets will struggle to find a sustainable business model, and even those altruistic schemes seeking to subsidise such an option are prevented from doing so by regulation that requires each benefit option to be financially sustainable.

The PMB package is intended to protect members, and to limit the ability of schemes to use benefit design as a means of cherry-picking. Despite these protective mechanisms, McIntyre contends that schemes provide insufficient financial protection for their members:

> Over and above these contributions, medical scheme members also have to make substantial out-of-pocket payments in the form of co-payments, covering the costs of services not covered by schemes or paying for services once the annual benefits have been exhausted.[21]

Therefore, despite the significant cost of the provision of PMBs, some feel that the PMB package does not go far enough to protect members.

Cost containment has been a key issue in the healthcare space globally, and the South African context is no different. While medical scheme non-healthcare costs have remained below inflation since 2008, medical costs have escalated at a rate significantly higher than inflation over the same period.[47] The above-inflation increases in healthcare costs can be driven by:

- changes in the risk profile of the covered population;
- changes in benefit richness within benefit options;
- increased utilisation of benefits for a given risk profile and set of benefits; and
- changes in the price of medical goods and services (true medical inflation).

It is not possible to disentangle these cost drivers, and further research is required on this issue. Whilst medical schemes have limited control over risk profile, they can impact on the latter three through trade-offs in benefit design and effective cost management. To the extent that cost increases are not driven solely by risk profile changes, an increased cost base may be justifiable if it reflects consumer preferences. The lack of consumer willingness to accept higher costs of cover is evidenced by both the buy-down phenomenon and observed reduction in family coverage. Furthermore, claims made out of savings accounts that members themselves control increased by only 1.6%, while risk claims increased by an average of 8.2%.[47] This would suggest that increases are not due to every member's increased appetite for healthcare expenditure. The combination of these factors may indicate a breakdown between consumer preference and medical scheme purchasing. This is a common feature of healthcare markets, known as the third-party payer effect.

The relationship between medical schemes and their service providers

The Genesis report describes the administrator market as being competitive due to low barriers to entry, oversight by the Council for Medical Schemes, and the ability of schemes to switch administrators.[48] Competition between service providers for schemes' business has driven innovation in various areas, notably in capitation services and managed health care. This has demonstrated that the system can be responsive.

However, administrators are also constrained by the environment – particularly in their ability to start a new scheme. The arbitrary solvency requirement of 25% of gross contributions leaves schemes at risk of insolvency due to high growth, and there are limited methods of funding a new scheme in an economically viable way. The number of schemes in the market reduced from 97 to 90 in the period 2011 to 2013,[9] with no new schemes being added in that period. This leaves administrators merely competing for the work of existing schemes, many of which have entrenched relationships.

Van den Heever differentiates between strong schemes (those to which service providers must bid for business) and weak schemes (those having entrenched relationships with service providers).[23] Current entrenched relationships between administrators and schemes are a major limitation on the ability of administrators to compete, and the ability of schemes to capture potential savings from economies of scale.[49] The current rationale for medical schemes being structured as not-for-profit trusts is to ensure strong governance. For weak schemes, the distinction between scheme and administrator is increasingly arbitrary, which raises the question of whether medical schemes would be more effective were they to be run on a for-profit basis. Importantly, this would not necessarily be at odds with solidarity objectives.

Skills and systems

There is significant business risk to administrators and managed care firms of a reduction in the number of beneficiaries with medical scheme cover[30] – a risk that could be mitigated by utilising their capacity in the management of NHI. Industry players have indicated a willingness to redefine and restructure business to utilise the skill and systems developed to assist government in implementing NHI.[28,30,41,42]

There are significant human resources that are required for the management of a fund. Consequently, it will take many years to build up an efficient organisation for fund management if the private health sector is not used.[41] The Government Employees Medical Scheme (GEMS) provides a good example of public-private collaboration, illustrating the effective use of the skills and resources of the private sector and the use of multiple service providers in a single fund.[41]

In terms of the pooling functions of the system, key areas of expertise include beneficiary communication (including healthcare call centre efficiency, mobile apps and benefit verification), data integrity and security, real-time processing of clinical and financial information, and record-keeping.[28,30,41,42]

Administrators and managed care organisations also have substantial experience relating to the purchasing functions of a healthcare system. Current expertise includes contracting on a fee-for-service basis on behalf of the fund, building of provider networks, establishing capitation arrangements, performance-based reimbursement, developing Diagnosis-Related Groups (DRGs) and establishing alternative risk-sharing arrangements with hospitals.[28,42] Experience with required service agreements will be increasingly important to support the split of the State's purchasing and provision functions. If the NHI fund were to purchase care from private-sector providers, expertise on provider network management will be required. This includes recruitment, contracting, communication and support services.[42]

The private health sector is able to provide significant resources relating to clinical coding, storing of clinical data and data analytics.[42] Such health informatics are seen as crucial, regardless of the final form of NHI, as they allow for better measurement of the appropriateness and efficiency of care, and for better management of supply-side costs.[28,41] Health informatics form a critical component of supporting the purchaser-provider split.[28]

Public-private partnerships could also assist in the management of risks associated with the provision of healthcare.[28,30,41,42] The private sector has a wide range of skills in this regard, including:

- the management of pharmaceutical costs;
- health technology assessments (assessment of new technologies for cost-effectiveness, innovative benefit structures and price negotiation);
- beneficiary segmentation and selection for care co-ordination;
- disease management programmes;
- sophisticated clinical reviews;
- peer review and provider profiling;
- management of chronic conditions;
- fraud management initiatives including forensics, profiling and sophisticated computing algorithms;
- clinical advisory services; and
- clinical governance structures.

Technical support in the private sector is available to support price determination for alternative reimbursement and to enable measurement of the efficiency of delivery and quality of outcomes.[16]

Delivery

There is a clear need to reform and improve service delivery, and a need for improved efficiency across the healthcare system.[4,12,50] This split of the State's purchaser and provider functions will enable a pluralistic approach to healthcare delivery, where care can be purchased from both public-sector providers and private-sector providers. The contracting of primary care providers in particular poses an opportunity to strengthen the overall health system.[41] There are a number of important issues that flow from the notion of plurality of provision, including ensuring a fair playing field between providers,[50] and the need to establish the basis on which providers can participate.[28]

The current lack of detail on the NHI benefit package makes it difficult for providers to comment on the role that they can play in the NHI delivery system, as they are not clear on the healthcare services that will be requested from them.[29,51] Healthcare providers also require clarity regarding what is proposed to address those services not covered.[52]

The basis on which providers will be reimbursed under NHI will impact on their willingness to participate in the system. A balance will need to be struck between ensuring sufficient capacity in the system to deliver care and the affordability of delivering care. The proposed systems of risk-adjusted capitation and DRGs require significant expertise, not only on the part of the funder but also on the part of the providers that are to be contracted.[53] Primary care providers have expressed concern about the lack of detail relating to potential payment mechanisms.[29]

The current shortage of health professionals is a widely acknowledged constraint on the healthcare sector. The private training of health professionals, managers, clinical coders and other skills, poses an opportunity to broaden the skills-base.[28] There are supply-side challenges in both the public and private sectors that need to be carefully managed to avoid further scarcities and imbalances.

There is significant scope to create an enabling environment for innovation in healthcare delivery. Examples include a cloud-based storage and reporting system for radiology,[51] mobile clinics,[15] chronic medication delivery,[15] and utilisation of the private-sector geographical footprint (such as the Western Cape Department of Health's strategic partnership with Clicks[b]). The current limitations imposed by the Health Professions Council of South Africa (HPCSA) on the employment of doctors in the private sector constrain innovation and the development of potential alternative delivery models.

The current absence of industry-wide tariffs for health practitioners poses a challenge in terms of consumer protection (i.e. the ability of

b http://www.westerncape.gov.za/news/western-cape-healths-strategic-partnership-clicks-brings-about-free-clinic-services-moms

the HPCSA to adjudicate claims of overcharging), medical scheme sustainability, and the development of NHI. Industry-wide benchmark tariffs would act as a base for contracting (whether on a fee-for-service or alternative reimbursement basis) for NHI to contract with private providers. There are, however, risks associated with attempts to set inflexible tariffs for health services, including healthcare providers emigrating or migrating to more lucrative disciplines or alternative careers, or market responses through increased out-of-pocket payments (which would compromise equity).[28]

There is significant capability for facility management in the private hospital sector, and hence an opportunity to access expertise and experience to improve public sector facility management.[28] The implementation of a purchaser-provider split in State functions requires increased accountability and responsibility for hospital managers – an area where there is scope to benefit from the depth of these skills in the private sector.

Conclusion

Despite a lack of formal consultation between private-sector stakeholders and government, there is substantial goodwill from the private sector to participate in the NHI reforms. A number of commentators indicated clear support for the goals of achieving universal access to quality health care for all South Africans, as well as a commitment to open engagement and debate in this regard. The private health sector acknowledges the difficulties associated with the current fee-for-service model, exacerbated by third-party payment.[42]

The opportunity exists to leverage the public-private interface and to build on the current role, expertise and assets of the private health sector.[28,54] The private sector has substantial assets, examples of which include existing infrastructures, IT systems and human resources. Private health sector expertise can be utilised to enhance the financing, pooling, purchasing and delivery elements of the health system. Leveraging this expertise requires exploration of models that allow for the attraction and retention of the required skills.[30] The extent of and manner in which skills and systems developed in the private sector over time will be utilised remains to be seen.

An important role exists for medical schemes in achieving key health system goals, both in the period before full implementation of NHI and subsequently. Private healthcare funding can be part of a pluralistic financing approach, and should not be seen as a potential replacement for the proposed NHI scheme. A competitive and dynamic medical funding industry can achieve efficient 'risk-smoothing' and pooling, promote social solidarity, and protect broad affordability. However, the current medical scheme environment faces a number of challenges, among which are sustained cost escalations in excess of consumer inflation, a failure to extend coverage, fragmented risk pools and opaque product offerings. There is significant risk that NHI reforms will be undermined if the medical scheme environment is not reformed, given the role that medical schemes play in reducing the burden of state facilities and the urgent need to strengthen public-sector delivery. Both social solidarity and subsidiarity can be enhanced by implementing a range of reforms such as the REF, revised PMBs and risk-based capital. The question of whether medical schemes could be more effectively run on a for-profit basis has also not received sufficient consideration.

The private health sector has acknowledged having been positively influenced by the values espoused in the Green Paper, such as a more patient-centric approach, increased pressure on provider groups for accountability, improvements in ensuring that clinical governance processes are sound, and a more robust evidence-based medicine approach (clinical protocols that take into account cost-effectiveness and affordability).[30]

In the 2010 edition of the *South African Health Review*, Ramjee and McLeod commented on the vacuum for providing constructive comment and the ensuing proliferation of newsletters, policy briefs and research notes funded by the private sector and academics.[11] The level of activity in this direction has subsequently reduced. However, there remains a significant body of work, some of which has been commissioned from consultancies and research entities and some of which resides within organisations. The NHI web library[c] created by IMSA for NHI research and documentation, remains a powerful resource, as does the work produced by Econex.[d]

Civil society organisations have played a variety of important roles in the engagement with NHI policy development. Comments submitted to the Department of Health on the Green Paper by the end of 2011 have not officially been released into the public domain. However, the Helen Suzman Foundation has created a web portal to facilitate transparency.[e] The Black Sash, together with the Health Economics Unit at the University of Cape Town and Health-e News, have run a project eliciting public opinions on health policies.[15] In 2011, the Centre for Development and Enterprise published a report on the role of the private sector in health reform.[54]

A considerable number of public fora have addressed issues relating to NHI, including conferences, workshops and seminars involving players from the public sector, labour unions, private sector, independent academics and consultants. These fora have been organised by private sector stakeholders (such as the annual Board of Healthcare Funders[f] and Hospital Association of South Africa conferences[g]), by research institutions (such as the Economic Research South Africa symposium[h]) and by civil society (such as the Black Sash[i]).

Many design issues remain unresolved. This creates system-wide uncertainty and anxiety for stakeholders. As the design is finalised, it is anticipated that numerous detailed issues will require broad consultation. There remain significant opportunities for improved stakeholder communication and engagement, including more formal consultation with a wide range of stakeholders, the publication of public submissions, responses to public submissions and the creation of government fora. In the medical scheme space, in particular, immediate action is required as the consequences of allowing the industry to drift are serious.

c http://www.integratedhealingmbs.com/#/imsa-nhi-policy-briefs/4580334234

d http://www.econex.co.za/index.php?option=com_content&view=article&id=55:health-economics&catid=35:sectors&Itemid=54

e http://hsf.org.za/projects/health-reform/national-health-insurance-project-developments/nhi-resources/responses-to-national-health-insurance-green-paper

f http://www.bhfglobal.com/meetings-events-0

g http://www.hasa.co.za/hasa-conference/

h http://www.econrsa.org/workshops/2013/ersa-symposium-and-training-workshop-critical-choices-around-universal-health

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10

Environmental health in South Africa

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The World Health Organization has estimated that as much as one quarter of the global burden of disease is due to modifiable environmental factors. In children, and in developing countries, the proportion of illness that can be attributed to modifiable environmental factors is even higher. Addressing environmental hazards in the places in which people live, learn and play, is therefore a cost-effective means of preventing ill health and reducing the burden of treatment currently borne by the health services.

This chapter provides an overview of some of the challenges and progress in addressing environmental health issues in South Africa. After providing some basic definitions, the chapter focuses on the environmental contribution to the global burden of disease, environmental risk factors such as urbanisation, living environments, and exposure to toxins, and the role of poverty and inequity in perpetuating these risk factors. The chapter concludes by discussing a possible framework for responding to environmental health in South Africa and briefly considers the role of environmental health practitioners in a post-apartheid South Africa.

Addressing environmental hazards in the places in which people live, learn and play, is a cost-effective means of preventing ill health and reducing the burden of treatment currently borne by the health services.

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Introduction

Environmental health is a branch of public health concerned with all aspects of the natural and built environment that may affect human health, and for which the World Health Organization (WHO) offers the following definition:

> Environmental health addresses all the physical, chemical, and biological factors external to a person, and all the related factors impacting behaviours. It encompasses the assessment and control of those environmental factors that can potentially affect health. It is targeted towards preventing disease and creating health-supportive environments. This definition excludes behaviour not related to environment, as well as behaviour related to the social and cultural environment, and genetics.[1]

Environmental health services are defined as:

> Those services which implement environmental health policies through monitoring and control activities. They also carry out that role by promoting the improvement of environmental parameters and by encouraging the use of environmentally friendly and healthy technologies and behaviours. They also have a leading role in developing and suggesting new policy areas.[2]

The South African National Environmental Health Policy similarly defines environmental health as encompassing those aspects of human health, including quality of life, that are determined by physical, chemical, biological, social and psychosocial factors in the environment. The Policy also refers to the theory and practice of assessing, correcting, controlling and preventing those environmental factors with the potential to affect adversely the health of present and future generations.[3]

The environmental contribution to the global burden of disease

The WHO has estimated that as much as one quarter of the global burden of disease is due to modifiable environmental factors.[4] In children, and in developing countries, the proportion is higher still: more than one third of the burden of ill health is attributable to environmental factors. Addressing environmental hazards in the places in which people live, learn and play, is therefore a cost-effective means of preventing ill health and reducing the burden of treatment currently borne by the health services.

Long-standing concerns, such as diarrhoeal diseases, lower respiratory infections and unintentional injuries, are among the main contributors to the environmental burden of disease.[4] The provision of safe water, sanitation, waste removal, hygiene education and household electricity may significantly reduce the burden of disease in many developing countries. For example, around 94% of the burden of diarrhoeal disease, and 42% of lower respiratory infections, may be prevented through environmental health interventions.[4] In the South African context of a particularly inequitable society, environmental health interventions also promote equity by addressing the needs of the most vulnerable and marginalised populations.[5]

Environmental risk factors in South Africa

From an environmental health perspective, South Africa has had a turbulent history. The nature and current distribution of some of the main environmental health problems in the country are rooted in the apartheid and colonial eras. Waves of rapid urbanisation, industrialisation, agriculture and mining, as well as a burgeoning informal or cottage industry sector, have all been driving forces of the current national environmental health profile.

The policies and programmes of non-health sectors are primary determinants of environmental quality and health status. For example, the promotion of private over public transport systems is associated with elevated exposure to vehicular pollution and road traffic injuries. The provision of communal or outdoor rather than domestic indoor water supplies is associated with water storage in containers, increased water contamination levels and elevated levels of diarrhoeal disease.[6] The past use of asbestos roofing in low-cost housing may increase the risk of exposure to cancer-causing asbestos fibres.[7]

There has been increasing concern about the advent of climate change and variability, which presents an unprecedented environmental health challenge that threatens the entire planet. It is expected that the greatest health burden associated with the effects of climate change will be borne by impoverished communities, and will underscore existing weaknesses in public health systems.[8]

Urbanisation, human settlements and housing

In 2007, for the first time in history, the world's urban population equalled the proportion living in rural areas. Urbanisation is expected to increase in the coming decades, with the fastest rates occurring in Africa.[9] As the urbanisation process unfolds, the health of nations will be increasingly determined by that of their urban populations. Since the urbanisation process in many African countries is driven by poverty, and urban growth is occurring predominantly in areas of existing poverty, it is to be expected that poverty and environment-related ill-health conditions in South African cities may increase, and will concomitantly define the national health profile.

Living environments

Housing and the quality thereof is one of the most powerful determinants of public health. Proper location and design of settlements, and healthy housing, have considerable potential to prevent disease, to promote health and to create healthy and sustainable communities. Poor or inadequate housing, on the other hand, may directly lead to significant burdens of preventable ill health in a society or community. The WHO has stated:

> Over and above their basic purpose of providing shelter against the elements and a focus for family life, human dwellings should afford protection against the hazards to health arising from the physical and social environments. At its best, appropriate housing promotes physical and mental health. It provides people with psychological security, physical ties with their community and culture, and a means of expressing their individuality.[10]

This definition of healthy housing was echoed in a State of the Nation Address by President Jacob Zuma on 3 June 2009, when he said:

> Human settlement is not just about building houses. It is about transforming our cities and towns and building cohesive, sustainable and caring communities with closer access to work and social amenities, including sports and recreation facilities.[11]

Housing and settlements in the apartheid era

Much of the housing delivered for the poor majority in South Africa during the apartheid era did not match the WHO definition of healthy housing. At the time, the majority of the black population was confined to rural homelands where they endured overcrowding and unsanitary living conditions, and where diseases such as tuberculosis were rife.[12] During the Johannesburg gold rush between 1880 and 1890, black miners lived mainly in overcrowded and squalid inner city settlements. An outbreak of bubonic plague in 1904 spurred the authorities to torch the area and relocate black residents to sprawling townships such as Soweto, which were located well away from places of work, and comprised mainly corrugated iron shacks or "matchbox" houses. Township housing was also often associated with hazards such as bucket toilets, asbestos roofing[7] and lead-based paint.[13] In dormitory-style mining "hostels", amenities were usually of a communal nature, with privacy severely curtailed.

Housing and settlements in the democratic era

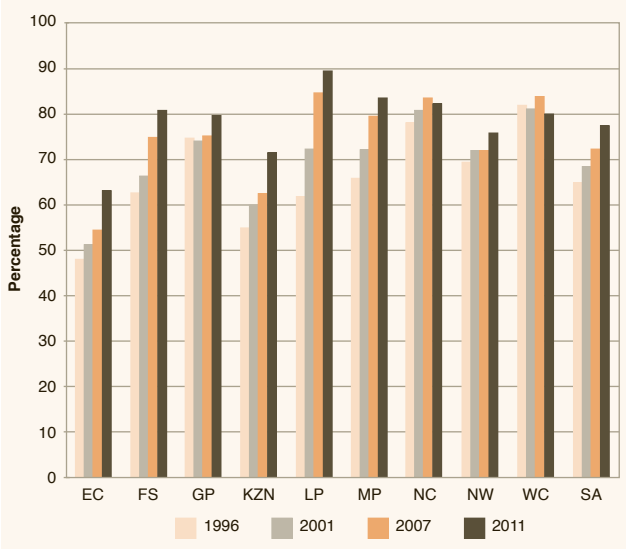
As can be seen in Figures 1 and 2, in the post-apartheid era, hundreds of thousands of households in South Africa have benefited from improved living conditions associated with housing construction programmes, improved water supplies, sanitation and waste removal services, electricity supplies and paved roads.[14]

Figures 1 and 2 illustrate the accelerated extension of housing and services to disadvantaged and marginalised people, thereby improving their environmental conditions, quality of life and health prospects. Nevertheless, large numbers of South African households remain without access to key environmental health services. Also, as Figure 3 shows, there is a degree of inequality with regard to the provision of environmental health services across provinces. The lowest levels of provision of indoor water supplies, for example, are in the Eastern Cape and Limpopo Provinces, compared with much higher household indoor water access in the Western Cape and Gauteng.

As a result of a significant historical housing backlog, urbanisation, influx from beyond the national borders and natural population increase, there continues to be a high demand for housing – a significant proportion of which remains unmet. There is a particular concern that urbanisation in developing countries is driven by poverty, and that much of the growth in urban areas in African settings in particular, is occurring in areas of existing poverty, resulting in sprawling areas of concentrated destitution.[16] According to the 2011 South African Census, around 14% of households still reside in informal or squatter housing, and a further 8% live in traditional dwellings.[15] Also, less than half of households have indoor water supplies and more than 7% use the bucket toilet system or have no access to sanitation at all.[15]

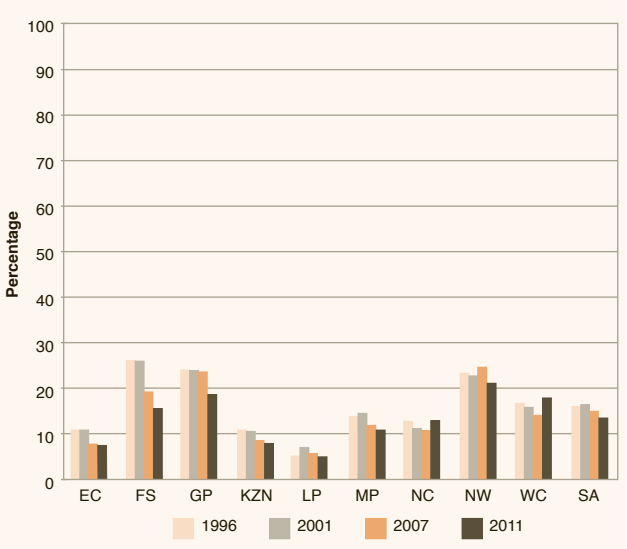
It is of concern that some new housing developments are not more closely aligned with the WHO definition of healthy housing, nor with the sentiments on sustainable communities expressed by President Zuma in June 2009. In such settings, for example, new housing has been developed in close proximity to mine dumps; moreover, a narrow definition of housing (or shelter) has been adopted, with scant regard for privacy needs (with the maximum possible number of dwellings being crammed into a confined space in some settlements), safe pedestrian and cycling infrastructure is absent, open space, sporting and recreation facilities are under-provided, and education, public transport, libraries and shopping facilities are limited. The end result is a loss of opportunity to build healthy and sustainable communities.

Figure 1a: Percentage of households living in formal type dwellings by province



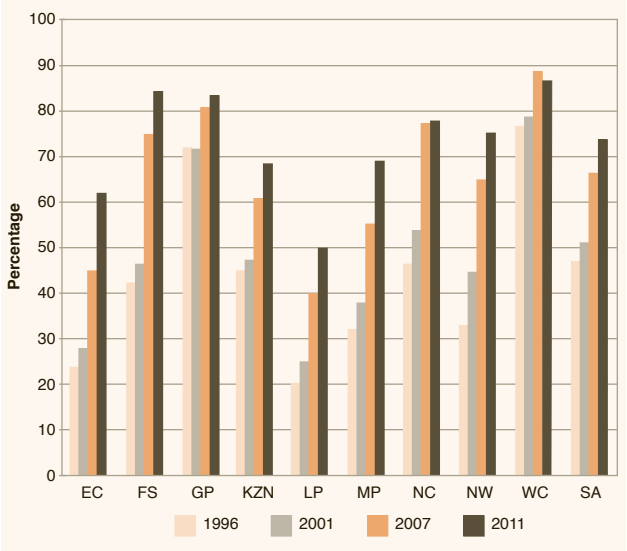
Source: Statistics SA, 2012.[15]

Figure 1b: Percentage of households living in informal types of dwellings by province



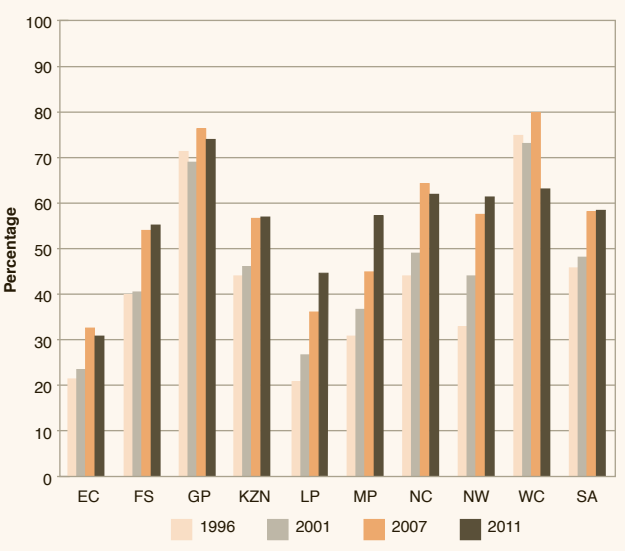
Source: Statistics SA, 2012.[15]

Figure 2a: Percentage of households using electricity for cooking by province



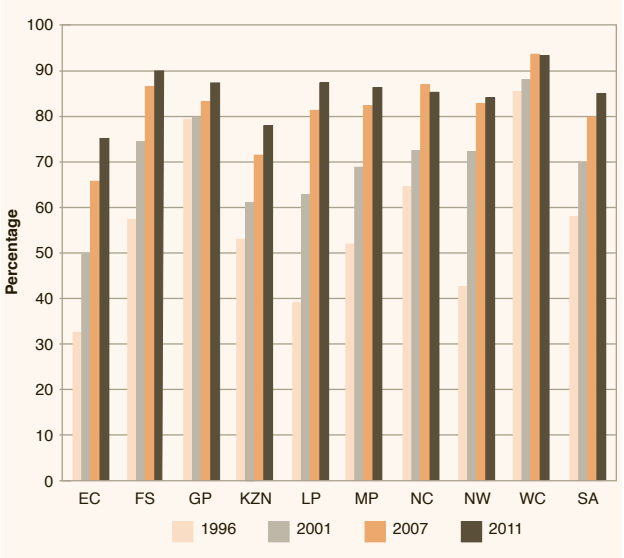
Source: Statistics SA, 2012.[15]

Figure 2b: Percentage of households using electricity for heating by province



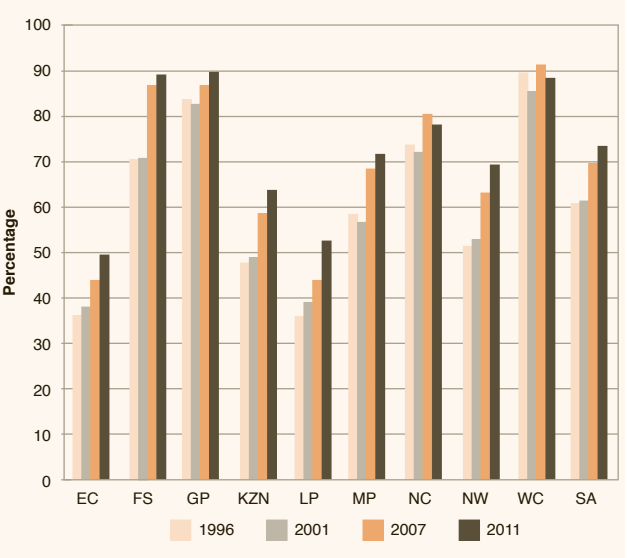
Source: Statistics SA, 2012.[15]

Figure 2c: Percentage of households using electricity for lighting by province



Source: Statistics SA, 2012.[15]

Figure 3: Percentage of households with access to piped water into the dwelling by province



Source: Statistics SA, 2012.[15]

Exposure to persistent toxic substances

The mainstays of the South African economy have predominantly included mining, agriculture and other industries. While these activities have contributed to the national economy, they have also in many instances imposed a legacy of environmental contamination and degradation on some of the poorest sectors of the population. A study conducted at the lead mining town of Aggeneys in the Northern Cape Province showed elevated lead exposure in young schoolchildren, relative to their counterparts in the non-mining town of Pella, some 40 kilometres away.[17] In 1990, concerns were raised over contamination and worker deaths at a mercury waste-processing plant in the province of KwaZulu-Natal;[18] recent studies point to continued environmental contamination around the site. Concerns have also been raised over elevated hair mercury levels in poor communities living around a dam downstream from the same plant.[19] Researchers have drawn attention to poor pesticide management practices on farms and the risk of long-term health consequences, suicide and unintentional poisoning in agricultural settings in South Africa.[20] Mining practices in Johannesburg have been associated with severe degradation of the local environment. A study undertaken in the broader Witwatersrand area showed that local mining activity contributed to reductions in the pH (acidification) of surface water, and that the seepage of acidified water from mine tailings dumps contributed around 20% of stream flow in the area, making local rivers and streams unsuitable for recreational use and unable to support diverse aquatic life.[21] For example, high loads of heavy metals were found in water systems, and in certain areas, evaporation resulted in such high concentrations of heavy metals that the growth of vegetation is no longer supported.[21]

Exposure to toxic metals

The removal of lead from petrol and paint constitutes two major milestones in lead poisoning prevention efforts in South Africa, and surveys indicate a decline in blood lead levels in certain groups of South African children.[22] Nevertheless, lead remains a widespread environmental contaminant in South Africa, with elevated blood lead levels found in many parts of the country, including in children living in urban areas,[21] around lead mines,[17] and in subsistence fishing communities where lead is melted to make sinkers.[23]

Elevated levels of mercury have been found in 62% of river and dam sediment samples, as well as in 50% of fish captured from the Inanda Dam in KwaZulu-Natal. Hair samples collected from community members alongside the dam showed that 17% had mercury concentrations above those specified in the WHO guidelines.[18]

Pesticide exposure

Pesticide poisoning has been shown to be a growing problem in South Africa, notably associated with the informal sale of illicit pesticides. A study at the Red Cross War Memorial Children's Hospital in Cape Town between 2003 and 2008 showed that 11% of all paediatric exposures and poisonings were associated with pesticide poisoning. The number of pesticide incidents increased annually over the study period, with cases peaking during the summer months. The vast majority of cases (91%) were in children aged five years or younger.[24] There is also growing concern about increasing street sales of hazardous pesticides, such as aldicarb, methamidophos and chlorpyrifos, and their application in residential settings, with the potential for acute and chronic ill-health effects.[25]

The informal sector and cottage industries

Impoverished communities, whose health may already be compromised by poor or under-nutrition, are in some instances simultaneously exposed to multiple environmental health hazards. Those living in an informal settlement located downstream of a polluting industry or mine, for example, may be exposed to harmful substances or chemicals, and at the same time face the hazards of poor housing and inadequate environmental health services. In a dwelling that serves as both a residence and the site of a cottage industry operation, there is the risk of exposure to hazardous substances, such as lead and volatile organic compounds, on an ongoing basis, including among young children. Unpublished findings from a long-term urban health surveillance study being undertaken by the South African Medical Research Council shows that around 22% of households in poor settings in Johannesburg operate small-scale industries from their homes.[26] Among the most widespread operations of this type are hairdressing, car repairs, welding, spray painting, jewellery-making and electrical repairs, all of which may be associated with harmful exposures (such as volatile organic compounds and lead). In the face of limited formal employment opportunities, the informal economy and cottage industries have been burgeoning, and this potentially represents a growing environmental health concern among marginalised groups, especially in urban settings.

Environment and cancer

Globally, approximately 19% of all cancers are estimated to be attributable to the environment, including work settings. Decreasing exposure to carcinogens reduces health care costs, and contributes to the overall well-being of communities.[27] Environmental and occupational interventions are critical to achieving a reduction in cancer incidence.

Poverty, inequality and health

Social determinants play an important part in influencing levels of poverty, inequality, quality of life and health.[28] In South Africa, the poorest households generally live in housing that is least protective of health, with limited access to clean water, sanitation, waste removal and safe fuels. They are often more likely than the wealthy to be exposed to indoor and outdoor pollution (from traffic, and formal and informal industry).[29] They are also more likely to be subject to food insecurity and malnourishment, which increases their vulnerability to the ill-health effects from environmental exposures. In cities, poor households may suffer from a double burden of disease resulting from under-development in their residential settings, and simultaneously from exposure to pollution associated with industry and traffic, for example. Therefore, social determinants of health and health status should be of concern to policy-makers in every sector, and not solely to those working in health policy.[28]

Climate and health

There is scientific consensus that the global climate is changing most probably as a result of human activities, giving rise to increasing surface temperatures, melting ice, rising sea levels, and increasing climate variability. The predicted effects on health include injuries and fatalities related to severe weather events and heat waves, infectious diseases related to altered vector distribution, contamination of food

and water, allergic reactions from increased allergen production, respiratory and cardiovascular disease related to deteriorating air quality, and malnutrition from food insecurity, mental ill health and stress from disasters and emerging environmental concerns, and civil dislocation.[30] While the National Department of Health has developed the National Climate Change and Health Adaptation Plan 2012–2016 (awaiting signature by the Minister of Health),[3] there is little evidence of action or capacity at local level to implement this strategy.

Burden of disease from environmental exposure in South Africa

South Africa has to grapple with multiple, simultaneous burdens of disease: communicable, non-communicable, perinatal and maternal, and injury-related disorders.[31] Environmental factors have a role to play in the causation and prevention of each of these. For example, five environmental risk factors (unsafe water, sanitation and hygiene; indoor air pollution from household use of solid fuels; urban outdoor air pollution and lead exposure) were associated with 5% of all deaths in South Africa in 2000. The joint attributable burden was especially high in children under five years of age, accounting for nearly 11% of total deaths in this age group.[32] For those who are HIV-positive, access to basic environmental health services is of critical importance to ensure personal hygiene and to adhere to medical regimes; safe water is needed for sound domestic hygiene to reduce the risk of opportunistic infections, and for taking medication, while proper sanitation in close proximity is needed for those with diarrhoeal disease, for example. From an environmental health perspective, access to healthy housing, safe water, sanitation and non-polluting fuels are critical factors necessary to work towards significant reductions in maternal and peri-natal mortality.

Several studies have shown that national figures may mask the very high burdens of ill health borne by certain communities. For example, an environmental health surveillance study in five impoverished settings in Johannesburg illustrates (see Table 1) the simultaneous prevalence of particularly high burdens of ill health especially violence and chronic lifestyle diseases; environmental interventions may play a positive role in all of these settings to improve quality of life and enhance psychological wellness.[26]

Towards a framework for responding to environmental health concerns in South Africa

This chapter has thus far outlined the seriousness and diversity of environmental health challenges prevailing in South Africa, noting the vulnerability of the poorest, the youngest and those with pre-existing ill-health conditions. There is particular concern that several of these challenges may be exacerbated in an era of climate change, especially in the light of widespread poverty and inequality in South Africa. Over the past two centuries, approaches to and institutional arrangements for environmental health have periodically required adaptation to respond effectively to prevailing environment and health issues. The changing spectrum of public and environmental health challenges, and the increasing emphasis over time on socio-environmental concerns, are reflected in a number of public health milestones, such as the Alma-Ata Declaration on Primary Health Care,[33] the Sundsvall Declaration on the Creation of Supportive Environments for Health, and the Commission on the Social Determinants of Health.[34] Overall, these and other milestones provide an evolving framework, as well as the tenets and tools for the public and environmental health response to prevailing health challenges.

Given the seriousness and persistence of environmental health hazards in South Africa, and especially with the advent of global environmental change, it may now be time for the environmental health sector in South Africa to reflect on whether current approaches and interventions for environmental health and environmental health

Table 1: Selected environmental risk factors and ill health levels in five impoverished neighbourhoods in Johannesburg

	Percentage of Households					
	Hospital Hill (informal settlements)	Riverlea (apartheid era low-cost housing)	Braamfischerville (democratic era low-cost housing)	Bertrams (inner city suburb)	Hillbrow (high-rise inner city suburb)	Total
Households using mainly electricity for cooking	2	97	98	90	98	78
Households with cottage industries	16	16	12	22	10	4
Households affected by violence (rape, gunshot, stabbing or beating)	28	19	17	18	14	19
Households with a member with asthma	3	19	7	20	2	9
Households with a member with diabetes	8	16	4	15	2	8
Households with a member with hypertension	11	31	16	23	5	16
Households with a death in the past year	12	13	13	11	2	10
Households with a member who committed suicide in the past year	2	6	5	1	0	3

Source: Adapted from Mathee et al., 2009.[26]

services in the country are effective or optimal. In the interests of cost-effectiveness and delivering on the constitutional right of all citizens to a safe and healthy environment, it is imperative that preventing diseases of environmental origin becomes a fundamental environmental and public health goal. In this regard, several strategies and tools are of particular relevance, including inter-sectoral action (ISA) and health impact assessment (HIA).

Inter-sectoral action

One of the most important and promising strategies for the resolution of environmental health challenges is inter-sectoral action. In a context of limited resources and complex, cross-cutting problems, and where the determinants of health problems lie predominantly outside of the sphere of control of the health sector, it is essential and obvious that the expertise, knowledge and experience of all relevant sectors of society, including the private sector, should be drawn on in order to develop solutions. Civil society groups, such as non-governmental organisations and pressure or lobby groups also have powerful roles to play in highlighting and securing attention to environmental health concerns.[35]

Government health departments on occasion involve non-health sectors in environmental health problems as a matter of courtesy, or at a relatively superficial level. In general however, the fundamental opportunities presented by ISA to prevent ill health and address the systemic problems which cause or contribute to disease, remain under-exploited. Consequently, the health sector usually lacks the institutional arrangements, expertise and capacity to fully capitalise on ISA. In South Africa, ISA would be invaluable in starting to address the poverty and inequality that underlie many health problems, to ensure that human settlements and housing are planned, designed and constructed to optimise health and prevent acute and chronic diseases, to ensure that industries are located, designed and controlled to minimise public exposure to pollutants, to ensure that the drainage of toxic water from mining sites is curtailed, and to ensure that water supply and sanitation standards and targets will reduce diarrhoeal diseases.

Health Impact Assessment

Economic sectors such as transport, agriculture and housing have profound impacts on health. For instance, transport is a major factor contributing to traffic injuries, air pollution and noise. But "healthy transport policies" can help to reduce these risks, as well as to promote walking and cycling, and thereby have a role to play in the prevention of obesity and chronic diseases. In agriculture, fertilisers and pesticides may boost crop yields, but prudence is required to protect farm workers and consumers from excessive chemical exposure.

Health Impact Assessment is a means of assessing the health impacts of policies, plans and projects in diverse economic sectors using quantitative, qualitative and participatory techniques. HIA helps decision-makers make choices about alternatives and improvements to prevent disease and/or injury, and to actively promote health. Such assessment is a practical approach used to judge the potential health effects of a policy, programme or project on a population, particularly vulnerable or disadvantaged groups. Recommendations are produced for decision-makers and stakeholders with the aim of maximising the proposal's positive health effects and minimising its negative health effects. In South Africa, the National Department of Health has produced guidelines on Environmental Health Impact Assessments.[36] However, these are not in widespread use at the local level.

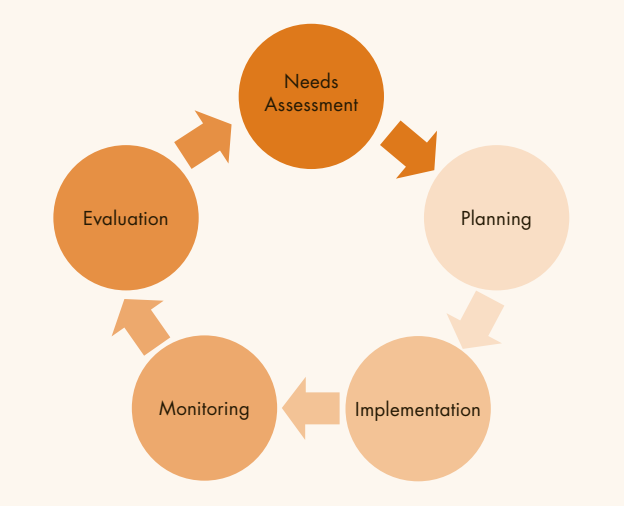
At a broad or strategic level, together with HIA and ISA, activities such as the development and maintenance of relevant environment and health information systems, ongoing legislative and policy reviews, continuing education/training and opportunities for local and international exchange of experiences and ideas, are also of high importance.

Local Agenda 21 / Healthy Cities

At the local level or the community interface with Environmental Health Practitioners (EHPs), there are several examples of operational frameworks that may guide the work of EHPs. These include the Local Agenda 21[37] and Healthy Cities[38] initiatives, which provide health-based or community-focused approaches to the planning and development of cities and settlements. They recognise that health is determined predominantly by economic, environmental and social factors, rather than by health services. Healthy Cities aims to improve recognition of the holistic and inter-sectoral nature of ill health, and is built on the principles and approaches of the Alma-Ata Declaration on Primary Health Care and the Ottawa Charter for Health Promotion. They also promote a generic, systematic and cyclical approach (see Figure 5) to address environmental health challenges within settings (settlements, schools and market-places, for example) or when tackling key environmental health issues (such as exposure to indoor air pollution or environmental tobacco smoke).

The Healthy Cities approach may be of particular use at the local level, providing a framework and process for EHPs together with others in the broad field of environmental health, to directly respond to local problems typical of human settlements in developing countries. The first step in any Healthy Cities initiative is to undertake the research or assessments needed to gain an understanding of the spectrum of environmental health challenges faced by the local community. Data may be collected from, for example, the census, surveys, records of complaints and inspections, and through public consultation processes. This information may be used to plan and implement programmes of action to eliminate or reduce environmental health hazards (see Figure 4), and may also feed into Integrated Development Planning (IDP). Such a constructive, developmental approach may be more appropriate, especially in settings of poverty, than the current trend towards regulatory and punitive environmental health systems. In some highly impoverished settings, it appears that the main body of work for EHPs constitutes meeting targets for the issuing of notices or penalties. While punitive measures may be warranted under certain circumstances, there is the danger that in communities where poverty, unemployment and food insecurity are rife, such punitive regulatory systems may serve to deepen inequality in a society that is already among the most unequal in the world.

Figure 4: Generic Cycle for Agenda 21 / Healthy Cities Initiatives



Research, monitoring and surveillance

If EHPs are to fulfil their primary function of properly identifying, assessing and managing health risks in the environment, research, monitoring and surveillance are fundamental. In a context of confirmed climate change and variability, but with high levels of uncertainty regarding related health outcomes, these functions become increasingly important. Environmental health monitoring programmes will need to be implemented at the level of cities, districts and neighbourhoods to determine spatial as well as temporal variations, to identify groups and locations at risk, and for the allocation of resources. Research should focus on estimating the contribution that various social and environmental factors are making to urban health problems, identifying health opportunities in key development sectors, and supporting decision-making.

The role of Environmental Health Practitioners

Environmental Health Practitioners (EHPs) constitute the backbone of environmental health services, and are trained and well-placed to play a key role in resolving environmental health challenges and preventing disease of environmental origin. The field of environmental health can be traced back to the 1840s in England when Edwin Chadwick conducted a study of poverty which concluded that people often became poor because of ill health due to living in a poor-quality environment. A campaign by Chadwick resulted in the Public Health Act of 1848 in England, which provided for Inspectors of Nuisances (later called Health Inspectors and Environmental Health Officers). Over time, the roles of these inspectors grew, with training programmes and standards being implemented, culminating in the establishment of an advanced training curriculum and environmental health as a graduate profession.

Presently, EHPs are trained in a range of fields to enable their undertaking an array of activities aimed at protecting public health from environmental risk exposure. These include health risk assessment and auditing, epidemiology and research methods, environmental planning and management, environmental pollution, community development, microbiology, and food science and technology. These practitioners also need strong investigative and negotiation skills and a thorough understanding of the application of legislation related to public health and the environment. EHPs are required to register with the Health Professions Council of South Africa (HPCSA) and must participate in a programme of continuing professional development. Their role requires working in partnership with key government departments (such as Water, Energy, Housing, Agriculture, Mining and Environment), local municipalities, the business sector, community groups, non-government organisations and individual members of the community. They have a direct relationship with the public, and adopt problem-solving skills in combination with legislative authority to address the causes of ill health. EHPs therefore have a wealth of skills and knowledge of public health, together with a broad understanding of how the policies, decisions and programmes of local authorities and other sectors affect health. Their skills enable them to play a powerful and unique role in the promotion of health and prevention of disease in multiple settings, including homes, schools, workplaces and neighbourhoods.[39] Their training, as well as the legal powers and functions bestowed on the profession in the "Scope of the Profession of Environmental Health" – Scope of Practice of EHPs place them in a unique position to play a key role in the prevention of exposure to environmental hazards and the elimination of the avoidable health burden of ill health as previously described in this chapter. Currently in South Africa however, a range of factors contribute to EHPs not entirely fulfilling their potential to make a meaningful contribution to reducing the burden of ill health of environmental origin: a selection of these factors is outlined in this section. This has implications for PHC re-engineering as they form part of the team.

Over the past decade, and notably as a result of the reality of climate change, the environmental health landscape is changing. In a context of uncertainty, EHPs around the world are reflecting on their role and scope of practice in the light of emerging environmental health hazards and threats. The Chartered Institute of Environmental Health together with the Government of the United Kingdom has, for example, prepared several resources for EHPs on health effects of climate change and the role of EHPs.[40] Serious consideration will need to be given to the role of EHPs in South Africa in terms of climate change and to an integrated response strategy to climate-related threats and impacts on environmental health. Human resource requirements are likely to include increased capacity and staffing, as well as additional training and perhaps even the re-framing of the EHP's scope of practice to include climate variability implications. In South Africa, as this chapter has illustrated, there is a need to consider the role of EHPs in a situation of multiple, simultaneous environmental threats to health, taking into consideration the legislative framework and service provision, among others.

Legislative framework

South Africa's legal framework for the provision of environmental health services is rooted in the Constitution of the Republic of South Africa (108 of 1996), which guarantees the right of citizens to a safe and healthy environment.[41] The Department of Health is primarily responsible for Environmental Health Services (EHS). In terms of the National Health Act (61 of 2003), EHPs are granted broad powers to investigate and address public health problems, as defined in the gazetted "Scope of Practice of EHPs".[42] While certain functions (port health, malaria control and control of hazardous substances) are designated as provincial level services, Section 5 of the National Health Act and the Municipal Structures Act (117 of

1998)[43] lists specific services that are to be provided at municipal level (referred to as "municipal health services" – MHS – originally referred to in the Constitution) in the context of the District Health System (DHS). These are:

- Adequate and safe water supply
- Basic sanitation
- Disposal of solid, toxic and hazardous waste
- Control of air and water pollution
- Chemical safety
- Food hygiene and safety
- Radiation
- Noise control
- Vector and vermin control
- Environmental public health disease control
- Human habitat
- Port health
- Occupational health
- Accident and disaster prevention and control

Municipal health services (MHS) authorisation came into effect on 1 July 2004; however, finalisation of these services to communities is far from complete. While relative success has been achieved in some provinces, in others the transfer of MHS to metropolitan and district municipalities is incomplete and a response from national and provincial structures is being called for. A more formal charge to municipalities to implement fully functioning MHS in their areas of jurisdiction is needed from the National Department of Health.[41] While a policy for this exists, it has not been given force and implemented effectively. Some of the challenges facing municipalities with regard to implementation of EHS include lack of financial allocation, lack of by-laws in some municipalities to rely on since no national legislation and regulations exist, under-staffing, lack of capacity and lack of training of EHPs.[44]

In December 2013, the National Environmental Health Policy was gazetted by the South African Government to serve as a broad guideline and framework for the effective implementation of environmental health services in South Africa.[3] While this is a positive step, it remains to be seen how this policy will be implemented and its strategies and policy objectives monitored and evaluated.

Fragmentation of environmental health legislation

Confusion and inefficiency is caused by fragmentation of legislation guiding the work of EHPs. For example, the promulgation of certain sections of the new National Health Act was delayed, leading to aspects of the work of EHPs needing to be undertaken under the umbrella of the old Health Act (63 of 1977).[45] In addition, EHPs have to be familiar with a plethora of acts, regulations and by-laws, promulgated across a range of sectors, for the implementation of their work. These include, for example:

- Hazardous Substances Act (15 of 1973)[46]
- National Health Act (61 of 2003)[42]
- Foodstuffs, Cosmetics and Disinfectants Act (54 of 1972)[47]
- National Environmental Management: Air Quality Act (39 of 2004)[48]
- Occupational Health and Safety Act (85 of 1993)[49]

Inequity in environmental health service provision

During the apartheid era, environmental health services were inequitably provided, with urban areas characterised by white populations being the main beneficiaries. Environmental health services were especially scarce in the former "homelands". There continues to be a serious shortage of EHPs in the country in relation to the WHO guidelines' level of 1 EHP per 10 000 population, and even in respect of the lower South African target of 1 EHP for every 15 000 people. Recent figures by province were reported in the South African Local Government Association (SALGA) report on Municipal Health Services Status Quo. Table 2 provides a staffing analysis by province of the current EHP population and the figures for both ratios, 1:15 000 and 1:10 000, respectively. This analysis demonstrates that EHPs are woefully under-provided, even in areas of considerable need. Existing figures for the EHP:population ratio may also mask the appointment of individuals to EHP positions, followed by subsequent allocation of tasks unrelated to environmental health.

Table 2: Staffing analysis by province of the current EHP population and the figures for both ratios, 1:15 000 and 1:10 000, respectively

Province	Current EHP population	EHP per Pop based on 1:15 000 (SA target)	EHP per Pop based on 1:10 000 (WHO target)
EC	252	444	666
FS	88	185	278
GP	453	746	1 121
KZN	195	648	985
LP	25	156	229
MP	34	196	293
NC	33	77	115
NW	88	231	345
WC	324	389	568

Source: SALGA, 2013.[44]

Inequality in environmental health service delivery remains a concern, particularly in district municipalities, where these services were historically not provided and where funding and staff capacity were constrained or absent; such provision continues to be weak. Unequal service delivery is likely to prevail until challenges such as varying funding models across municipalities and districts are resolved.

Training

With advancing urbanisation, rapid industrialisation and climate change, it is imperative that the training of EHPs be reviewed and appropriately adapted on an ongoing basis. The health sector should lead the definition of the changing role of EHPs and associated staff. In this light, it is gratifying that the Professional Board for Environmental Health Practitioners recently approved the curriculum for a Bachelor of Science degree in Environmental Health,

scheduled for implementation in 2014. Action is also being taken to offer, on a more widespread basis, Masters of Public Health courses with an Environmental Health specialisation at multiple institutions across South Africa.

Discussion and conclusion

In the past two decades, a number of steps have been taken to improve environmental health in South Africa. For example, new legislation, such as the National Environmental Management and Air Quality Acts, have been promulgated and the country is a signatory to a wide range of international environmental agreements and protocols, including the United Nations Framework Convention on Climate Change, the Montreal Protocol (on ozone depletion), the Minamata Convention on Mercury, and the Basel Convention dealing with control of trans-boundary movements of hazardous waste. The government has also acted to control the use of asbestos in dwellings (although many older houses still have asbestos roofing installed), phased out leaded petrol, and regulated the use of lead in paint. Through promulgation of the Tobacco Products Control Act of 1993[50] and participation in the Framework Convention on Tobacco Control, South Africa became a global leader in prevention of exposure to environmental tobacco smoke. Hundreds of thousands of households have benefited from improved housing, water, sanitation, waste disposal and electricity.

Notwithstanding this progress, South Africa continues to face numerous formidable and complex environmental health challenges. These include problems emanating from improper mining, agricultural and industrial practices, and under- or inappropriately developed human settlements. With the advent of climate change and increased climate variability, there is increasing concern that existing environmental health challenges are likely to be intensified.

Tackling the large-scale and complex environmental health problems in South Africa will require the pooled expertise and experience of multiple disciplines and sectors, including non-government organisations, the media and public pressure groups.

EPHs have a key role to play with respect to addressing prevailing problems, as well as to ensuring that all future development and planning opportunities are fully exploited in the interests of promoting health and preventing disease. Paradoxically, at this time of unmatched need for scaled-up and prudent environmental health action, South African environmental health services appear to be stagnant or in decline. In part, this decline is attributable to unresolved issues arising from a protracted and incomplete transformation process, such as unfunded or inadequately funded environmental health mandates (particularly at district level), an inadequate EHP:population ratio, and a high degree of inequality in environmental health service provision across the country. Serious attention should be given to these and other issues to ensure that the field and profession of environmental health can live up to its potential to reduce and prevent ill health of environmental origin.

South Africa is among the most unequal societies in the world: the lack of employment opportunities, unhealthy quality of living environments, high levels of exposure to environmental hazards and compromised health status among the poor are vastly different from the conditions enjoyed by the wealthiest in the country. The role of social factors in health have recently been emphasised by the WHO Commission on the Social Determinants of Health. It therefore stands to reason that the approach to environmental health in settings of poverty and under-development ought to take account of local challenges and needs. The facilitation of healthy and sustainable development and innovative solutions to local challenges and health threats, and support for community efforts, should underpin environmental health strategies in such settings. In wealthier areas, on the other hand, a stronger focus on the enforcement of regulations may be more appropriate. While this approach should not condone environmental pollution by any socio-economic group within society, in an unequal society, environmental health strategies should be tailored to local environmental health profiles and community needs; a "one-size-fits-all" approach to environmental health may serve to exacerbate inequality.

History provides strong evidence for the powerful role that environmental health action and professionals can play in preventing disease and promoting health. Remarkable reductions in cholera, typhoid and other infectious diseases were achieved during the Nineteenth Century in England as a consequence of improved housing and environmental health services, associated with the forging of closer relationships among planners, engineers and the health sector.[51] Health is at the heart of national economic prospects. Efforts to ensure cleaner and safer environments will yield reductions in the burden of disease. Through their vital role in this regard, EHPs contribute, inter alia, to the reduction of school and work absenteeism, and the improvement of societal intellectual capacity and learning ability (for example, through lead exposure reduction efforts), ultimately paving the way for people to participate more effectively and productively in the national or regional economy. Therefore, the field and profession of environmental health has much to offer in South Africa in terms of the prevention of disease and the promotion of good health, but its potential will be reached only if the prevailing obstacles are addressed.

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Cervical cancer in South Africa: challenges and opportunities

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South Africa has a high burden of cervical cancer, despite the existence of a national programme that focuses on this disease. The implementation of a national human papillomavirus (HPV) vaccination strategy that uses the service delivery platform of the Integrated School Health Programme is an integral part of a comprehensive cervical cancer control policy for the country.

There will be challenges in implementing such a programme. Lessons learned from the successful implementation of the HPV vaccine through national programmes and demonstration projects will guide all stakeholders in ensuring the efficient, equitable and safe delivery of the vaccine to the target population.

This chapter discusses the burden of disease from cervical cancer, HPV vaccines, the relevant national policies, and the opportunities and challenges associated with the implementation of HPV vaccination.

This content is a summary of information from sources considered pertinent to the implementation of the HPV vaccine and is not intended to be a systematic review.

The implementation of a national human papillomavirus vaccination strategy that uses the service delivery platform of the Integrated School Health Programme is an integral part of a comprehensive cervical cancer control policy for the country.

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Introduction

After breast, colorectal and lung cancer, cervical cancer is the fourth most common cancer affecting women worldwide.[1,2] The burden of cervical cancer is higher in low- to middle-income countries, due to poor access to screening and treatment services, competition with other health priorities, limited human and financial resources, and overburdened health systems.[1]

Cervical cancer is caused by the sexually acquired human papillomavirus (HPV).[1] Two vaccines have been developed that prevent the acquisition of high-risk HPV types linked to cervical cancer, and one of the vaccines has also been shown to protect against genital warts.[1]

According to the World Health Organization (WHO), the introduction of vaccines that prevent HPV infection, combined with a comprehensive cervical cancer screening and treatment policy, is key to addressing the burden of cervical cancer.[1] The WHO recommends the vaccination of 9- to 13-year-old girls, prior to the debut of sexual activity.[1]

In May 2013 the National Minister of Health, Dr Aaron Motsoaledi, announced the progressive implementation of HPV vaccine administration as part of the 2014 Integrated School Health Programme. The target group for 2014 is approximately 500 000 girls in 18 000 schools; all girls in Grade 4 who are nine years of age and older in Quintile 1 to 5 public schools will be vaccinated.

Cervical cancer: burden of disease

Global

There are an estimated 528 000 new cases of cervical cancer diagnosed per year globally, with 266 000 deaths due to cervical cancer in 2012.[2] However, there is a difference in the distribution of the incidence and mortality related to cervical cancer.[2] Nine out of 10 cervical cancer (87%) deaths occur in regions with lower levels of development.[2]

Africa is the region with the highest burden of cervical cancer.[3] In 2008, approximately 80 000 women were diagnosed with cervical cancer, and 60 000 women died from cervical cancer, in a population of 270 million women (aged 15 years and older).[3]

This is in stark contrast to the region of Western Europe, which had 9 318 cases of cervical cancer and 3 794 deaths for the same period, in a total female population of 96 million women.[3] North America had 12 488 cases of cervical cancer with 4 413 deaths, in a total female population of 175 million.[3]

The difference in the incidence of cervical cancer between regions of higher and lower levels of development has been attributed to the absence of national cervical cancer screening programmes in the majority of low- to middle-income countries.[4]

South Africa

According to the HPV Information Centre in Spain, 7 735 women are diagnosed with cervical cancer every year in South Africa, which represents 19.3% of cancers in women. Annually 4 248 women die from cervical cancer (17.6% of deaths being due to cervical cancer in women).[2,5]

Data from the 2006 South African National Cancer Registry (NCR) (a passive pathology-based surveillance system) indicated that there were 5 071 new cases of cervical cancer for the year (17.83% of histologically diagnosed cancers, with a lifetime risk of 1 in 38). Cervical cancer was more common in black women, than in white women. For 2006, cervical cancer was diagnosed in 3 958 black women (representing 30.96% of cancer in women) with a lifetime risk of 1 in 32.[6] By comparison, cervical cancer was diagnosed in 380 white women (3.77% of cancer in women) with a lifetime risk of 1 in 73.[6]

Factors contributing to the high morbidity and mortality related to cervical cancer in low- to middle-income countries

In most low- to middle-income countries, there is competition for limited resources amidst substantial health needs. Many countries in sub-Saharan Africa are characterised by high burdens of disease typified by HIV, tuberculosis and malaria, as well as high rates of maternal and child mortality.[7]

Planning of healthcare strategies, as well as monitoring and evaluation of interventions, is problematic due to the paucity of reliable data.[8] There are only a few reported functional cancer registries in low- to middle-income countries. A study conducted in 2003 on patients diagnosed with various types of cancers showed that only two cancer registries in Africa (The Gambia and Uganda) contained data of sufficient quality for inclusion in the study.[8]

In many low- to middle-income countries, there are significant challenges in the provision of health promotion and prevention services for cervical cancer. This is exacerbated by delays in early diagnosis and lack of access to treatment and palliative services. It has been estimated that the actual supply of radiation treatment services in Africa is 18% of the required amount.[9]

A lack of trained healthcare personnel is a significant factor contributing to mortality related to cervical cancer. In Africa, there are an estimated 2.2 doctors per 10 000 of the population, compared to Europe which has an estimated 33.2 doctors per 10 000 of the population.[7] Similar discrepancies in nursing and midwifery personnel have been described (9/10 000 in Africa, compared to 65/10 000 of the population in Europe).[7]

Cervical cancer and HPV

Cervical cancer is caused by HPV, the most common viral infection of the reproductive tract.[1] HPV infection occurs soon after the debut of sexual activity.[1] Of the 150 different identified HPV types, about 40 are known to infect the ano-genital tract, resulting in genital warts, and pre-invasive and invasive lesions.[10] Persistent infection with high-risk types (HPV-16, HPV-18) is associated with 70% of cervical cancers worldwide, and types (HPV-6, HPV-11) are linked to 90% of genital warts.[1,10]

Cervical cancer and HIV

A number of studies conducted in HIV-positive women have described a higher prevalence of HPV infection, persistent HPV infection, as well as infection with multiple HPV types and a higher prevalence of the precursors of cervical cancer.[11-13] In a cohort study of HIV-positive women, Denny et al. found that almost 70% were infected with the high-risk HPV types, and over 90% were persistent, with only 6% actually clearing the infection with HPV.[14] Moodley et al.[15] showed in a case-control study conducted in South Africa that HIV-positive women were nearly five times more likely to have high-risk HPV infection compared to women who did not have HIV. In another South African study, sero-conversion to HIV was associated with newly detected HPV infection and an increased risk of low-grade cytological abnormalities.[16]

Individuals with HPV infection may also be at an increased risk for the subsequent acquisition of HIV. A population-based study conducted in KwaZulu-Natal described an association between HPV sero-positivity and the subsequent acquisition of HIV.[17]

HPV vaccines

Description of the two HPV vaccines

The recognition that there is a causal relationship between HPV infection and cervical cancer was an important step in the development of HPV vaccines against cervical cancer. Currently, two vaccines are available: a quadrivalent vaccine (against HPV types 6, 11, 16 and 18; Gardasil, Merck & Co., West Point, Pennsylvania), and a bivalent vaccine (against HPV types 16 and 18; Cervarix, GlaxoSmithKline Biologicals, Rixensart, Belgium).[18,19]

Both vaccines offer protection against the types (HPV-16, HPV-18) responsible for the majority of cervical cancer lesions, with the quadrivalent vaccine offering additional protection against the types (HPV-6, HPV-11) associated with genital warts.[18,19]

The vaccines are prepared from empty protein shells and are produced by recombinant technology.[18,19] They do not contain any live biological material and are non-infectious.[18,19] Both vaccines are designed to be prophylactic, not therapeutic.[18,19]

The vaccines are licenced for use in both males and females from 9 to 26 years of age.[18,19] The vaccines must be refrigerated (not frozen) and are given as a series of three 0.5 ml intramuscular injections over a period of six months.[18,19]

Recent studies have demonstrated the safety and immunogenicity of the two-dose schedule (at an interval of five to seven months). The evidence available suggests that the two-dose schedule is a suitable alternative to the three-dose schedule, as it is less costly, easier to implement, and would improve the overall vaccine coverage.[20,21]

Safety, efficacy and immunogenicity

Large randomised controlled trials that have been conducted in Europe, the Asia-Pacific region and North, Central and South America have shown both vaccines to be safe, efficacious and immunogenic following vaccination.[10,13,18,22,23] A systematic review of the safety of the HPV vaccines has shown that they are safe and well-tolerated.[24] In the HPV vaccine trials, injection site symptoms (pain, erythema and oedema), headache and fatigue were the most common side-effects.[24] Both vaccines induce high serum antibody levels in almost all vaccinated individuals at levels 10 to 100 times higher than those seen in natural infections.[19,23,25,26] These titres have remained high for at least five years for the quadrivalent vaccine and eight years for the bivalent vaccine.[27]

Cross-protection

Both vaccines have shown cross-protection against infection and cervical disease associated with HPV types not specifically included in the vaccine. The bivalent vaccine has shown significant protection against HPV types HPV 31, 33, 45 and 52.[28] The quadrivalent vaccine has demonstrated significant protection against HPV type 31.[25]

HPV vaccination in HIV-positive individuals

Studies to date have shown that the vaccine is safe and immunogenic in HIV-positive individuals, although antibody titres were lower than those seen in HIV-negative individuals.[26,29-31] No adverse effects on CD4 counts have been observed.[26,29-31]

Cost-effectiveness

Several cost-effectiveness studies have found that the addition of a HPV vaccine to an existing cervical cancer screening programme is cost-effective (using cost per life year gained and cost per quality adjusted life year gained).[32-35] It has been shown that it is not cost-effective to include males in a HPV vaccination programme unless vaccine coverage among 12-year-olds is very low, and even then it is more cost-effective to invest in strategies to increase coverage in young females.[36] A South African study examined the cost-effectiveness of adding HPV vaccination to the existing national cancer screening strategy.[37] Cost-effectiveness was estimated in terms of incremental cost per life saved, and incremental quality adjusted life years (QALYs) gained, for girls vaccinated at 12 years of age.[37] This study showed that the addition of the HPV vaccine to the cervical cancer screening strategy would be a cost-effective intervention.[37]

HPV vaccination: opportunities and challenges

Comprehensive approach to cervical cancer

According to recommendations from the WHO and the United Nations Population Fund (UNFPA), national strategies for cervical cancer prevention and control should adopt a comprehensive approach that acts across the life-course, involving the identification of intervention opportunities in the relevant age groups in order to develop and deliver targeted strategies.[1,38] It has been suggested that a comprehensive approach should include the following strategies:

- prevention – HPV vaccination in young girls;
- screening and treatment services for women diagnosed with pre-cancerous lesions; and
- treatment and palliative services for women diagnosed with invasive cancer.[1,38]

Recommendations for the integration of HPV vaccine delivery into health systems

UNFPA has made recommendations regarding the integration of HPV vaccine delivery into health systems (see Box 1).[38]

Box 1: Recommendations for the integration of HPV vaccine delivery into health systems

Leadership and governance	The HPV vaccination plan should be included in the national immunisation programme, and should form an integral part of the national comprehensive cervical cancer prevention and control strategy. New screening programmes for cervical cancer may need to be implemented or existing programmes may need to be strengthened.[1]
Financing	Budgeting for the costs associated with the HPV vaccines, and the costs of vaccine delivery (including human resources, communication strategies, maintenance of the cold chain, appropriate transport, injection equipment and disposal, safety and coverage monitoring) is essential in the implementation of a HPV vaccination strategy.
Procurement and logistics	A consideration of logistical and operational issues involved is important in ensuring sustainability of the programme.
Human resource management	Delivery strategies should aim to use existing human resources in an efficient manner.
Service delivery modalities	The choice of strategy is dependent on the setting that can achieve the highest coverage of vaccination.
Health Information Systems	Existing systems should be used for the monitoring of coverage, safety and effectiveness.
Advocacy and community mobilisation	Individuals and communities should be empowered in order to make informed decisions regarding utilisation of the services.

Source: United Nations Population Fund, 2011.[38]

Choice of vaccine delivery strategy

The target group for HPV vaccination is girls aged nine to 13 years.[1] Ensuring an effective, affordable and equitable delivery strategy for this age group has challenges, as it differs from the younger target population of most national immunisation programmes. Nonetheless, vaccination of this age group represents a unique opportunity for cervical cancer prevention.[1]

A number of countries have implemented HPV vaccination (either as national programmes, or as demonstration projects). The following summary reflects some of the strategies that have been implemented in a number of countries.

National programmes

Australia

In 2007, Australia implemented a nationally funded programme of quadrivalent HPV vaccination for girls and young women.[39] The rationale for the choice of vaccine was the protection against cervical cancer (HPV types 16 and 18) and genital warts (HPV types 6 and 11).[39] Coverage has been high (see Table 1). A sentinel surveillance network was established in order to monitor the effect of the vaccine in cases of genital warts.[39] During the vaccination period, the proportion of women under 21 years of age diagnosed as having genital warts, decreased by 92.6% to 0.85% in 2011, from 11.5% in 2007.[39] In women aged 21 to 30 years, there was a 72.6% decrease from 11.3% in 2007 to 3.1% in 2011.[39] There were also significant declines noted in the numbers of heterosexual men diagnosed with genital warts.[39] The decline in the under-21 age group has been attributed to the free HPV vaccination received at schools, while the decline in the younger age groups of heterosexual men has been attributed to the effect of herd immunity.[39]

United States of America

In the United States of America, HPV vaccination was introduced into the routine immunisation schedule in 2006 for females (11 or 12 years old), with a recommendation for catch-up doses in females aged 13- to 26-year-old (see Table 1).[40] Initially the programme recommended the quadrivalent vaccine; this was updated three years later to include both the quadrivalent and the bivalent vaccines.[40] In 2011, routine vaccination of males in the same age group as the female target population was recommended.[40] Among females aged 14 to 19 years, the vaccine type HPV prevalence (HPV 6, 11, 16 or 18) decreased from 11.5% in 2003–2006 to 5.1% in the vaccination era, a decline of 56%.[40] These findings illustrate the early impact of HPV vaccination on vaccine type prevalence in this setting.[40] This is despite vaccination coverage ≥1 dose of HPV vaccine remaining static at 53.8% in 2012.[41]

The Centers for Disease Control and Prevention (CDC) highlight three areas to be addressed in order to improve the HPV vaccination coverage: the education of parents – as they tend not to understand the need for the vaccine, or have concerns over its safety; the role of healthcare providers in recommending the vaccine – as some are less likely to recommend the HPV vaccine than they would other vaccines; and the need to reduce missed opportunities for vaccination during health visits.[41]

United Kingdom

The United Kingdom (UK) – and other countries such as Canada, France, Greece, New Zealand, Norway and Sweden – offer the HPV vaccine as part of their national immunisation programme.[42] In the UK, the programme was introduced in 2008 and has been characterised by high uptake (see Table 1), but inequalities in uptake have been identified in communities of high deprivation and among vulnerable groups.[42]

Demonstration projects

Numerous demonstration projects have been conducted worldwide, mainly in low- to middle- income countries in Africa, Asia and South America (see Table 1). Generally the projects have been successful, with a median HPV vaccine coverage of 88.3%. The demonstration projects described here have mainly involved the donation of vaccines to the respective ministries of health or to non-governmental organisations.

Three modes of vaccine delivery have been documented:[43]

- school-based models where vaccines are given at schools;
- health facility-based models where vaccines are given at health facilities and mobile clinics; and

- mixed models that use both schools and clinics to deliver the vaccine.

School-based vaccination delivery methods were the most effective way of reaching girls within the WHO recommended age group (9–13 years), because girls in this age profile do not typically engage with the health system.[43] The primary advantage of the school-based model was the lower numbers of girls being lost to follow-up, especially for the three scheduled visits. Where loss to follow-up did occur, it was associated with students transferring to new schools, family migrations, holidays, and conflicts with the school calendar. The main challenge for this model is the high level of co-ordination and logistics required by education and health departments to ensure that vaccination occurs during the academic school year.[43]

Health facility models were characterised by the following advantages: immediate and dedicated adverse event reporting at facilities; the human resources, injection equipment and supplies needed to administer the vaccine outside the planned schedule were available; and vaccine storage was possible.[43] Key challenges included ensuring the involvement of girls who do not routinely visit health facilities, and the lack of rigorous follow-up procedures to ensure adherence to all three scheduled doses.[43]

The mixed model had the advantage of the combination of school and facility resources, which helped to ensure vaccination of girls who missed the doses at schools.[43]

HPV vaccination in South Africa

The HPV vaccine strategy links with other recent policy developments at a national level (see Box 2).

Box 2: Policy context for the HPV vaccination strategy in South Africa

Integrated School Health Policy (ISHP)

The ISHP provides for Sexual and Reproductive Health services in the school setting, with a focus on dual protection (to prevent pregnancy and sexually transmitted infections, including HIV infection) and provision of HIV Counselling and Testing (HCT). All learners should be counselled with regard to sexual and reproductive health.[44]

Primary Health Care (PHC) Re-engineering Strategy: School Health Services

The PHC Re-engineering Strategy has three streams, one of them being the implementation of school health services. School health services aim to improve the general health of schoolgoing children through addressing the environmental conditions in schools and health barriers to learning. These will in turn influence the educational outcomes through better school attendance and academic achievement. The school health services will initially prioritise learners in the lower socio-economic schools with the following package of health services: health education and health promotion, learner assessment and screening, provision of on-site services, and follow-up and referral.[45]

Cervical cancer policy (draft)

The National Department of Health is currently finalising revision of the National Cervical Cancer Control Policy. This policy updates the existing strategy to take into account technological advancements in cervical cancer prevention and new evidence on screening methods and prevention in the context of the HIV epidemic. The overall goal is to improve women's health by decreasing morbidity and mortality due to cervical cancer. This updated policy makes provision for the introduction of primary prevention of cervical cancer through HPV vaccination of young girls aged 9–13 years, and the promotion of awareness regarding HPV prevention through safe sex practices and dual protection (barrier plus other methods of contraception).[46]

National Strategic Plan (NSP) on HIV, Sexually Transmitted Infections and TB (2012–2016)

The NSP Strategic Objective 3 (sustaining health and wellness) includes the prevention, screening and treatment for cervical cancer in HIV-positive women. HPV vaccines prevent cervical cancer and genital warts, which cause significant morbidity, especially among people living with HIV. Cervical cancer screening is an important intervention for HIV-positive women.[47]

Strategic Plan for the Prevention and Control of Non-Communicable Diseases

The Strategic Plan has recommended the introduction of the HPV vaccine as a highly cost-effective intervention to reduce the burden of cervical cancer.[48]

Millennium Development Goals (MDGs)

HPV vaccination as part of a comprehensive cervical cancer prevention and control programme contributes to the attainment of the MDGs through the provision of sexual and reproductive health services in order to improve women's health.[1]

HPV demonstration project in South Africa

A demonstration project conducted among 963 schoolgirls (aged 9–12 years) in rural KwaZulu-Natal showed a high uptake of HPV vaccination among schoolgirls, using the existing resources of the school health teams. The uptake of the vaccine was 99.7%, 97.9% and 97.8% for the first, second and third doses respectively.[49]

The study made the following recommendations for a national roll-out of school-based HPV vaccination:[49]

- The planning and preparation for vaccination (including numbers of learners to be vaccinated, human resources, vaccine delivery, maintenance of the cold chain, training of healthcare workers, and community mobilisation) should occur well in advance of the actual vaccination in order to ensure a high uptake of the vaccine.
- There should be active tracing mechanisms in place in order to follow up with those girls who do not complete the schedule.
- There should be clear guidelines in place for the recognition and reporting of adverse events.
- The concerns of parents and caregivers should be addressed through health promotion/education.
- Mass media can be used to increase awareness among communities.

Implementation of HPV vaccination in South Africa

In May 2013 the National Minister of Health, Dr Aaron Motsoaledi, announced the commencement of HPV vaccine administration in 2014 as part of the ISHP, in collaboration with the Departments of Basic Education (DBE) and Social Development (DSD).[50]

In March 2014, Dr Motsoaledi launched South Africa's HPV vaccination campaign at a primary school in the Free State. The campaign is part of the Extended Programme on Immunisation. The bivalent HPV vaccine will be administered in a two-dose strategy to an estimated 500 000 girls, in quintile 1 to 5 schools across the country. All girls, in grade four, who are 9 years and older, will be vaccinated. Prior to the launch, the DBE released a Guide

for Educators on the vaccination process, while vaccination consent forms, letters to parents and posters were also made available. After the March 2014 rollout, the girls will receive their second dose of the vaccine in October 2014.[51] While a detailed monitoring and evaluation plan has been developed for the programme, it is still too early to present any meaningful reports.

The first aim of the vaccine programme is to reach the widest possible coverage of the pre-pubertal female population with vaccines against HPV 16 and 18 before considering extension of the programme to boys. As resources expand, the target group for the vaccine can be redefined to extend benefit to other diseases caused by HPV among males and females.[50]

Conclusion

With the availability of effective vaccines to prevent cervical cancer and a service delivery platform utilising the ISHP, South Africa has an opportunity to decrease the morbidity and mortality associated with cervical cancer. There are many lessons to be learned from settings where the HPV vaccine has been routinely implemented and from demonstration projects, with an example of the latter being particularly relevant in the South African context.

It is likely that human resource constraints may still hamper effective delivery of HPV vaccines to schoolgirls, and the National Department of Health will seek to mitigate this at all levels through proper planning, resource forecasting and strengthened procurement systems; reliable monitoring and evaluation to determine the progress and impact of the vaccination strategy, and importantly, social mobilisation and advocacy efforts to improve the demand for the service. This will require concerted efforts by all stakeholders to ensure successful implementation of the HPV vaccination strategy.

Table 1: National programmes and demonstration projects – HPV vaccination delivery in countries

Country	Year programme implemented	Type of programme	Vaccine	Target group	Vaccination delivery model	Coverage[a] or uptake[b]
Australia[39]	2007 2013	National	Quadrivalent	Schoolgirls 12-13 years Catch-up vaccinations for 13-18 year old school girls, and for 18 to 26-year-old females in community Schoolboys 12-13 years Catch-up for schoolboys 14-15 years	Schools	Coverage 1st dose – 83% 2nd dose – 80% 3rd dose – 73% Not available
United States of America[40,41]	2006 2011	National	Quadrivalent and bivalent	11 to 12-year-old females 11 to 12-year-old males Catch-up for females and males 13-26 years	Health providers	Coverage ≥ 1 dose – 53.8% Not available
United Kingdom[52]	2008	National	Quadrivalent	Schoolgirls 12-13 years and 17 to 18-year-old girls Catch-up for 13 to 18-year-old girls	Schools and health providers	Uptake 1st dose – 90.3% 2nd dose – 88.1% 3rd dose – 71.8%
South Africa[49]	2011	Demonstration project	Quadrivalent	Schoolgirls 9-12 years	Schools	Uptake 1st dose – 99.7% 2nd dose – 97.9% 3rd dose – 97.8%
Brazil[53]	2010	Demonstration project	Quadrivalent	Schoolgirls 10-16 years	Schools	Uptake 1st dose – 87.5% 2nd dose – 86.3% 3rd dose – 85.0%
Peru[54]	2008	Demonstration project	Quadrivalent and bivalent	Schoolgirls – Grade 5	Schools	Coverage All 3 doses – 82.6%
Uganda[54]	2008-2009	Demonstration project	Quadrivalent and bivalent	Schoolgirls – Primary 5 class	Schools	Coverage All 3 doses – 88.9%
Vietnam[54]	2008-2010	Demonstration project	Quadrivalent and bivalent	Schoolgirls – Grade 6 Health centre – 11-year-old girls (not in schools)	Schools and health facilities	Coverage All 3 doses – 96.1%
India[54]	2009-2010	Demonstration Project	Quadrivalent and bivalent	Schoolgirls 10-14 years Health centre – 10 to 14-year-old girls (not in schools)	Schools and health facilities	Coverage All 3 doses – 87.8%
Bhutan[43]	2009-2011	Demonstration project	Quadrivalent	9-13 years	Schools	Coverage All 3 doses – 85.0%
Bolivia[43]	2009-2011	Demonstration project	Quadrivalent	9-13 years	Schools and health facilities	Coverage All 3 doses Schools – 107.4% Health facilities – 89.3%
Cambodia[43]	2009-2011	Demonstration project	Quadrivalent	11-18 years	Health facilities	Coverage All 3 doses – 101.3%
Cameroon[43]	2009-2011	Demonstration project	Quadrivalent	9-18 years	Health facilities	Coverage All 3 doses – 64.5%
Haiti[43]	2009-2011	Demonstration project	Quadrivalent	9-13 years	Schools and health facilities	Coverage All 3 doses – 87.4%
Lesotho[43]	2009-2011	Demonstration project	Quadrivalent	10-18 years	Schools and health facilities	Coverage All 3 doses – 84.3%
Nepal[43]	2009-2011	Demonstration project	Quadrivalent	9-13 years	Schools and health facilities	Coverage All 3 doses – 105.5%

a Coverage is defined as the number receiving all three doses of the vaccine divided by the number originally targeted by the project. Coverage >100% could be attributed to errors in census data used to calculate the denominator of the coverage estimation, or to the increased demand and recruitment for the vaccination outside the original coverage area, due to successful community information campaigns.[41]

b Uptake is defined as the relative proportion of those vaccinated to the total number of those eligible – can be calculated separately for the first, second and third doses.[50]

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12

Voluntary Medical Male Circumcision in South Africa: challenges and opportunities

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Findings from three randomised controlled trials in South Africa, Kenya and Uganda have shown the efficacy of medical male circumcision in reducing HIV transmission risk among men when engaging in vaginal sex. These results led to a recommendation from the World Health Organization calling for immediate scale-up of Voluntary Medical Male Circumcision (VMMC) in high HIV-prevalence settings to 80% coverage among men aged 15–49. South Africa, with an astounding 6.4 million people infected with HIV and medical circumcision coverage of only 18.6%, has been identified as one of 14 priority countries in east and southern Africa targeted for scale-up. This chapter reviews the current situation regarding VMMC in South Africa, including progress in achieving scale-up, the complexities of rolling out such an intervention, demand creation, and supply-side issues such as costs and resource availability to achieve coverage. The chapter also examines issues related to integrating safe medical circumcision into traditional practices. Finally, we look at the implementation of the intervention going forward, including new technologies for non-surgical circumcision, possible targeting strategies for maximum cost-effectiveness, and the integration of VMMC in a wider range of HIV prevention and treatment services being rolled out in the country.

South Africa, with an astounding 6.4 million people infected with HIV and medical circumcision coverage of only 18.6%, has been identified as one of 14 priority countries targeted for scale-up of Voluntary Medical Male Circumcision.

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Introduction

Voluntary Medical Male Circumcision (VMMC)[a] was first proposed as an HIV prevention intervention for men over a decade ago based on observational data. These initial observational studies showed a link between circumcision and low HIV prevalence.[1,2] Three randomised controlled trials (RCTs) have confirmed the effectiveness of VMMC as a biomedical prevention intervention for the reduction in HIV risk acquisition in men. The first RCT to test for efficacy of VMMC was conducted from 2002 to 2004 in Orange Farm, a high HIV prevalence site near Johannesburg, South Africa.[3] This trial, along with the two subsequent RCTs in Kenya and Uganda,[4,5] demonstrated that VMMC reduces the risk of HIV infection for men by up to 60% and additional studies have found that VMMC offers durable protection, with prevention benefits documented five years after VMMC.[6,7] Observational data have revealed plausible biological reasons as to why the removal of the foreskin would reduce the risk of HIV acquisition in men.[8] The foreskin has the tendency to develop epithelial disruptions, or tears, during intercourse, which may allow HIV a portal of entry and compared with the tissue of the outer foreskin, the foreskin's HIV target cells (Langerhans cells with CD4 receptors) are closer to the epithelial surface.[9,10]

In response to these findings, in 2007 the Joint United Nations programme on HIV/AIDS (UNAIDS) and the World Health Organization (WHO) published recommendations supporting Voluntary Medical Male Circumcision (VMMC) as an HIV prevention strategy among young boys, adolescents and adult men in countries with generalised heterosexual[b] epidemics, high prevalence of HIV and low levels of circumcision. Recommendations from modelling studies showed that scaling up VMMC to 80% in men aged 15–49 within five years would avert over a million HIV infections in South Africa alone.[11,12] VMMC is also seen as a highly cost-effective HIV biomedical intervention strategy. More recently, the UNAIDS investment framework, a strategy for investing resources in key programmatic activities to achieve an impact on new HIV infections (2011–2020), sees VMMC as a core value-for-money activity in the context of declining international development assistance. As an additional indicator of effectiveness, a series of costing studies in the southern African region have shown that VMMC is not only highly cost-effective, but after 15 years will save over US$16 billion if scaled up to 80% within four years and maintained into the future.[11,12]

Although findings from the three RCTs[3-5] showing a protective effect for men against HIV infection have been widely accepted,[c] a number of concerns have been raised regarding the scale-up of VMMC programmes in the"real" world. These include the effectiveness of VMMC for reducing HIV transmission outside of controlled clinical trial settings,[13,14] the impact of widespread VMMC on women,[13,15,16] as well as the negative impact of risk compensation following VMMC.[13] These concerns need not negate the advocacy for VMMC as a prevention tool for inclusion in the HIV response, but do highlight the importance of careful consideration of the manner in which the intervention is scaled up, as well as much-needed evidence for assessing context-specific effectiveness.

Policy, targets, performance and demand for VMMC

South Africa has set an ambitious target of 4.3 million VMMCs by 2016 to achieve an impact on the HIV epidemic. This is due to the high HIV prevalence rate of 12.2% with a total of 469 000 new infections recorded in 2012.[17] The South African VMMC programme is led by the National Department of Health (NDoH) and supported financially by a number of international donors (e.g. US President's Fund for Emergency AIDS Relief – PEPFAR; the Global Fund to Fight AIDS, Tuberculosis and Malaria – GFATM; WHO and the World Bank).[18,19] An implementation plan for the scale-up of the VMMC programme in South Africa (2011–16) has a number of objectives, including increasing access to VMMC services across the country, focusing on the establishment of high-volume sites and capacity-building; integrating safe medical circumcision into traditional practices; incorporating VMMC in an integrated package of health services; and increasing demand for circumcision through media and social mobilisation.[20] Table 1 shows the breakdown of provincial targets set out in the plan.

Table 1: VMMC targets per province 2011/12 – 2015/16

Province	2011/12	2012/13	2013/14	2014/15	2015/16
EC	27 585	33 102	33 102	55 171	181 248
FS	33 634	40 361	40 361	67 268	107 629
GP	115 701	138 841	138 841	231 401	370 242
KZN	145 688	174 826	174 826	291 377	466 203
LP	18 571	22 285	22 285	37 142	59 426
MP	41 719	50 063	50 063	83 439	133 502
NC	16 308	19 569	19 569	32 615	52 186
NW	42 279	50 735	50 735	84 557	135 291
WC	58 515	70 218	70 218	117 030	181 248
National	500 000	600 000	600 000	1 000 000	1 600 000

Source: National Department of Health, 2012.[20]

The NDoH's Annual Performance Plan for 2013–2016 reiterates the targets set out in the VMMC plan and gives performance figures to date: 140 120 medical circumcisions were recorded in 2010/11, 347 947 in 2011/2012, with a further 422 518 performed in 2012/2013.[21] The latest unofficial figures from the Department indicate that about 1.44 million circumcisions had been performed (cumulative figure between 2010 and end of March 2013), with 512 902 occurring in the 2013/14 year.[d] These figures show significant progress but are still short of the 80% coverage target of 4.3 million.

a We use the term "Voluntary Medical Male Circumcision" (VMMC) which has replaced the term "Medical Male Circumcision" (MMC) in most of the current literature on this subject. We also make the distinction in this chapter between VMMC and "Male Circumcision", which may include traditional circumcision, infant circumcision and VMMC.

b Based on a review of studies, there is no convincing evidence for the protective effect of VMMC in men who have sex with men (MSM). Further research is required in this area.

c Some dissident voices have questioned the results of these RCTs; see Boyle & Hill.[13]

d These unaudited figures were obtained through personal communication with NDoH. Audited figures will be published in the next NDoH annual report.

Achievement of the 80% target coverage hinges upon acceptability and demand creation. More specifically, demand creation activities to increase VMMC coverage aim to influence attitudes, perceptions and behaviours, to increase general social acceptability and individual uptake.[22]

While acceptability of medical male circumcision in southern Africa was found to be around 60% among uncircumcised men and women, this figure is likely to vary considerably depending on religion, culture and other attitudes and perceptions in different population sub-groups.[23,24] In 2012, fewer than 40% of uncircumcised men in South Africa indicated that they would consider undergoing circumcision.[17] Demand for VMMC, however, varies by age group. In the 15–24 age group, almost 60% indicated that they would consider VMMC, compared to 37.1% in the 25–49 age group and 11.7% of those over 50 years of age.[17] Demand for circumcision has been increased through effective communication programmes. In 2012, The National Communication Survey estimated that about 47% (from 9% in 2009) of men and women had knowledge of the protective benefits of VMMC against HIV infection.[25]

There are numerous individual and community-level factors that can affect demand for VMMC. Some of the individual barriers to the demand for male circumcision (MC) include: fear of pain during and after the surgery; concern about the long healing period; financial and opportunity costs; fear of adverse events and complications relating to the procedure; perceptions about the benefits to the individual; perceptions about HIV and STI risk because of age and sexual activity; and personal preferences. Other factors also contribute to difficulties in creating demand for VMMC.[26-29] Community-level factors include a lack of cultural acceptability and poor integration of traditional and medical circumcision practices.[22] The main stimuli for VMMC demand seem to be health reasons,[8] peer pressure and the influence of female intimate partners.[29]

Strategies to increase MC uptake

There are many challenges in implementing HIV prevention interventions on a large scale, especially considering the inherent complexities of the epidemic, as well as the social and economic contexts in which these interventions are rolled out. More particularly, in considering VMMC scale-up, the following important issues need to be considered in closing the gap between evidence and practice:

- VMMC communication strategies to create awareness and increase acceptability in uncircumcised men and minimise risk compensation in circumcised men;
- the role of traditional male circumcision;
- the supply of healthcare resources
- non-surgical circumcision; and
- neonatal and infant circumcision.

VMMC communication strategies, and minimising risk compensation

Current VMMC communication strategies have included mass media campaigns, billboard messages, print material, interpersonal recruitment, and edutainment.[28,30,31] Despite a high level of exposure to VMMC messaging, Peltzer and Mlambo note that this does not necessarily translate into acceptability or uptake of VMMC.[32] Two common problems inherent in these campaigns are inadequate messaging tailored to specific contexts[28] and a lack of systematic integration of VMMC into HIV prevention messages.[32] Moreover, identified barriers to VMMC include fear of HIV testing that precedes circumcision, concerns about adverse effects (e.g. lack of sexual pleasure),[26,27] transport costs,[28] time off from work,[28,33] temporary sexual abstinence and unsupportive cultural norms.[34] These barriers need to be adequately addressed in any communication strategy.

Evidence suggests that interpersonal communication, such as support from peers and intimate partners, is often central to a man's decision to undergo VMMC.[35] Demand creation activities need to be designed with the specific contexts and demographic characteristics of the targeted population in mind.[22]

In addition to targeted approaches, social mobilisation may be central to increasing demand and acceptability of VMMC. Organisations in South Africa, such as Brothers for Life and Soul City, are devoting considerable time and resources to researching the best communication strategies for this purpose, and these campaigns are continually developing to reach and influence as many people as possible with accurate information and effective messaging.[30,31]

VMMC efforts have often neglected the gender dimension and focused on men only. In a multi-country (Kenya, Namibia, Swaziland, South Africa and Uganda) study by AIDS Legal Network (ALN), 87% of the women said that they would support the introduction of VMMC in their communities, 74% would want to be involved in VMMC decision-making with their partners, and 72% were aware of the partial protection that VMMC offers.[36] This study also showed that women's involvement in VMMC programmes and policy development is low in the five countries. The majority of women surveyed did not talk to their partners about circumcision and felt it was ultimately a man's decision to undergo circumcision.[36] The findings indicate that women's involvement in VMMC is shaped by the existing socio-cultural prescriptions on sexuality and health. As regards the South African data, findings were mixed.[36] In a VMMC programme running in Gauteng Province, women felt that even though they were engaged with their male partners, the extent to which they affected the actual decision for men to be circumcised remains questionable.[28]

Risk compensation is a major concern relating to male circumcision. Risk compensation or sexual disinhibition is "the phenomenon whereby those who have taken protective steps offset the benefit with risk-related behavioural changes".[37] In the case of VMMC, the protective effect of the circumcision may be negated by engaging in risky sexual practices, for example: decreased condom use, increased number of (concurrent) partners, etc. This issue of sexual disinhibition may be especially relevant for young and sexually active populations in high HIV-prevalence areas. Data from the three RCTs suggest that in Uganda, participants did not report risk compensation.[38] The South African RCT found an increase in the number of sexual encounters, but importantly, not an increase in the number of partners, and the Kenyan trial found a reduction in the number of sexual partners and increased condom use among both circumcised and uncircumcised men.[38] While risk compensation may not have been a major issue under trial conditions because of high-quality motivational counselling, one cannot assume the same outcomes in the context of "real-world" VMMC scale-up. With VMMC services being increasingly promoted and offered, it is important to monitor for risk compensation.[39] A study on male

circumcision among men in South African townships showed no real-world risk compensation.[40] However, women's anxiety about circumcised men's sexual behaviour was evidenced in a study in KwaZulu-Natal among women attending tertiary institutions. While women were aware of the partial protective benefits of VMMC, some were concerned that VMMC could actually increase their risk of acquiring HIV because of behavioural disinhibition amongst circumcised men.[41] In this study, VMMC was perceived as a threat rather than a protective factor against women being infected with HIV.[41] According to Bailey et al., risk compensation may be addressed and minimised with appropriate education and condom promotion.[42] Communication strategies are therefore important, to ensure that men who have been circumcised are aware of the limited protective effect of VMMC and that they should continue to be sexually responsible. VMMC promotion and advertising should not only focus on the benefits of circumcision, but importantly, on the fact that circumcision does not offer full protection from HIV infection.

Risk compensatory behaviour will ultimately influence the level of risk to which women are exposed, as circumcision does not protect females from HIV infection. Hallet et al. indicate that risk compensation could lead to more women being infected with HIV, and project that a 90% decrease in condom use by men following circumcision will result in a 40% increase in HIV incidence in women.[37] However, looking at the long-term effect of circumcision, over time, MC would probably protect more women than nearly any other HIV prevention strategy.[43] The paucity of literature on motivations for men undergoing circumcision, as well as the dearth of studies documenting sexual practices of circumcised males, needs to be addressed in future research.

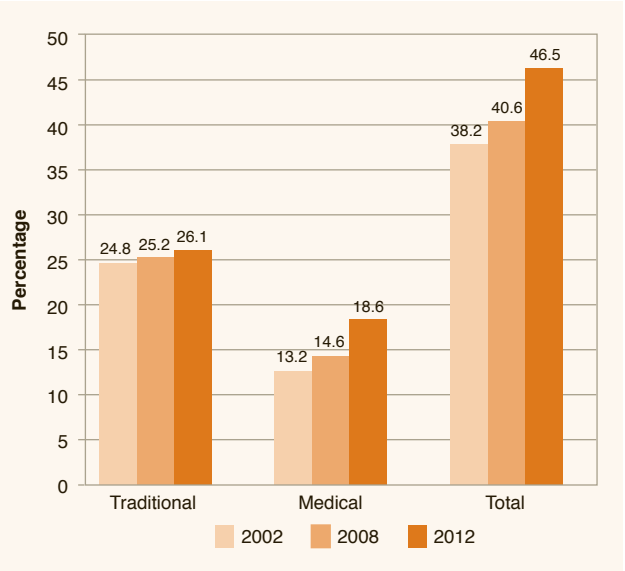
The role of traditional male circumcision

In South Africa, the majority of circumcisions are of a traditional nature. The national prevalence of circumcision was recorded as approximately 38.5% of men in 2002, with most of these circumcisions taking place in non-medical settings, often after sexual debut.[17,44] In 2012, this figure had increased with an estimated 46.5%[e] coverage of circumcision among men. However, only 18.4% of men were medically circumcised.[17]

Figure 1 shows that, while traditional MC prevalence has been much higher than medical circumcision over the three survey periods (2002, 2008, 2012), traditional circumcision varies by ethnic group and province. Among the Xhosa, Pedi and Venda, traditional MC is practised widely, with the Sotho, Ndebele and Shangaan practising MC moderately and the Zulu, Tswana and Swazi rarely practising MC.[45] As a result, traditional MC prevalence is considered to be high in the Eastern Cape (74%) and Limpopo Province (72.6%), and low in the Northern Cape (20.3%) and KwaZulu-Natal (23.2%).[17] In circumcising communities, MC is seen as a socio-cultural practice and rite of passage to manhood[46] and the procedure is usually performed on young men in a non-clinical setting by a traditional provider.[47] Some 10 000 Xhosa men are traditionally circumcised annually in the Eastern Cape.[48] Amongst men who self-report as being circumcised, often the foreskin is only partially removed.[48,49] However, there is no evidence that incomplete removal of the foreskin reduces the risk of HIV infection.

e MC prevalence estimates based on self-reporting may be misleading, as men may falsely report being circumcised.

Figure 1: Trends in adult male self-reported circumcision by type of circumcision, South Africa 2002, 2008 and 2012



Source: Adapted from Shisana et al., 2014.[17]

Clearly, the established practice of traditional MC has posed challenges within the context of scaling-up VMMC. Peltzer et al. noted that when VMMC is performed as part of the process of traditional initiation into manhood, a number of acceptability problems have been reported, notably those that relate to the visible physical differences between VMMC and traditional circumcision.[50] For example, Xhosa initiates reported mixed attitudes towards combining medical circumcision with traditional circumcision. The majority of initiates suggested that there was stigma associated with being medically circumcised.[51]

Compared to medical circumcision, traditional MC increased the risk of complications.[47] Serious clinical complications and a considerable number of deaths have been reported from traditional circumcisions carried out on adolescents. Between 2001 and 2006, 2 262 hospital admissions, 115 deaths and 208 genital amputations were recorded as a result of traditional circumcision.[52] The Eastern Cape has been associated with botched traditional circumcisions, with 853 boys having died since 1995.[53] As a result of the high risk of complications, traditional practitioners are now required to be registered with the Provincial Department of Health.[54]

In 2001, a law regulating traditional MC was passed in the Eastern Cape. The objectives of the Application of Health Standards in Traditional Circumcision Act (Eastern Cape) No. 6 of 2001 are to provide for the observation of health standards in traditional circumcision; the issuing of permission for the performance of a circumcision operation; and permission for the operation of initiation schools.[49] Medical Officers appointed by the Provincial Department of Health issue permits to traditional circumcisers. Peltzer et al. noted significant reductions in the severity of adverse effects of traditional circumcision if the traditional provider was a registered practitioner.[55]

There is some optimism that VMMC in South Africa could be integrated into traditional circumcision practices.[56] There have been examples of success, notably in Limpopo Province where there is evidence of integration of VMMC into traditional circumcision resulting in general practitioners conducting circumcisions at

initiation schools.[18] However, in general, there is little evidence to show the level of involvement of traditional leaders in demand creation activities and whether these leaders are willing to advocate for VMMC instead of traditional circumcision practices.[29] Integrating VMMC and traditional circumcision practices in South Africa will be no small challenge, but support from leaders at all levels – especially traditional and religious leaders – will go a long way to improving the coverage of VMMC. For example, in KwaZulu-Natal at the end of 2009, the Zulu King Goodwill Zwelethini voiced his support for VMMC among Zulu men, who do not usually practise circumcision.[57] This kind of support is necessary to help decrease stigma and objections to VMMC based on cultural, religious or ethnic identity.[28] Internationally, VMMC experiences in Kenya have shown that early engagement of traditional leaders from non-circumcising communities can facilitate the uptake of VMMC.[58]

The supply of healthcare resources

The success of the scale-up of VMMC in priority countries is directly attributed to the supply of healthcare resources. Supply-side issues include limited access to facilities that provide circumcision in high prevalence areas and limited human resources for health.[21] In order to increase coverage, the NDoH plans to increase the number of VMMC sites from 460 to 508 during 2013/14.[21]

One innovative intervention to increase both supply and demand currently being rolled out in South Africa is provision of VMMC at mobile clinics, which are fully equipped to adequately perform VMMC procedures.[29] However, human resources for VMMC are a particular problem because of the inadequate production and poor retention of appropriately trained healthcare personnel, as well as the mismatch of needs and skills of the healthcare professionals, especially for HIV programmes.[59] WHO recommendations for implementing Models for Optimising Volume and Efficiency (MOVE) suggest increased efficiency and effectiveness of services will be achieved through task-sharing, task-shifting, diathermy for haemostasis and prepackaged surgical instruments.[60] MOVE was first developed and implemented in Orange Farm, South Africa, in the Bophelo Pele Male Circumcision Project which began in 2007. Since the release of the WHO guidelines in 2010, MOVE (or elements of this model) has been adopted by most of the priority countries in the east and southern African region.[61] In South Africa, NGOs such as Anova Health, the Centre for HIV/AIDS Prevention Studies (CHAPS), and Maternal, Adolescent and Child Health (MatCH) have begun to implement MOVE in their circumcision programmes throughout the country.[62] The South African government is also incorporating elements of MOVE into the national VMMC programme. Although there is no official policy on task-shifting, the NDoH has consulted with the South African Nursing Council and permission has been granted for professional nurses to conduct circumcisions. However, task-shifting has yet to be implemented.[18]

Other countries have adopted innovative strategies which have resulted in increased uptake of VMMC. Kenya has implemented strategies including mobile and outreach services and Rapid Results Initiatives.[f] Kenya has also adopted task-shifting strategies enabling nurses to perform circumcisions, which has increased the human resource capacity for VMMC in the country.[58] In Tanzania, public sector clinicians were moved to high-volume sites during VMMC campaigns and this has resulted in increased delivery and scale-up.[63]

While a focused approach to HIV prevention scale-up is often recommended, it may not be the most efficient approach, given that demand is rarely constant so it is difficult to dedicate space and staff for MC alone. There is also deliberate planning in some countries for VMMC programmes to be fully integrated within public health facilities, motivated by the possibility of broadly strengthening infrastructure within the health system. Again, the variable demand means that VMMC staff are available for other pressing needs within the health system. A customised approach may be a more plausible and effective strategy for VMMC scale-up.

Non-surgical circumcision

Given the human resource limitations for VMMC scale-up, there is a growing emphasis on the introduction and use of non-surgical circumcision devices in South Africa. Non-surgical devices currently include the Shang Ring, PrePex and the TaraKLamp – although the acceptability and usability of these devices varies because of the incidence of adverse events found with each device, price, and endorsement by the WHO. The use of these devices will strengthen South Africa's ability to reach national circumcision targets for three important reasons. Firstly, these devices do not need to be administered by a doctor, nor do they require the use of a sterile facility, and the procedure takes only a fifth of the time for a surgical circumcision.[64,65] This will dramatically reduce the burden on human resources and allow high-volume VMMC sites to undertake more circumcisions.

Secondly, there is optimism around the fact that these devices could allow for a smoother integration of medical and traditional circumcision practices where traditional leaders could be trained to administer safe circumcisions in non-clinical settings.[66] This possibility is not one that has yet been accepted or tested, and there is some debate as to whether this concept would be implementable and practical in traditional circumcision settings. Although the acceptability of these devices is uncertain, careful negotiation and interaction with traditional leaders based on respect for traditional practices could see the inclusion of medical circumcision in the wider practices of the rites of passage to manhood.

Thirdly, non-surgical devices may present a demand creation opportunity. Devices such as PrePex that do not require surgery or the use of anaesthetic have already been shown in some settings to have a high level of acceptability and may present an option for circumcision that is preferred by some men.[67] The PrePex device – endorsed by the WHO – was tested in South Africa in 2013/14 and, pending final recommendations from the WHO based on the results from three ongoing pilot studies, is planned to be rolled out as part of the national VMMC scale-up plan in 2014.[68]

One of the key concerns for the roll-out of any circumcision devices is cost. Table 2 shows a comparison of the estimated costs of surgical circumcision and the use of the PrePex device in 2012. It should be noted that the data were collected from a pilot field study, so costs under scale-up conditions are likely to be different.

f Rapid Results Initiatives are a form of results-based management systems used in the public service aimed at jump-starting major change efforts, enhancing public ownership and improving implementation capacity. http://transforming-kenya.com/rapid-results-initiative.html

Table 2: Costs of Surgery vs. PrePex[g]

	Surgery only		PrePex only	
	Cost/ circumcision $	% of unit cost	Cost/ circumcision $	% of unit cost
Staff	9.68	21	3.82	7
Training	0.19	0	0.11	0
Consumables	23.60	52	26.90	48
Device	0.00	0	10.00	18
Durable equipment	0.36	1	0.63	1
Supply chain management	11.53	25	14.27	26
Waste management	0.17	0	0.17	0
Total unit cost/ circumcision	45.54		55.89	

Source: Njeuhmeli, 2013.[69]

While the cost per circumcision using the PrePex device (US$55.89) is estimated to be slightly higher than the cost per surgical circumcision (US$45.54), offering the option to be circumcised surgically or with a device may help to increase demand.

In 2013, the price of a device – excluding other incidental costs such as materials and implements needed to conduct the procedure – was not believed to be a sustainable solution for rapid scale-up purposes.[66] The Global Fund to Fight HIV, Tuberculosis and Malaria has negotiated a price of US$12 per unit for 1.5 million PrePex devices to be distributed among 14 priority countries in the east and southern African region.[70] If these prices can be maintained and continue to decrease, the widespread use of the device may become sustainable, representing a significant cost saving.[12]

Although the new Chinese-manufactured Shang Ring device is likely to be cheaper than PrePex per device, this only comprises 20–30% of the cost per circumcision, such that VMMC using any device is not likely to provide a cheaper solution per procedure than surgical circumcision.[69]

Creating demand for circumcision remains crucial in ensuring that the programme is cost-effective. If more men decide to undergo VMMC, clinics will operate closer to their full capacity, resulting in less waste and a declining average cost per procedure due to more efficient use of fixed resources.[69] Table 3 shows estimates of the cost per circumcision at sites using a combination of surgical VMMC and PrePex depending on the utilisation capacity of the site. It is clear that low uptake will significantly increase the unit cost per circumcision.

g These figures are based on modelling estimates at the time the study was conducted, and do not reflect the real prices and costs applicable to South Africa in 2014. The study does, however, provide a useful comparison of the costs of different methods of circumcision.

Table 3: Costs of combination surgery and PrePex

Mixed	# circ/yr	Unit cost $
10% of max	2 640	83
20% of max	5 280	61
Average	15 400	47
80% of max	21 120	45
Max	26 400	44

Source: Njeuhmeli, 2013.[69]

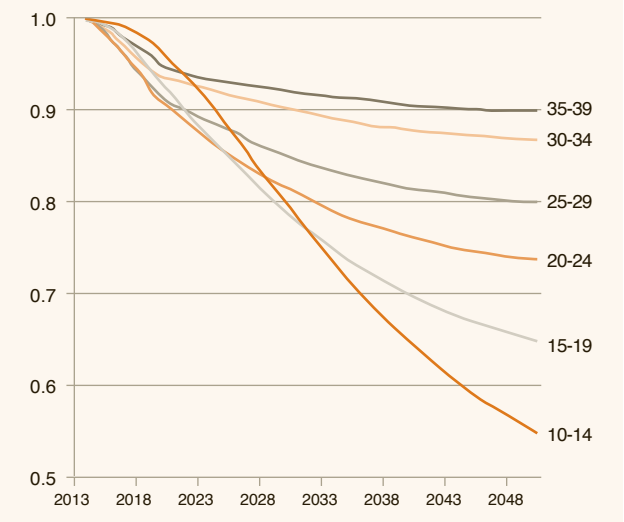
While there have been concerns and negative reports about the use of some circumcision devices, the opportunity that this new technology represents cannot be overlooked – provided that the use of these devices has been tested according to the set procedure for introduction of a device and have received approval from the WHO.[26,71] Continual monitoring of safety, acceptability and implementation in line with recommendations from the manufacturers of the devices will help ensure the safe and increased use of these devices across the country.

Neonatal and infant circumcision

One scale-up plan that has not received much attention thus far in South Africa is that of increasing the coverage of neonatal and infant circumcisions. Neonatal circumcision for HIV prevention has been the source of heated debate and presents many challenges. Issues of autonomy, human rights and consent complicate the issue of infant circumcision, especially in America where it is viewed as a form of non-consensual surgery.[72] In this light, circumcising a male infant without his consent is seen as unjust. Those who are against infant circumcision propose that any parent should wait until the child is old enough to make an autonomous decision.[73]

Recent PEPFAR-modelled data for South Africa illustrated in Figure 2 show that the most cost-effective strategy for VMMC scale-up in the short run is to target the age group with the highest incidence – ages 25–29. However, given that the HIV epidemic is unlikely to have disappeared in the next 15 to 20 years, promoting infant

Figure 2: Reduction in HIV incidence using age-specific VMMC targeting



Source: Stover, 2014.[74]

circumcision now for the health of the child may be as cost-effective as an HIV prevention intervention in the long term. The following graph shows the modelled reduction in incidence when VMMC targeting is used focusing on specific age groups.

From Figure 2 it is clear that the more time passes, the more effective targeting younger age groups will be. Looking 10 years into the future, targeting the 20–24 year age group for VMMC now will be most effective and after 20 years, targeting the 10–14 year age group will be most effective in reducing incidence. While it is clear that targeting younger age groups (especially infants) for circumcision will not be useful in stemming the tide of the epidemic immediately because they are not sexually active, it remains a relatively low-cost long-term intervention that must be considered. Neonatal circumcision is likely to be more cost-effective than adult circumcision in the long run because it can be integrated into existing maternal and infant health services.

Infant circumcision has a number of advantages: there are no days lost from school or work, and the cost is low as it can be integrated into existing reproductive clinical services and other postnatal programmes.[72] When circumcision is done early in life, risk compensation is avoided. Furthermore, infant circumcision protects infants against urinary tract infections.[75] Although there are some notable advantages in neonatal circumcision, it also has its drawbacks – specifically in the context of HIV prevention, the benefits will only be gained once these boys become sexually active. In other contexts, there can be socio-cultural pressure against neonatal circumcision, where circumcision is seen as a rite of passage into adulthood.[76] Neonatal circumcision and MC in general have been viewed by certain sectors of society as genital mutilation. Potential factors that might affect uptake of infant circumcision relate to the safety, pain and discomfort that is associated with circumcision.[77]

Acceptability studies on neonatal circumcision are scarce. If scale-up of infant MC is to be improved, there is a need to increase the acceptability of this practice among parents.[78] In a study in Botswana, an estimated 90% of mothers were willing to have their infants circumcised if the surgery were done without charge and in a clinical setting. Their motivation to have their infants circumcised was driven by the future protective effect against HIV infection.[79] Targeting circumcision before boys become sexually active should be considered for inclusion in VMMC scale-up plans, as this would offer maximum exposure to the benefits of this intervention, as well as result in optimal cost-effectiveness.[80]

The rare short-term risks of neonatal circumcision need to be weighed against the potential benefits accrued in infancy and childhood (e.g. reduction of urinary tract infections), the longer-term benefits that may accrue in adolescence and adulthood (e.g. reduced risks of HIV, HSV-2, and HPV), as well as possible benefits to female sexual partners of circumcised men (e.g. reduced bacterial vaginosis and trichomonas).[81] As neonatal or infant circumcision is a simpler and safer procedure than adult circumcision, WHO/UNAIDS encourage countries to consider expanding services among infants as a longer-term HIV prevention strategy.[82,83]

Neonatal circumcision is prohibited according to Section 12 of the South African Children's Act (38 of 2005), except for cultural, religious or medical reasons.[h] Based on the increasing evidence regarding the medical benefits of circumcision, KwaZulu-Natal MEC for health Dr Sibongiseni Dhlomo announced in a speech on 4 November 2010 that by January 2011, the Provincial Department of Health would be commencing neonatal male medical circumcision and referred to their awareness campaign for pregnant mothers to understand the importance of having their babies circumcised at birth.[84] There exists a possible conflict between the international directives (WHO/UNAIDS, 2011 call for neonatal circumcision) and South African law on this issue, which would potentially present doctors in KwaZulu-Natal with an ethical dilemma between complying with the directive issued by the Provincial Department of Health and performing a procedure prohibited in terms of the South African law. This policy requires clarification, particularly in terms of whether HIV prevention can be accepted as a medical reason for infant MC.

Optimising VMMC impact: combination prevention

In the South African context, where HIV prevalence is high, widespread coverage of VMMC will be an effective tool in gaining control of the spread of the epidemic. However, due to the widely varying social, cultural and economic contexts of different people in the country, it is vital that South Africa continues to pursue a combined prevention and treatment approach. Circumcision is not equivalent to a vaccine and therefore being circumcised does not, for example, negate the use of condoms or any other prevention interventions and should not be presented as such.[85] The newly discovered benefits of treatment as prevention have led to the WHO adjusting the CD4 count threshold recommendations for treatment to 500 cells/μL (up from 350 and 200 previously).[86] Recommendations also include scaling up provision of treatment to maximise the benefits of treatment as prevention. However, modelling studies from South Africa have shown that combination treatment and prevention strategies will be at least as effective and cost less. Table 4 shows the effectiveness and cost-effectiveness of a combination of these three interventions in averting new infections and AIDS deaths when scaled up to different levels. Different combination strategies were modelled in comparison to the base case scenario estimated for South Africa (ART 50%; VMMC 45% and TasP 0%). This provides a useful tool for understanding the effectiveness of different combination strategies for the HIV response.

Overall, the findings show that a combination of widespread VMMC and CD4 <350/μL as a threshold for treatment is as effective in reducing prevalence and incidence, as well as costing US$5 billion less in the next decade, as pursuing a treatment-as-prevention strategy alone.[87] While scaling up all three interventions to 80% provides maximum effectiveness, the value for money significantly decreases, while total cost increases without a large impact on the number of infections and deaths averted.

h Circumcision of children under the age of 16 is prohibited, except when:
a) circumcision is performed for religious purposes in accordance with the practices of the religion concerned and in the manner prescribed ; or
b) circumcision is performed for medical reasons on the recommendation of a medical practitioner.

Table 4: Combination prevention

Coverage, %			Cumulative discounted 2009–2020 (in millions)			ICER 2009–2020	
ART	TasP	MMC	Infections	Deaths	Costs	$/IA	$/DA
50		45	2.76	3.57	8 520		
50		60	2.63	3.54	8 660	1 087	4 639
50		80	2.46	3.50	8 847	1 096	5 198
60		45	2.47	3.23	10 341	6 366	5 353
60		60	2.36	3.20	10 479	4 906	5 328
60		80	2.21	3.17	10 663	3 909	5 463
70		45	2.18	2.86	12 319	6 560	5 410
70		60	2.08	2.85	12 456	5 819	5 484
70		80	1.95	2.82	12 640	5 120	5 553
80		45	1.88	2.51	14 450	6 790	5 604
80		60	1.80	2.49	14 588	6 356	5 650
80		80	1.70	2.47	14 772	5 890	5 710
70	20	45	2.11	2.80	13 150	7 157	6 061
70	20	60	2.02	2.78	13 266	6 439	6 051
70	20	80	1.90	2.76	13 420	5 726	6 066
80	40	45	1.76	2.40	16 969	7 482	6 391
80	40	60	1.69	2.39	16 073	7 103	6 411
80	40	80	1.60	2.37	16 212	6 672	6 455
80	60	45	1.65	2.31	17 265	7 937	6 987
80	60	60	1.60	2.30	17 354	7 619	7 001
80	60	80	1.52	2.29	17 473	7 245	7 020
80	80	40	1.50	2.20	19 063	8 375	7 739
80	80	60	1.45	2.20	19 148	8 153	7 780
80	80	80	1.39	2.19	19 263	7 881	7 827

Source: Barnighausen et al., 2012.[87]

Conclusion

Scaling up HIV prevention interventions is not simply about meeting targets. It requires a multifaceted response that promotes VMMC scale-up in order to achieve a long-term sustainable impact on the HIV epidemic. An appropriate strategy for scaling-up VMMC lies in customising the approach to meet the needs and align with the contexts of different populations. This requires tailored communication strategies to create demand for VMMC services and engagement with programme planners who have anticipated increasing demand and are designing VMMC interventions to respond by supplying safe, acceptable and accessible services. It will take continued innovation in medical device development and testing, along with other efficiency gains, to decrease procedure times and thereby increase access.[11] Above all, successful scale-up requires strong central leadership, political commitment, efficient co-ordination and sufficient health care and material resources. It will also require a dynamic understanding of how VMMC programming presents opportunities to create synergies with other HIV prevention interventions to rapidly halt the increasing number of new HIV infections.

Human rights should be a central part of VMMC campaigns.[19] MC needs to be voluntary, based on informed consent, non-coercive and carried out under safe conditions. The ethics, policies and practice of neonatal circumcision for HIV prevention requires more debate in order to foster points of consensus, given the ethical dilemmas that physicians currently face in performing neonatal circumcisions for HIV prevention.

Scaling up VMMC in South Africa should not be seen as a way of narrowing the HIV response, but rather as one that supports a widening approach, including a combination prevention strategy, a health systems strengthening approach, and the provision and promotion of a wide range of biomedical prevention and treatment interventions. Most importantly, VMMC is a partially protective procedure and should not be seen as the only solution in the context of complex drivers of the HIV epidemic. Circumcision will be most effective if it is not perceived as a stand-alone clinical procedure, but as one component of a full suite of HIV prevention and reproductive health services, including HIV testing and counselling, diagnosis and treatment of sexually transmitted infections, condom promotion, behavioural change counselling and promotion, and other methods that have proved to be effective.[4]

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13

Knowing our TB epidemic: key challenges facing the TB Programme in South Africa

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South Africa is a global hotspot of the tuberculosis (TB), drug-resistant TB and HIV syndemics, and will not achieve the TB targets contained in the Millennium Development Goals. Using information from National Department of Health databases (the District Health Information System and electronic TB register), this chapter identifies areas of sub-optimal performance in the National TB Programme, focuses on three categories of high-risk populations, and makes recommendations that will contribute to addressing these problems.

Recommendations include developing enhanced case-finding strategies in community settings and screening of all patients who enter health facilities, taking steps to reduce the initial defaulter rate, and reducing the large number of TB patients who remain documented as having an unknown HIV status. Additionally, the management of TB in populations at risk, such as correctional service inmates and miners, must be optimised and aligned with the NTP. Vigilant monitoring of stock levels and contingency for stock-outs must be developed and implemented.

Developing enhanced case-finding strategies in community settings and screening of all patients who enter health facilities, taking steps to reduce the initial defaulter rate, and reducing the large number of TB patients that are still documented as having an unknown HIV status, are critical.

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Introduction

South Africa is estimated to have the third-highest number of incident cases of tuberculosis (TB) in the world after India and China and, with Swaziland, to share the world's highest TB incidence rate at 1 000 per 100 000 people.[1] The synergistic relationship between the TB and HIV epidemics is well documented[2] and in South Africa, HIV remains a key driver of the TB epidemic.[3] Although TB is a curable disease, it remains a main cause of death in South Africa.[3] Disconnected and inadequate services have contributed to poor treatment outcomes in patients co-infected with TB and HIV, as well as the development of drug-resistant TB.[3] Fuelled by concomitant hyper-endemic TB and HIV, South Africa has, after India, the highest number of reported drug-resistant TB cases globally.[1] Figure 1 provides further information in this regard.

Given the current performance of the National TB Programme (NTP) and the most recent treatment outcomes for the country, South Africa is unlikely to reach the TB targets set by the Millennium Development Goals (MDGs).[1,4] A number of recent articles have highlighted areas of sub-optimal performance in the NTP. In 2013, the NTP commissioned a series of systematic reviews to contribute to evidence-informed policy development in a number of areas in which NTP performance could be strengthened.

Energy and resources should be appropriately focused on improving NTP performance in areas most likely to yield significant gains. Building a greater understanding of the areas in South Africa with the highest burden of TB and TB-HIV co-infected patients, and of where the NTP is not performing well, is required of such focus. Using data available through national databases, this chapter aims to identify districts with a high burden of TB or where the NTP is performing poorly. By providing more information (i.e. knowing our TB epidemic), more appropriate and relevant interventions can be planned to improve programme performance, facilitating South Africa's closer alignment with the MDG targets and decreasing the magnitude of the TB epidemic.

Methodology

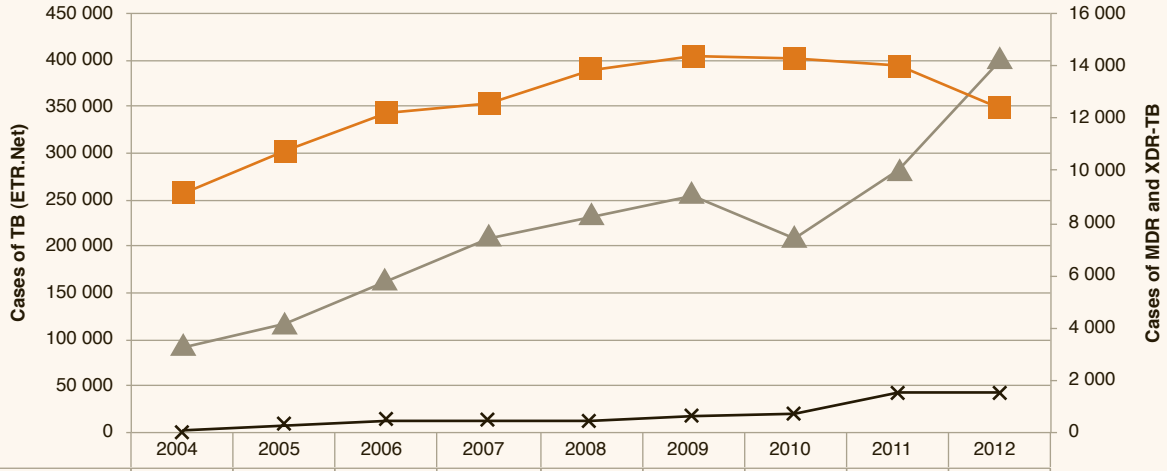
Areas in which the NTP is performing sub-optimally were identified using recent literature,[5-7] as well as South Africa's NTP documents and the country's TB indicators. Two national databases, the electronic TB register (ETR.Net) and the District Health Information System (DHIS), were used to identify districts that are "TB hotspots" or "TB-HIV hotspots". "TB hotspots" refers to districts with a high TB burden and "TB-HIV hotspots" refers to districts where a high proportion of TB patients are co-infected with HIV.

Ten indicators were used to flag districts that were either TB or TB-HIV hotspots (Box 1). High risk populations such as healthcare workers, correctional service inmates and miners were considered. While these three categories of people are acknowledged to be at high risk of TB in South Africa, there was a paucity of information available on these groups in the national databases.

The two indicators chosen to identify TB hotspots included the number of TB cases and the incidence of TB. Indicators to identify districts with a high TB burden were identified, as improving TB programme performance in these districts will impact significantly on NTP programme performance. The proportion of TB cases co-infected with HIV and the proportion of TB cases whose HIV status was unknown were chosen to identify TB-HIV hotspots. The indicators chosen to identify areas of sub-optimal programme performance included the proportion of patients who were initial defaulters, defaulters, and patients not evaluated. Two indicators about re-treatment patients were included: the proportion of re-treatment patients and their treatment success. Finally, an indicator that measures the percentage of facilities in a district that had a stock-out of any first-line TB drugs was included. Childhood TB was not included, as this is addressed in another chapter (see Chapter 14).

For each of the 10 indicators, the 52 districts in the country were ranked to identify which districts had the highest burden of TB and TB-HIV co-infection and which districts were performing least well.

Figure 1: Reported cases of TB* and laboratory-diagnosed cases of MDR-TB and XDR-TB



	2004	2005	2006	2007	2008	2009	2010	2011	2012
TB (ETR.Net)	256 662	302 467	342 315	353 879	388 782	405 699	401 048	393 214	349 594
MDR-TB	3 219	4 120	5 774	7 429	8 198	9 070	7 386	10 085	14 161
XDR-TB	85	298	464	453	488	594	741	1 574	1 545

* Reported cases of TB from ETR.Net

Source: Diagnosed cases of M/XDR-TB reported by Dr N Ndjeka at MDR-TB Think Tank meeting, April 2014.

Box 1: Indicators used to flag districts as TB or TB-HIV hotspots

TB hotspots

- Numbers of TB patients
- Incidence of TB (number of cases per 100 000 population)

TB-HIV hotspots

- TB-HIV co-infection rate (percentage of all TB cases recorded as HIV-positive)
- TB patients with an unknown HIV status

Sub-optimal programme performance

- Initial defaulters (percentage of new smear-positive patients diagnosed who were not started on treatment)
- Defaulters (percentage of TB patients started on treatment who defaulted)
- Not evaluated rates (percentage of TB patients started on treatment whose treatment outcome is not known)
- Re-treatment patients
  - Number of re-treatment patients as a proportion of all cases
  - Treatment outcomes (treatment success rate)
- TB drug stock-outs (the proportion of all fixed public health facilities that had stock-out of any TB drug)

Limited information

- High-risk categories of people: healthcare workers, correctional service inmates and miners
- Proportion of TB and HIV co-infected patients on ART

These rankings were averaged to obtain a composite score for each district, enabling the identification of districts in which energy and resources should be focused to achieve maximum gains.

Results

TB hotspots

Table 1 lists the districts with the highest incidence of TB per 100 000 population and the highest number of cases of TB. Together, the five districts with the highest number of cases of TB account for almost a third (30%) of South Africa's TB burden. These districts should focus on reducing the transmission of TB in their districts by diagnosing as many cases of TB as possible and ensuring that these patients are effectively treated to completion of their regimens – ideally, cured.

Table 1: TB hotspots: Districts with a high burden or caseload of TB, 2012*

District (Province)	TB incidence per 100 000, all TB, (rank)	Number of cases, all TB, (rank)
Ugu: DC21 (KZN)	1 254.2 (1)	9 632 (9)
eThekwini: ETH (KZN)	1 126.4 (2)	39 133 (1)
Cacadu: DC10 (EC)	1 029.2 (3)	4 582 (31)
West Coast: DC1 (WC)	981.3 (4)	3 468 (40)
Zululand: DC26 (KZN)	971.2 (5)	8 373 (11)
Cape Winelands: DC2 (WC)	949.6 (6)	7 263 (15)
N Mandela Bay: NMA (EC)	949.3 (7)	11 013 (6)
Harry Gwala: DC43 (KZN)	946.2 (8)	4 844 (27)
Pixley ka Seme: DC7 (NC)	942.5 (9)	1 815 (48)
OR Tambo: DC15 (EC)	938.6 (10)	12 751 (4)
uMgungundlovu: DC22 (KZN)	879.7 (16)	9 427 (10)
Cape Town: CPT (WC)	740.6 (28)	26 885 (2)
Ehlanzeni: DC32 (MP)	630.4 (33)	10 043 (7)
Johannesburg: JHB (GP)	499.6 (43)	19 050 (3)
Tshwane: TSH (GP)	424.1 (46)	11 661 (5)
Ekurhuleni: EKU (GP)	334.5 (50)	9 902 (8)

* Districts in the top 10 highest incidence and/or top 10 highest caseload

Source: ETR.Net and DHIS (population denominators).

TB-HIV hotspots

Table 2 lists the districts with the highest proportion of TB patients co-infected with HIV and the districts with the largest proportion of TB patients with unknown HIV status. Given that the centre of the TB and HIV syndemic is KwaZulu-Natal (KZN), it is not surprising that five KZN districts are amongst those with the highest proportion of TB-HIV co-infected patients. The high proportion of TB patients with unknown HIV status is concerning.

Table 2: TB-HIV hotspots: Districts with high TB-HIV co-infection rate and patients with unknown HIV status, 2012

Proportion of TB patients co-infected with HIV (rank)		Proportion of TB patients with unknown HIV status (rank)	
uThukela: DC23 (KZN)	70.1 (1)	Pixley ka Seme: DC7 (NC)	37.9 (1)
Sedibeng: DC42 (GP)	67.8 (2)	uThungulu: DC28 (KZN)	26.2 (2)
Amajuba: DC25 (KZN)	67.1 (3)	Dr K Kaunda: DC40 (NW)	25.5 (3)
uMzinyathi: DC24 (KZN)	67.1 (4)	N Mandela Bay: NMA (EC)	24.3 (4)
G Sibande: DC30 (MP)	67.1 (5)	eThekwini: ETH (KZN)	22.6 (5)
Zululand: DC26 (KZN)	66.7 (6)	Cape Winelands: DC2 (WC)	21.8 (6)
Johannesburg: JHB (GP)	66.3 (7)	Frances Baard: DC9 (NC)	21.5 (7)
Capricorn: DC35 (LP)	65.1 (8)	Lejweleputswa: DC18 (FS)	19.5 (8)
Waterberg: DC36 (LP)	64.5 (9)	JT Gaetsewe: DC45 (NC)	18.4 (9)
uMgungundlovu: DC22 (KZN)	63.8 (10)	Central Karoo: DC5 (WC)	17.9 (10)

Source: ETR.Net.

Initial defaulters

The initial default rate was investigated across the country by comparing the number of patients diagnosed as having smear-positive TB with the number of smear-positive patients started on treatment (using data from the DHIS). Although inaccurate data in at least two provinces undermine the value of this information and make it impossible to assess trends, Table 3 illustrates that nationally, over the last four years, the initial defaulter rate has remained over 14%. In Gauteng, the initial defaulter rate has remained over 30% for the last four years. In the Western Cape, it was determined that a quarter of the patients diagnosed as having smear-positive TB were never started on treatment.[7]

The number of smear-positive TB patients started on treatment is also recorded in the ETR.Net, but integration between different information systems (the DHIS and ETR.Net) is poor, making it challenging to validate the DHIS data presented in Table 3 with the ETR.Net data, particularly when disaggregated to district level.

Table 3: Initial defaulter rates across the provinces, 2009–2012

Year	EC %	FS %	GP %	KZN %	LP %	MP %	NC %	NW %	WC %	SA %
2009	17.6	7.5	32.0	*	6.8	8.7	16.3	20.4	14.5	17.5
2010	16.7	13.0	36.8	*	11.4	8.0	7.9	12.8	14.6	18.3
2011	11.1	10.3	35.1	*	*	13.7	5.1	11.6	10.3	16.5
2012	9.6	10.1	32.7	8.5	12.1	14.5	10.9	16.8	12.8	14.4

* Data inaccurate and removed from calculation of the SA totals

Source: DHIS.

Note: Calculated from DHIS data elements (Suspected TB case sm+) MINUS (Suspected TB case sm+ treatment start) DIVIDED BY (Suspected TB case sm+). This indicator is the inverse of the routine indicator in DHIS "Treatment start among TB smear-positive rate" (National Indicator Data Set 2010).

Defaulters

The average defaulter rate in South Africa for 2011 was 6.7%, with three provinces having rates over 8% (Western Cape 8.4%, Eastern Cape 8.2% and the North West 8%). As the District Health Barometer[8] monitors and ranks district defaulter rates annually, more information on patients most likely to default is provided here.

Across the country, more males than females were treated for TB (males 54.7% versus females 45.3%), with little variation across the provinces. However, throughout the country, of those who defaulted, 62.1% were males versus 37.9% who were females. The gender difference of the defaulters varied across the provinces. In the North West, more than two thirds of the defaulters were males (67.4%). In comparison, the gender difference in the defaulters in Limpopo Province was least with 58.4% of the defaulters being male. The median age of the females who defaulted (29 years, IQR 23–39) was lower than that of the males (35 years, IQR 27–43).

In most provinces, patients who defaulted had a higher HIV co-infection rate than the whole cohort of TB patients. In five provinces, patients who defaulted had co-infection rates greater than 60%. Defaulter rates are higher in males than in females regardless of HIV status. However, 64.0% of female defaulters are HIV-positive compared to 48.6% of male defaulters. Among all treatment outcomes in 2011, 60.1% of females and 49.7% of males were recorded as HIV-positive.

Not evaluated

Across the country, the proportion of TB patients not evaluated has remained at 2% or more over the last couple of years. Patients in the not-evaluated category are patients who started treatment, but for whom no treatment outcome is known. KwaZulu-Natal, the Northern Cape and the North West still have over 3% of their patients not evaluated. This suggests that a number of defaulters are included (and "hiding") in this category. Provinces – especially KZN, the Northern Cape and the North West – will increase their cure rates by reducing the number of patients in the not-evaluated category. Patients in this category follow the same trend as the defaulters with regard to age and HIV co-infection, but in contrast to the defaulters, a higher proportion of patients in the not-evaluated category are female.

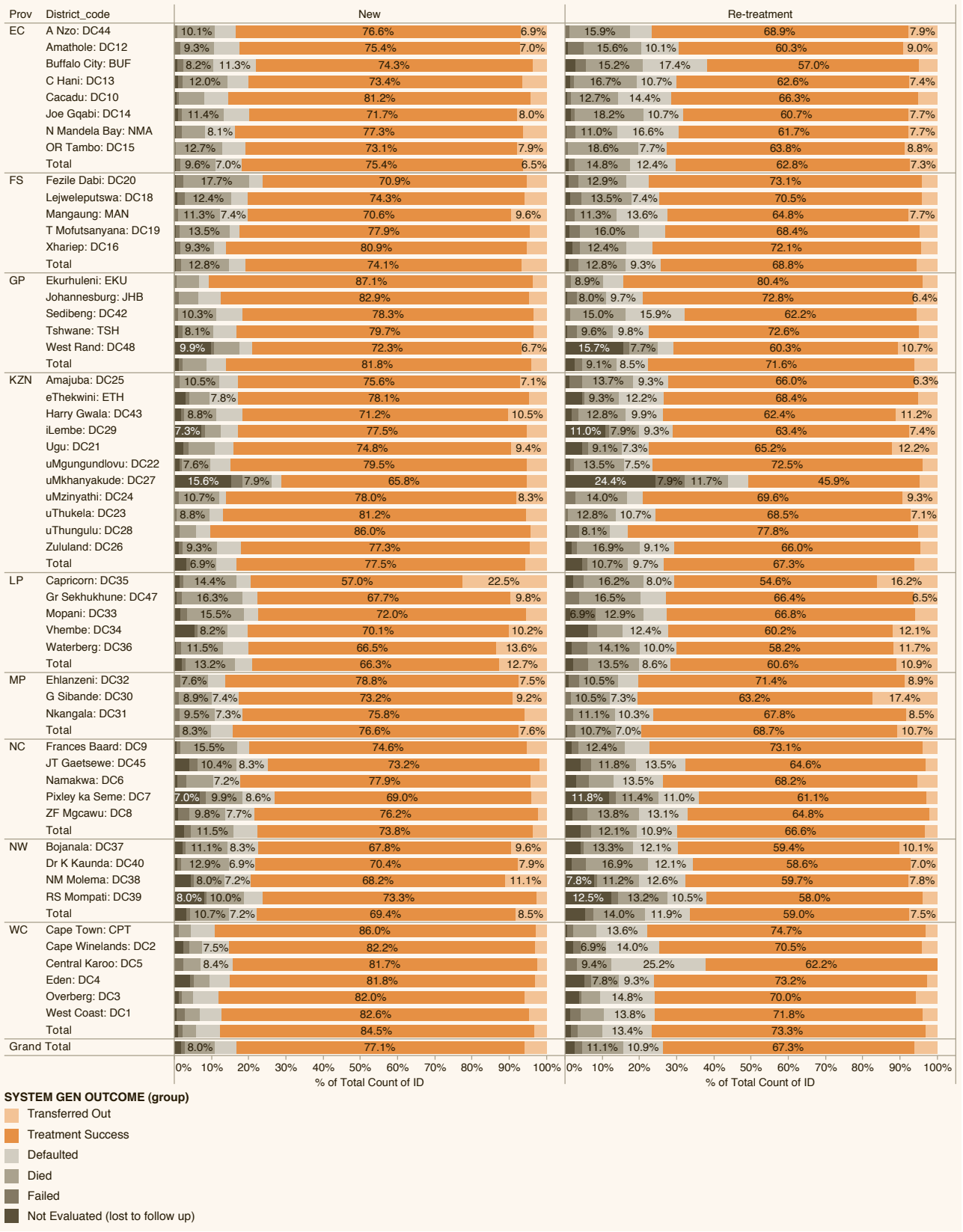
Re-treatment patients

With the introduction of the GeneXpert diagnostic assay, the re-treatment category of patients has fallen away, the re-treatment regimen using streptomycin has been phased out, and patients now receive treatment for either drug-sensitive or drug-resistant TB. Although the re-treatment category of patients no longer exists, healthcare workers should pay greater attention to patients who have had previous episodes of TB. Among the reasons for this are, firstly, a considerable number of TB patients have had previous episodes of TB. In 2011, re-treatment patients comprised 17% of the cohort of TB patients (See Figure 3 in the Appendix). Secondly, there are fewer successful treatment outcomes among the re-treatment patients, and thirdly, many of these patients develop drug-resistant TB.

In Figure 2, treatment outcomes between new and re-treatment TB patients are compared. In 2011, only 67% of the TB patients in the re-treatment category had a successful treatment outcome. As compared with new TB patients, the proportion of re-treatment patients who defaulted was higher (re-treatment 10.9% vs. new 5.9%) and the proportion of patients who died was also higher (re-treatment 11.1% vs. new 8.0%). The Eastern and Western Cape have the districts with the highest proportion of re-treatment patients. In the Western Cape, the districts with the highest proportion of re-treatment patients are the Central Karoo (36%), West Coast (32.6%) and Cape Winelands (29.4%). In the Eastern Cape, the districts with the highest proportion of re-treatment patients are Nelson Mandela Bay Metro (28.9%), Cacadu (28.8%) and Chris Hani (24.2%).

One of the most striking trends apparent in Figure 2 is the cumulative effect of high proportions of defaulters, patients not evaluated and patients who died during their TB treatment in the re-treatment cohort of patients. Consequently, in eight districts, treatment success was lower than 60%. This included all four districts in the North West Province, Waterberg and Capricorn (LP), uMkhanyakude (KZN) and Buffalo City (EC). These districts must make a concerted effort to improve treatment success in patients who have had previous episodes of TB, as these areas may well proceed to become hotspots for MDR-TB.[9]

Figure 2: Treatment outcomes in "new" compared to "re-treatment" patients by district, 2011



Source: ETR.Net.

Drug stock-outs

Drug stock-outs in the public health system in South Africa are a reality. Given the size of the TB and HIV epidemics in South Africa, great care should be taken to prevent stock-outs of anti-tuberculosis medication and antiretrovirals. Problems with drug supply can occur at various points in the supply chain.

The DHIS indicator "Any TB drug stock-out rate" measures the proportion of all fixed facilities that recorded a stock-out of any TB drug during the monthly reporting period. In 2012, from the DHIS, the Eastern Cape and Limpopo were the provinces in which districts recorded the highest percentages of drug stock-outs. In Vhembe (LP) in 2012, the stock-out rate for any TB drug was 32.8%, whilst the rates were 18.8% and 18.1% in the facilities in Greater Sekhukhune and Mopani respectively. In the Eastern Cape, three districts recorded stock-outs of more than 18%: Joe Gqabi, OR Tambo and A. Nzo. Given that three districts in Limpopo and the Eastern Cape reported stock-outs, it may be that there are problems at a provincial level with drug distribution or supply. In all these districts, consistently high levels of drug stock-outs were recorded over the three years from 2010 to 2012.

High risk populations

Correctional service facilities

For centuries, prisons all over the world have been considered hotspots for the transmission of TB, a consequence of overcrowding, inadequate ventilation, a lack of sunlight and poor nutrition.[10] Recently, the NTP has started to focus on TB in correctional service facilities, where the prevalence of TB is estimated to be seven times higher than in the general population.[11,12] It is therefore concerning to note that only 98 of the 242 correctional service facilities (40%) were listed as reporting units in the electronic TB register (ETR.Net). Moreover, just under half of these facilities (48) recorded fewer than 10 inmates each who had TB, which seems unlikely given the repeated reports of overcrowding.

Although correctional services are institutions that are publicly funded and run, the NTP is not involved in the management or monitoring of TB within these institutions. There is a need to ensure that prisoners are treated according to NTP guidelines and that healthcare workers at these facilities are adequately trained to manage and supervise prisoners with TB and MDR-TB and patients co-infected with TB/MDR-TB and HIV. District and provincial TB managers need access to healthcare workers managing TB and MDR-TB patients within correctional service facilities to provide regular ongoing monitoring, supervision and training on TB and HIV. Mechanisms between correctional service facilities and districts need to be established so that released inmates on TB treatment continue their treatment at home. Moreover, data collection tools, processes and reporting mechanisms within correctional service facilities need to be aligned with the standardised NTP policies and procedures. Finally, TB patients from correctional service facilities should be included in the national TB databases so that the data accurately reflect the country's TB burden and NTP outcomes.

Mines

The risk of TB in miners is well documented in South Africa. Over the last two decades, HIV has led to an increase in the incidence of TB in miners so that incidence is presently estimated to be 3 000 per 100 000 miners.[13,14] The number of miners with drug-resistant TB is also on the increase. The mines have assumed responsibility for the treatment and management of TB in miners, which has enabled them to develop services appropriate to the needs of their specific patient population. However, it is not known whether this has been done in all mines and how effective these strategies have been, as there is little collaboration with the NTP.

In the electronic TB register, a small number of reporting units (14) were found which appeared to be mines, treating fewer than 2 000 TB patients. Given the burden of TB in the mining population, case-finding and treatment outcome data from the mines should be incorporated into the country's TB data, as this would provide a more accurate and realistic picture of the TB epidemic in South Africa and the effectiveness of our TB programme in addressing this epidemic.

Healthcare workers

A number of recent studies have documented both a higher incidence and prevalence of TB and MDR-TB in healthcare workers in the country.[15,16] However, there is no routinely collected data on healthcare workers who acquire TB. Given that healthcare workers, particularly female nurses, are at an increased risk of acquiring TB due to their repeated exposure to TB in health facilities in South Africa, there may be a role for routine monitoring of TB and MDR-TB in healthcare workers.

Proportion of TB and HIV co-infected patients on ART

Given the importance of antiretroviral therapy (ART) for TB patients co-infected with HIV, it would have been useful to investigate the proportion of TB-HIV co-infected patients on ART. However, due to the inaccuracy and incompleteness of these fields in the ETR.Net (over 36% of HIV-positive TB cases with unknown ART status in 2012), this information is not presented.

Districts in greatest need of improved NTP performance

Table 4 lists the 16 districts where TB is the greatest problem based on ranking "TB hotspots", "TB-HIV hotspots" and areas of sub-optimal performance. Nelson Mandela Bay was identified as the district most in need of addressing TB. Two other metros, eThekweni and Buffalo City, were also ranked in the top six poorly performing TB districts. Due to large populations in the metros (and urbanising districts such as Pixley ka Seme), high burdens of TB are not surprising, but poor programme performance in metros is less acceptable.

Most of the districts identified in Table 4 as having a TB problem have been performing poorly for a number of years with regard to the NTP. Without improving performance of the NTP in these districts, South Africa will fail to address the TB epidemic.

Table 4: Identification of districts for NTP improvement using TB and TB-HIV hotspots and areas of sub-optimal performance: indicator value (district rank, 1=worst)

	TB hotspots		TB-HIV hotspots		Poor TB control programme performance					
Indicator	**Highest number of cases (all TB)**	**Highest TB incidence (all TB)**	**Highest % of all TB cases HIV positive**	**Highest % with unknown HIV status**	**Highest initial default new sm+**	**Highest defaulter rate (all TB)**	**Highest not evaluated rate (all TB)**	**Highest % of retreatment cases (of all outcomes)**	**Lowest treatment success rate (in retreatment cases)**	**Highest TB stock-out rate**
District (Province)	**2012**	**2012**	**2012**	**2012**	**2012**	**2011**	**2011**	**2011**	**2011**	**2012**
N Mandela Bay: NMA (EC)	11 013 (6)	949.3 (7)	41.1 (43)	24.3 (4)	18.8 (9)	10.6 (3)	0.4 (36)	29.6 (3)	61.7 (14)	11.1 (17)
Dr K Kaunda: DC40 (NW)	7 612 (14)	936.7 (11)	56.2 (27)	25.5 (3)	11.4 (26)	7.9 (17)	1.0 (26)	18.8 (18)	58.6 (6)	13.7 (11)
Pixley ka Seme: DC7 (NC)	1 815 (48)	942.5 (9)	23.0 (52)	37.9 (1)	15.8 (15)	9.1 (6)	8.0 (4)	21.5 (12)	61.1 (13)	17.3 (9)
eThekwini: ETH (KZN)	39 133 (1)	1 126.4 (2)	57.8 (26)	22.6 (5)	11.1 (27)	8.6 (11)	3.5 (10)	19.8 (13)	68.4 (34)	2.2 (43)
Buffalo City: BUF (EC)	6 259 (18)	781.2 (26)	47.9 (38)	14.4 (20)	18.8 (10)	12.7 (1)	1.4 (19)	21.9 (10)	57.0 (3)	5.2 (31)
NM Molema: DC38 (NW)	5 007 (26)	625.9 (34)	49.0 (35)	15.0 (17)	13.7 (20)	8.0 (16)	5.1 (7)	15.9 (28)	59.7 (8)	13.4 (12)
OR Tambo: DC15 (EC)	12 751 (4)	938.6 (10)	51.4 (31)	12.5 (26)	**	6.3 (30)	0.1 (47)	19.4 (14)	63.8 (21)	18.7 (4)
Mangaung: MAN (FS)	6 522 (17)	893.6 (15)	58.3 (24)	16.7 (16)	16.0 (14)	8.5 (12)	0.2 (43)	18.2 (20)	64.8 (23)	7.6 (24)
iLembe: DC29 (KZN)	5 824 (23)	920.9 (12)	62.4 (14)	13.4 (24)	20.3 (8)	5.4 (36)	7.9 (5)	15.5 (29)	63.4 (20)	2.9 (40)
Bojanala: DC37 (NW)	8 131 (13)	599.3 (38)	62.4 (15)	14.8 (19)	6.8 (40)	8.7 (10)	2.6 (12)	11.7 (38)	59.4 (7)	10.0 (20)
Cape Winelands: DC2 (WC)	7 263 (15)	949.6 (6)	27.1 (49)	21.8 (6)	9.4 (31)	9.3 (4)	2.5 (13)	27.4 (6)	70.5 (39)	0.9 (47)
Ugu: DC21 (KZN)	9 632 (9)	1 254.2 (1)	60.1 (21)	17.3 (12)	1.5 (48)	5.3 (37)	2.9 (11)	19.3 (15)	65.2 (25)	2.5 (41)
uMkhanyakude: DC27 (KZN)	6 117 (19)	917.7 (13)	63.1 (12)	11.1 (34)	**	2.9 (49)	16.4 (1)	9.2 (48)	45.9 (1)	6.9 (25)
RS Mompati: DC39 (NW)	3 646 (39)	798.3 (25)	48.7 (37)	13.5 (23)	9.7 (29)	6.0 (31)	8.8 (3)	18.1 (21)	58.0 (4)	12.2 (15)
G Sibande: DC30 (MP)	5 882 (21)	621.3 (35)	67.1 (5)	17.6 (11)	23.0 (6)	7.4 (21)	0.1 (46)	10.4 (43)	63.2 (19)	9.1 (21)
Zululand: DC26 (KZN)	8 373 (11)	971.2 (5)	66.7 (6)	7.3 (45)	9.1 (34)	6.9 (25)	1.4 (20)	16.4 (27)	66.0 (26)	5.0 (32)

** missing data

Data for all 52 districts are shown in Table 9 in the Appendix.

Source: ETR.Net and DHIS.

Limitations

This study relied on data from the ETR.Net and the DHIS, which are at times inaccurate and incomplete. Where data from some provinces were missing or inaccurate, these were excluded and we made assumptions based on trends from other provinces, which may not be completely accurate. In addition, these national databases have limited data on categories of people for whom TB is an occupational hazard, such as healthcare workers, miners and prisoners.

In light of this, it is important to note that Table 4 does not present an unequivocal statement about the districts in South Africa in which TB is most concentrated, as such a conclusion would be dependent on the choice of indicators, data quality, and a simple equal weighting method.

Recommendations

To reduce the TB and MDR-TB epidemics in South Africa, rapid diagnosis and effective treatment are necessary to reduce the spread of these infectious diseases. Implementation of the following recommendations will contribute to addressing these epidemics.

To identify people with TB, enhanced case-finding strategies in community settings and screening of all patients who enter health facilities, particularly HIV or maternal and child health services, should be undertaken. To ensure that all those diagnosed with TB are started on treatment, the initial defaulter rate has to be reduced. In every PHC facility, a person should be assigned the responsibility of documenting the contact details of each person suspected of having TB for whom a sputum specimen is sent off for analysis. On a weekly basis, all patients diagnosed as having TB should be followed up to ensure that they have started treatment.

In spite of the focus on TB and HIV integration over the last few years, a considerable number of TB patients are still documented as having an unknown HIV status. Provider-initiated testing and counselling has to be implemented as routine practice in all facilities. District TB and HIV co-ordinators working in the districts with high rates of TB patients whose HIV status is unknown have to visit and monitor facilities regularly to address this problem.

Given that the greatest chance of treatment success occurs the first time a patient contracts TB, minimising treatment default is essential. The importance of adherence to treatment for the full course of the regimen has to be explained and reinforced by all healthcare workers, including those who are part of ward-based outreach teams. In facilities with high numbers of patients in the not-evaluated category, mechanisms have to be introduced for tracing these patients. Information about which patients are most likely to default must be passed on to PHC-level healthcare workers, so that adherence is emphasised in HIV co-infected patients, in older men (35 years) and younger women (29 years). The Eastern Cape, Western Cape and North West Provinces in particular should pay increased attention to adherence in re-treatment patients.

The management of TB in populations at risk, such as correctional service inmates and miners, must be optimised and aligned with the NTP.

Given the size of the TB and HIV epidemics in South Africa and the different levels of the health system at which problems can arise, all those involved in drug management need to be vigilant in their monitoring of stock levels, order timeously, and have contingency plans in place for stock-outs. The districts recording the highest stock-outs in 2012 should ensure that these problems are addressed and performance improved in 2014.

Conclusion

A concerted and sustained effort is needed to address the TB and MDR-TB epidemics in South Africa. Information has been drawn from national databases to guide the improvement of areas of weak performance in the NTP. Ongoing and more in-depth analysis of research findings from South Africa studies, together with more detailed analysis of the national databases, is needed to inform the National TB Programme on a sustained basis.

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Appendix

The following tables and graph provide additional detail to supplement summarised information provided in this chapter.

Table 5: Demographics and case finding by province

	Year of TREATMENT (RX) START DATE	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA
Number of cases (ETR.Net)	2011	59 883	23 092	55 416	121 328	22 121	24 679	10 218	28 556	47 921	393 214
	2012	55 492	20 840	50 867	103 937	20 195	20 359	8 373	24 396	45 135	349 594
Incidence (reported cases per 100 000 population) - all cases	2006	721	820	462	592	284	23	778	792	959	578
	2007	807	844	174	881	329	227	859	766	938	608
	2008	963	890	489	928	397	637	935	815	948	753
	2009	953	860	517	1,215	433	745	933	904	930	832
	2010	922	837	114	1,162	420	715	892	894	910	718
	2011	900	788	496	1,142	420	674	839	882	863	780
	2012	832	709	448	971	382	552	712	720	800	687
Smear +ve cases: n (% of cases)	2011	28 312 (47.3%)	10 640 (46.1%)	24 087 (43.5%)	39 981 (33.0%)	10 135 (45.8%)	10 682 (43.3%)	4 734 (46.3%)	11 849 (41.5%)	21 374 (44.6%)	161 794 (41.1%)
	2012	27 724 (50.0%)	10 204 (49.0%)	20 603 (40.5%)	34 509 (33.2%)	8 628 (42.7%)	8 603 (42.3%)	4 386 (52.4%)	10 570 (43.3%)	20 201 (44.8%)	145 428 (41.6%)
Retreatment cases: n (% of cases)	2011	13 406 (22.4%)	3 304 (14.3%)	6 078 (11.0%)	17 962 (14.8%)	2 172 (9.8%)	2 871 (11.6%)	1 993 (19.5%)	4 215 (14.8%)	12 877 (26.9%)	64 878 (16.5%)
	2012	11 466 (20.7%)	1 681 (8.1%)	4 567 (9.0%)	13 369 (12.9%)	2 077 (10.3%)	2 405 (11.8%)	1 410 (16.8%)	3 058 (12.5%)	12 556 (27.8%)	52 589 (15.0%)
Female: n (%)	2011	28 474 (47.5%)	10 322 (44.7%)	25 234 (45.5%)	58 361 (48.1%)	10 495 (47.4%)	11 661 (47.3%)	4 570 (44.7%)	12 297 (43.1%)	21 419 (44.7%)	182 833 (46.5%)
	2012	25 886 (46.6%)	8 898 (42.7%)	22 179 (43.6%)	49 378 (47.5%)	9 251 (45.8%)	9 181 (45.1%)	3 702 (44.2%)	10 162 (41.7%)	19 882 (44.1%)	158 519 (45.3%)
Median age of females (IQR)	2012	33 (24-46)	32 (23-43)	32 (25-41)	30 (23-40)	33 (24-42)	32 (25-42)	33 (23-43)	32 (23-42)	30 (21-40)	32 (23-42)
Median age of males (IQR)	2012	37 (27-49)	38 (29-48)	37 (29-46)	34 (26-43)	39 (29-49)	37 (29-47)	36 (27-47)	39 (29-48)	34 (24-44)	36 (27-46)
HIV positive: n (%)	2011	26 259 (43.9%)	13 340 (57.8%)	33 236 (60.0%)	71 766 (59.2%)	13 350 (60.3%)	15 425 (62.5%)	3 469 (33.9%)	14 760 (51.7%)	18 513 (38.6%)	210 118 (53.4%)
	2012	25 915 (46.7%)	12 115 (58.1%)	32 441 (63.8%)	63 103 (60.7%)	12 196 (60.4%)	12 638 (62.1%)	3 015 (36.0%)	13 579 (55.7%)	17 207 (38.1%)	192 209 (55.0%)
HIV unknown: n (%)	2011	11 729 (19.6%)	4 274 (18.5%)	9 724 (17.5%)	22 924 (18.9%)	2 500 (11.3%)	4 224 (17.1%)	2 171 (21.2%)	6 617 (23.2%)	3 985 (8.3%)	68 148 (17.3%)
	2012	8 105 (14.6%)	3 154 (15.1%)	6 787 (13.3%)	16 841 (16.2%)	1 915 (9.5%)	3 190 (15.7%)	1 693 (20.2%)	4 386 (18.0%)	3 607 (8.0%)	49 678 (14.2%)
% HIV positive on ART: n (%)	2011	7 318 (27.9%)	6 661 (49.9%)	12 881 (38.8%)	12 661 (17.6%)	4 231 (31.7%)	3 587 (23.3%)	1 357 (39.1%)	4 358 (29.5%)	8 044 (43.5%)	61 098 (29.1%)
	2012	13 878 (53.6%)	7 682 (63.4%)	11 408 (35.2%)	15 766 (25.0%)	3 734 (30.6%)	3 517 (27.8%)	1 483 (49.2%)	4 440 (32.7%)	5 570 (32.4%)	67 478 (35.1%)

Source: ETR.Net.

Note: IQR = Interquartile range

Table 6: Characteristics of defaulters (all TB) by province, 2011

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA
Number of treatment outcomes (all cases)	61 177	22 571	60 196	117 150	20 179	24 794	10 786	27 710	48 070	392 633
Defaulters: n (%)	5 043 (8.2%)	1 196 (5.3%)	3 322 (5.5%)	7 344 (6.3%)	1 021 (5.1%)	1 495 (6.0%)	795 (7.4%)	2 204 (8.0%)	4 026 (8.4%)	26 446 (6.7%)
Female: n (%)	1 969 (39.0%)	416 (34.8%)	1 296 (39.0%)	2 883 (39.3%)	424 (41.5%)	526 (35.2%)	295 (37.1%)	718 (32.6%)	1 488 (37.0%)	10 015 (37.9%)
Median age of females (IQR)	30 (23-40)	29 (22-38)	31 (25-40)	28 (21-38)	30 (23-37.75)	31 (24-41)	30 (23-39.75)	30 (21-39)	29 (22-38)	29 (23-39)
Median age of males (IQR)	35 (27-44)	35 (28-43)	36 (29-44)	33 (26-42)	36 (27-44)	35 (28-43)	35 (26-43)	36 (28-44)	33 (26-41)	35 (27-43)
HIV positive: n (%)	2 210 (43.8%)	767 (64.1%)	2 046 (61.6%)	4 520 (61.5%)	636 (62.3%)	945 (63.2%)	275 (34.6%)	1 263 (57.3%)	1731 (43.0%)	14 393 (54.4%)
HIV unknown: n (%)	1 039 (20.6%)	158 (13.2%)	652 (19.6%)	1 266 (17.2%)	103 (10.1%)	268 (17.9%)	141 (17.7%)	313 (14.2%)	373 (9.3%)	4 313 (16.3%)
% HIV positive on ART: n (%)	565 (25.6%)	340 (44.3%)	695 (34.0%)	721 (16.0%)	214 (33.6%)	273 (28.9%)	92 (33.5%)	371 (29.4%)	588 (34.0%)	3 859 (26.8%)

Source: ETR.Net.

Note: IQR = Interquartile range

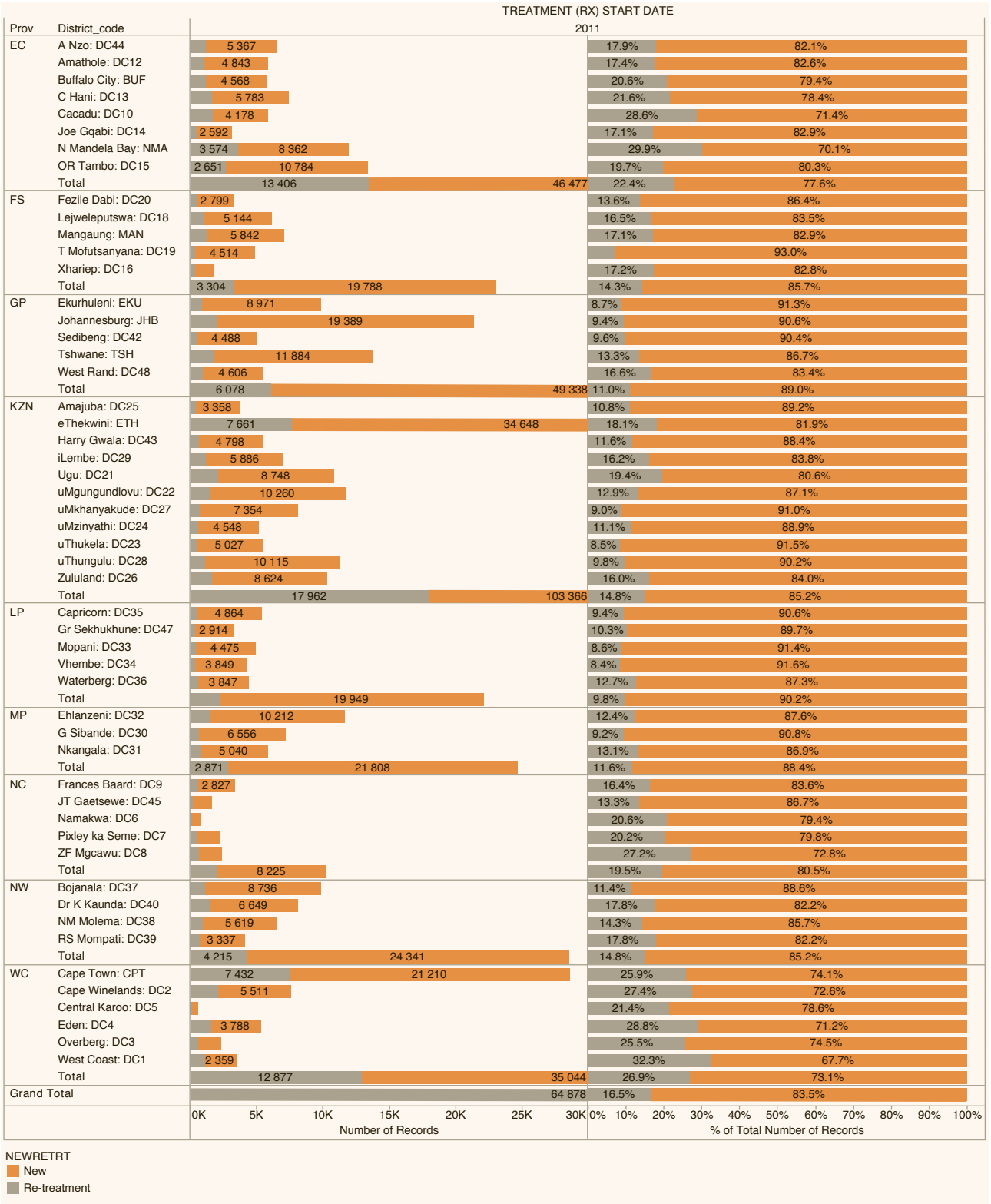
Table 7: Characteristics of patients who were not evaluated (all TB) by province, 2011

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA
Number of treatment outcomes (all cases)	61 177	22 571	60 196	117 150	20 179	24 794	10 786	27 710	48 070	392 633
Not evaluated: n (%)	339 (0.6%)	125 (0.6%)	853 (1.4%)	4 109 (3.5%)	411 (2.0%)	53 (0.2%)	324 (3.0%)	1005 (3.6%)	622 (1.3%)	7 841 (2.0%)
Female: n (%)	145 (42.8%)	32 (25.6%)	239 (28.0%)	1 951 (47.5%)	185 (45.0%)	26 (49.1%)	143 (44.1%)	426 (42.4%)	266 (42.8%)	3 413 (43.5%)
Median age of females (IQR)	34 (26-44)	30 (25.25-41)	33 26-40)	31 (23-41)	32 (19-44)	30 (24.25-39.75)	32 (25-44)	32 (23-43)	28 (20-38)	31 (23-41)
Median age of males (IQR)	42 (26-51)	43 (25.25-49)	40 (26-49)	34 (23-43)	39 (19-48)	37 (24.25-41.5)	35 (25-44)	37 (23-47)	34 (20-44)	36 (23-46)
HIV positive: n (%)	167 (49.3%)	51 (40.8%)	467 (54.7%)	2 535 (61.7%)	251 (61.1%)	25 (47.2%)	76 (23.5%)	524 (52.1%)	254 (40.8%)	4 350 (55.5%)
HIV unknown: n (%)	74 (21.8%)	51 (40.8%)	225 (26.4%)	724 (17.6%)	60 (14.6%)	24 (45.3%)	126 (38.9%)	290 (28.9%)	95 (15.3%)	1 669 (21.3%)
% HIV positive on ART: n (%)	55 (32.9%)	23 (45.1%)	112 (24.0%)	516 (20.4%)	98 (39.0%)	(0.0%)	31 (40.8%)	106 (20.2%)	46 (18.1%)	987 (22.7%)

Source: ETR.Net.

Note: IQR = Interquartile range

Figure 3: Case finding (number and percentage) of new and retreatment patients by district, 2012



Prov	District_code	New	Re-treatment	New %	Re-treatment %
EC	A Nzo: DC44	5 367		17.9%	82.1%
	Amathole: DC12	4 843		17.4%	82.6%
	Buffalo City: BUF	4 568		20.6%	79.4%
	C Hani: DC13	5 783		21.6%	78.4%
	Cacadu: DC10	4 178		28.6%	71.4%
	Joe Gqabi: DC14	2 592		17.1%	82.9%
	N Mandela Bay: NMA	3 574	8 362	29.9%	70.1%
	OR Tambo: DC15	2 651	10 784	19.7%	80.3%
	Total	13 406	46 477	22.4%	77.6%
FS	Fezile Dabi: DC20	2 799		13.6%	86.4%
	Lejweleputswa: DC18	5 144		16.5%	83.5%
	Mangaung: MAN	5 842		17.1%	82.9%
	T Mofutsanyana: DC19	4 514		93.0%	
	Xhariep: DC16			17.2%	82.8%
	Total	3 304	19 788	14.3%	85.7%
GP	Ekurhuleni: EKU	8 971		8.7%	91.3%
	Johannesburg: JHB	19 389		9.4%	90.6%
	Sedibeng: DC42	4 488		9.6%	90.4%
	Tshwane: TSH	11 884		13.3%	86.7%
	West Rand: DC48	4 606		16.6%	83.4%
	Total	6 078	49 338	11.0%	89.0%
KZN	Amajuba: DC25	3 358		10.8%	89.2%
	eThekwini: ETH	7 661	34 648	18.1%	81.9%
	Harry Gwala: DC43	4 798		11.6%	88.4%
	iLembe: DC29	5 886		16.2%	83.8%
	Ugu: DC21	8 748		19.4%	80.6%
	uMgungundlovu: DC22	10 260		12.9%	87.1%
	uMkhanyakude: DC27	7 354		9.0%	91.0%
	uMzinyathi: DC24	4 548		11.1%	88.9%
	uThukela: DC23	5 027		8.5%	91.5%
	uThungulu: DC28	10 115		9.8%	90.2%
	Zululand: DC26	8 624		16.0%	84.0%
	Total	17 962	103 366	14.8%	85.2%
LP	Capricorn: DC35	4 864		9.4%	90.6%
	Gr Sekhukhune: DC47	2 914		10.3%	89.7%
	Mopani: DC33	4 475		8.6%	91.4%
	Vhembe: DC34	3 849		8.4%	91.6%
	Waterberg: DC36	3 847		12.7%	87.3%
	Total	19 949		9.8%	90.2%
MP	Ehlanzeni: DC32	10 212		12.4%	87.6%
	G Sibande: DC30	6 556		9.2%	90.8%
	Nkangala: DC31	5 040		13.1%	86.9%
	Total	2 871	21 808	11.6%	88.4%
NC	Frances Baard: DC9	2 827		16.4%	83.6%
	JT Gaetsewe: DC45			13.3%	86.7%
	Namakwa: DC6			20.6%	79.4%
	Pixley ka Seme: DC7			20.2%	79.8%
	ZF Mgcawu: DC8			27.2%	72.8%
	Total	8 225		19.5%	80.5%
NW	Bojanala: DC37	8 736		11.4%	88.6%
	Dr K Kaunda: DC40	6 649		17.8%	82.2%
	NM Molema: DC38	5 619		14.3%	85.7%
	RS Mompati: DC39	3 337		17.8%	82.2%
	Total	4 215	24 341	14.8%	85.2%
WC	Cape Town: CPT	7 432	21 210	25.9%	74.1%
	Cape Winelands: DC2	5 511		27.4%	72.6%
	Central Karoo: DC5			21.4%	78.6%
	Eden: DC4	3 788		28.8%	71.2%
	Overberg: DC3			25.5%	74.5%
	West Coast: DC1	2 359		32.3%	67.7%
	Total	12 877	35 044	26.9%	73.1%
Grand Total		64 878		16.5%	83.5%

Source: ETR.Net.

Table 8: Treatment outcomes (TO) in retreatment TB patients by province, 2011

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA
Number of treatment outcomes (all cases)	61 177	22 571	60 196	117 150	20 179	24 794	10 786	27 710	48 070	392 633
TO for Retreatment cases: n (%)	13 881 (22.7%)	3 442 (15.2%)	6 527 (10.8%)	18 213 (15.5%)	2 266 (11.2%)	3 144 (12.7%)	2 229 (20.7%)	4 299 (15.5%)	12 928 (26.9%)	66 929 (17.0%)
Retreatment TO (%)										
Transferred Out	7.3%	5.5%	6.1%	6.1%	10.9%	10.7%	3.2%	7.5%	3.4%	6.2%
Treatment Success	62.8%	68.8%	71.6%	67.3%	60.6%	68.7%	66.6%	59.0%	73.3%	67.3%
Defaulted	12.4%	9.3%	8.5%	9.7%	8.6%	7.0%	10.9%	11.9%	13.4%	10.9%
Died	14.8%	12.8%	9.1%	10.7%	13.5%	10.7%	12.1%	14.0%	6.5%	11.1%
Failed	1.8%	2.6%	2.1%	1.4%	4.0%	2.4%	2.8%	2.0%	1.8%	1.9%
Not Evaluated (lost to follow up)	0.8%	1.0%	2.7%	4.7%	2.3%	0.6%	4.4%	5.7%	1.6%	2.7%
Median age of retreatment females (IQR)	36 (28-47)	35 (28-43)	35 (28-42)	33 (27-41)	35 (28-44)	34 (27-42)	37 (29-45)	35 (28-44)	36 (28-44)	35 (28-43)
Median age of retreatment males (IQR)	41 (33-51)	41 (34-49)	40 (33-48)	37 (31-45)	41 (33-50)	39 (32-48)	40 (33-48)	41 (34-49)	39 (32-48)	39 (32-48)
HIV positive: n (% of retreatment TO cases)	7 188 (51.8%)	2 449 (71.2%)	4 403 (67.5%)	13 255 (72.8%)	1 501 (66.2%)	2 234 (71.1%)	929 (41.7%)	2 945 (68.5%)	5 973 (46.2%)	40 877 (61.1%)

Source: ETR.Net.

Table 9: Overview of selected indicators of sub-optimal performance in the NTP by district: indicator value (district rank, 1=worst)

	TB hotspots		TB-HIV hotspots		Poor TB control programme performance						
	Number of cases (all TB)	TB incidence (all TB)	Percentage of all TB CF HIV positive	% unknown HIV status	Initial Default (DHIS)	Defaulter rate (all TB)	Not Evaluated rate (all TB)	Percentage of Retreatment cases (of all TO)	Low Treatment success rate (in Retreatment cases)	TB stock-outs (DHIS)	Average rank
	2012	2012	2012	2012	2012	2011	2011	2011	2011	2012	
N Mandela Bay: NMA (EC)	11 013 (6)	949.3 (7)	41.1 (43)	24.3 (4)	18.8 (9)	10.6 (3)	0.4 (36)	29.6 (3)	61.7 (14)	11.1 (17)	14.2 (1)
Dr K Kaunda: DC40 (NW)	7 612 (14)	936.7 (11)	56.2 (27)	25.5 (3)	11.4 (26)	7.9 (17)	1.0 (26)	18.8 (18)	58.6 (6)	13.7 (11)	15.9 (2)
Pixley ka Seme: DC7 (NC)	1 815 (48)	942.5 (9)	23.0 (52)	37.9 (1)	15.8 (15)	9.1 (6)	8.0 (4)	21.5 (12)	61.1 (13)	17.3 (9)	16.9 (3)
eThekwini: ETH (KZN)	39 133 (1)	1126.4 (2)	57.8 (26)	22.6 (5)	11.1 (27)	8.6 (11)	3.5 (10)	19.8 (13)	68.4 (34)	2.2 (43)	17.2 (4)
Buffalo City: BUF (EC)	6 259 (18)	781.2 (26)	47.9 (38)	14.4 (20)	18.8 (10)	12.7 (1)	1.4 (19)	21.9 (10)	57.0 (3)	5.2 (31)	17.6 (5)
NM Molema: DC38 (NW)	5 007 (26)	625.9 (34)	49.0 (35)	15.0 (17)	13.7 (20)	8.0 (16)	5.1 (7)	15.9 (28)	59.7 (8)	13.4 (12)	20.3 (6)
OR Tambo: DC15 (EC)	12 751 (4)	938.6 (10)	51.4 (31)	12.5 (26)	**	6.3 (30)	0.1 (47)	19.4 (14)	63.8 (21)	18.7 (4)	20.8 (7)
Mangaung: MAN (FS)	6 522 (17)	893.6 (15)	58.3 (24)	16.7 (16)	16.0 (14)	8.5 (12)	0.2 (43)	18.2 (20)	64.8 (23)	7.6 (24)	20.8 (8)
iLembe: DC29 (KZN)	5 824 (23)	920.9 (12)	62.4 (14)	13.4 (24)	20.3 (8)	5.4 (36)	7.9 (5)	15.5 (29)	63.4 (20)	2.9 (40)	21.1 (9)
Bojanala: DC37 (NW)	8 131 (13)	599.3 (38)	62.4 (15)	14.8 (19)	6.8 (40)	8.7 (10)	2.6 (12)	11.7 (38)	59.4 (7)	10.0 (20)	21.2 (10)
Cape Winelands: DC2 (WC)	7 263 (15)	949.6 (6)	27.1 (49)	21.8 (6)	9.4 (31)	9.3 (4)	2.5 (13)	27.4 (6)	70.5 (39)	0.9 (47)	21.6 (11)
Ugu: DC21 (KZN)	9 632 (9)	1 254.2 (1)	60.1 (21)	17.3 (12)	1.5 (48)	5.3 (37)	2.9 (11)	19.3 (15)	65.2 (25)	2.5 (41)	22.0 (12)
uMkhanyakude: DC27 (KZN)	6 117 (19)	917.7 (13)	63.1 (12)	11.1 (34)	**	2.9 (49)	16.4 (1)	9.2 (48)	45.9 (1)	6.9 (25)	22.4 (13)
RS Mompati: DC39 (NW)	3 646 (39)	798.3 (25)	48.7 (37)	13.5 (23)	9.7 (29)	6.0 (31)	8.8 (3)	18.1 (21)	58.0 (4)	12.2 (15)	22.7 (14)
G Sibande: DC30 (MP)	5 882 (21)	621.3 (35)	67.1 (5)	17.6 (11)	23.0 (6)	7.4 (21)	0.1 (46)	10.4 (43)	63.2 (19)	9.1 (21)	22.8 (15)
Zululand: DC26 (KZN)	8 373 (11)	971.2 (5)	66.7 (6)	7.3 (45)	9.1 (34)	6.9 (25)	1.4 (20)	16.4 (27)	66.0 (26)	5.0 (32)	23.1 (16)
West Rand: DC48 (GP)	5 583 (24)	593.4 (39)	61.5 (16)	17.0 (13)	28.7 (5)	3.5 (48)	10.8 (2)	16.6 (26)	60.3 (10)	0.6 (50)	23.3 (17)
JT Gaetsewe: DC45 (NC)	1 524 (49)	696.5 (29)	41.1 (42)	18.4 (9)	14.9 (17)	9.0 (7)	4.0 (9)	13.6 (34)	64.6 (22)	8.1 (23)	24.1 (18)
Joe Gqabi: DC14 (EC)	2 598 (44)	775.5 (27)	58.1 (25)	12.1 (31)	8.9 (36)	7.5 (20)	1.3 (22)	17.4 (24)	60.7 (12)	18.5 (5)	24.6 (19)
Waterberg: DC36 (LP)	3 948 (37)	582.7 (41)	64.5 (9)	9.0 (40)	14.1 (19)	7.2 (24)	0.7 (30)	14.9 (31)	58.2 (5)	15.5 (10)	24.6 (20)
C Hani: DC13 (EC)	6 997 (16)	908.9 (14)	48.8 (36)	11.0 (35)	0.1 (50)	6.9 (26)	1.2 (24)	22.1 (9)	62.6 (18)	9.0 (22)	25.0 (21)
Harry Gwala: DC43 (KZN)	4 844 (27)	946.2 (8)	60.9 (17)	8.4 (42)	14.5 (18)	7.2 (23)	1.8 (15)	11.9 (37)	62.4 (17)	1.1 (46)	25.0 (22)
Cacadu: DC10 (EC)	4 582 (31)	1029.2 (3)	35.5 (45)	12.2 (30)	7.8 (38)	8.8 (9)	0.7 (31)	30.0 (2)	66.3 (28)	3.2 (38)	25.5 (23)
Central Karoo: DC5 (WC)	570 (52)	859.4 (17)	33.0 (48)	17.9 (10)	12.0 (25)	12.0 (2)	0.0 (52)	21.9 (11)	62.2 (16)	**	25.9 (24)
Lejweleputswa: DC18 (FS)	5 827 (22)	838.8 (21)	55.6 (29)	19.5 (8)	8.9 (37)	4.8 (38)	1.0 (27)	17.5 (23)	70.5 (40)	12.3 (14)	25.9 (25)
Tshwane: TSH (GP)	11 661 (5)	424.1 (46)	59.5 (23)	16.8 (15)	32.4 (2)	6.8 (27)	1.1 (25)	13.3 (35)	72.6 (45)	3.5 (37)	26.0 (26)

** missing data

	TB hotspots		TB-HIV hotspots		Poor TB control programme performance						
	Number of cases (all TB)	TB incidence (all TB)	Percentage of all TB CF HIV positive	% unknown HIV status	Initial Default (DHIS)	Defaulter rate (all TB)	Not Evaluated rate (all TB)	Percentage of Retreatment cases (of all TO)	Low Treatment success rate (in Retreatment cases)	TB stock-outs (DHIS)	Average rank
	2012	2012	2012	2012	2012	2011	2011	2011	2011	2012	
ZF Mgcawu: DC8 (NC)	2 092 (47)	842.6 (20)	37.1 (44)	6.4 (49)	17.7 (11)	9.2 (5)	1.4 (21)	28.5 (5)	64.8 (24)	3.6 (36)	26.2 (27)
Capricorn: DC35 (LP)	4 472 (32)	370.7 (49)	65.1 (8)	6.5 (48)	16.3 (13)	4.1 (42)	1.6 (17)	10.8 (40)	54.6 (2)	10.9 (18)	26.9 (28)
Johannesburg: JHB (GP)	19 050 (3)	499.6 (43)	66.3 (7)	12.3 (28)	29.0 (4)	6.3 (29)	0.3 (40)	9.2 (47)	72.8 (46)	6.9 (26)	27.3 (29)
Frances Baard: DC9 (NC)	2 315 (45)	613.6 (37)	45.3 (39)	21.5 (7)	21.2 (7)	3.8 (45)	0.9 (29)	18.4 (19)	73.1 (47)	24.1 (2)	27.7 (30)
Ehlanzeni: DC32 (MP)	10 043 (7)	630.4 (33)	59.7 (22)	16.9 (14)	9.6 (30)	4.6 (39)	0.3 (39)	12.9 (36)	71.4 (41)	10.1 (19)	28.0 (31)
Vhembe: DC34 (LP)	4 252 (35)	324.0 (51)	55.6 (28)	11.4 (33)	6.6 (42)	6.0 (32)	5.6 (6)	9.6 (44)	60.2 (9)	32.8 (1)	28.1 (32)
Amathole: DC12 (EC)	5 889 (20)	591.5 (40)	43.4 (41)	8.8 (41)	10.0 (28)	7.4 (22)	0.3 (41)	17.2 (25)	60.3 (11)	11.1 (16)	28.5 (33)
A Nzo: DC44 (EC)	5 403 (25)	670.0 (30)	50.5 (34)	14.0 (21)	9.2 (32)	5.6 (34)	0.0 (51)	18.9 (17)	68.9 (36)	17.7 (8)	28.8 (34)
Sedibeng: DC42 (GP)	4 671 (29)	528.8 (42)	67.8 (2)	6.8 (47)	29.2 (3)	7.8 (18)	0.1 (44)	9.1 (49)	62.2 (15)	3.2 (39)	28.8 (35)
Nkangala: DC31 (MP)	4 434 (34)	385.6 (48)	60.9 (18)	10.4 (37)	16.8 (12)	7.8 (19)	0.1 (50)	14.8 (32)	67.8 (31)	17.9 (7)	28.8 (36)
West Coast: DC1 (WC)	3 468 (40)	981.3 (4)	23.9 (50)	5.9 (50)	12.5 (23)	8.3 (15)	0.9 (28)	32.4 (1)	71.8 (42)	3.8 (35)	28.8 (37)
Cape Town: CPT (WC)	26 885 (2)	740.6 (28)	44.0 (40)	3.8 (52)	15.6 (16)	8.3 (14)	0.4 (37)	26.0 (7)	74.7 (50)	0.2 (51)	29.7 (38)
uMgungundlovu: DC22 (KZN)	9 427 (10)	879.7 (16)	63.8 (10)	7.3 (46)	4.3 (46)	5.7 (33)	1.6 (16)	14.7 (33)	72.5 (44)	2.1 (44)	29.8 (39)
Namakwa: DC6 (NC)	627 (51)	499.2 (44)	23.4 (51)	14.8 (18)	12.6 (22)	8.4 (13)	1.2 (23)	19.1 (16)	68.2 (32)	6.0 (28)	29.8 (40)
Mopani: DC33 (LP)	4 436 (33)	407.5 (47)	60.8 (19)	9.1 (39)	13.1 (21)	3.9 (44)	1.6 (18)	9.5 (45)	66.8 (30)	18.1 (6)	30.2 (41)
Overberg: DC3 (WC)	2 154 (46)	831.5 (22)	35.0 (46)	11.7 (32)	6.2 (43)	8.8 (8)	2.1 (14)	25.7 (8)	70.0 (38)	0.7 (48)	30.5 (42)
Ekurhuleni: EKU (GP)	9 902 (8)	334.5 (50)	63.4 (11)	12.4 (27)	40.2 (1)	2.8 (51)	0.1 (49)	9.1 (50)	80.4 (52)	12.8 (13)	31.2 (43)
Eden: DC4 (WC)	4 795 (28)	844.2 (19)	34.3 (47)	9.2 (38)	5.6 (45)	6.8 (28)	4.6 (8)	28.8 (4)	73.2 (49)	0.6 (49)	31.5 (44)
Gr Sekhukhune: DC47 (LP)	3 087 (43)	309.3 (52)	54.4 (30)	12.3 (29)	12.1 (24)	4.4 (40)	0.6 (32)	11.6 (39)	66.4 (29)	18.8 (3)	32.1 (45)
uThungulu: DC28 (KZN)	8 295 (12)	846.9 (18)	51.4 (32)	26.2 (2)	9.0 (35)	3.7 (46)	0.3 (42)	9.4 (46)	77.8 (51)	2.4 (42)	32.6 (46)
Fezile Dabi: DC20 (FS)	3 146 (42)	619.7 (36)	60.4 (20)	13.6 (22)	9.1 (33)	4.1 (43)	0.5 (35)	15.4 (30)	73.1 (48)	6.1 (27)	33.6 (47)
Xhariep: DC16 (FS)	1 432 (50)	819.4 (23)	51.0 (33)	12.7 (25)	5.6 (44)	3.7 (47)	0.6 (33)	17.5 (22)	72.1 (43)	5.6 (30)	35.0 (48)
uThukela: DC23 (KZN)	4 634 (30)	659.5 (32)	70.1 (1)	10.9 (36)	1.4 (49)	4.4 (41)	0.1 (48)	9.1 (51)	68.5 (35)	4.1 (34)	35.7 (49)
uMzinyathi: DC24 (KZN)	4 236 (36)	818.1 (24)	67.1 (4)	7.6 (44)	6.7 (41)	1.9 (52)	0.1 (45)	10.6 (42)	69.6 (37)	4.9 (33)	35.8 (50)
Amajuba: DC25 (KZN)	3 422 (41)	661.5 (31)	67.1 (3)	5.1 (51)	3.1 (47)	5.6 (35)	0.4 (38)	10.7 (41)	66.0 (27)	1.3 (45)	35.9 (51)
T Mofutsanyana: DC19 (FS)	3 913 (38)	469.0 (45)	62.4 (13)	8.0 (43)	7.2 (39)	2.8 (50)	0.5 (34)	7.6 (52)	68.4 (33)	5.9 (29)	37.6 (52)

Source: ETR.Net and DHIS.

A review of TB in children and adolescents in South Africa 2008–2012

Authors:

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Candy Day[i]

Childhood tuberculosis (TB) has gained increasing focus in recent years due to the recognition of the contribution of the disease to morbidity and mortality in children. Previous studies have shown that the burden of TB disease in South Africa may mirror the high burden of the adult epidemic, although systematic reporting on childhood TB has been absent.

This chapter looks at an analysis of data from the Electronic TB Register to examine the characteristics of childhood TB (0–9 years) in South Africa over the five-year period 2008 to 2012.

Childhood cases represented 15.3% of all TB cases in South Africa in 2012 with the majority of cases in the 0–4 years age group, similar to trends found in the majority of countries. The five-year trends reflect the influence of national HIV counselling and testing policies implemented during the same period. The basis for diagnosis has historically leaned towards radiology due to the difficulty of obtaining microscopy specimens; while this still holds true for children aged 0 to 4 years, there has been a consistent increase in the proportion of children with microscopy results.

Clinical outcomes are generally better than for adult TB patients, with all age groups achieving a successful treatment (cure or completion) rate in excess of 80%. The defaulter rates are correspondingly lower than in adults, with the 15 to 19 years age group having the highest defaulter rates.

Previous studies have shown that the burden of TB disease in South Africa may mirror the high burden of the adult epidemic, although systematic reporting on childhood TB has been absent.

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Introduction

Tuberculosis (TB) has increasingly been recognised as a major cause of morbidity and mortality among children in high TB-burden settings.[1,2,3] Graham et al. highlighted the importance of TB control in addressing child survival, relating this to Millennium Developmental Goal 5.[3] Although there are limited data on TB in adolescents, they are noted to be an important group at risk for TB infection.[2] A cross-sectional study in a high TB-burden setting in Cape Town reported that the force of infection with *Mycobacterium tuberculosis* increased from 3.96 at age 10 years to 6.63 at 19 years, indicative of a high TB burden, even in this age group.[4] The Child TB Roadmap calls for strengthened reporting of TB cases occurring in children by national TB programmes, and among its 10 key actions are inclusion of the needs of children and adolescents in research, policy development and clinical practice, and collection and reporting of better data, including data on preventive measures.[2]

This chapter presents selected trends in TB in children and adolescents (0–19 years) in South Africa from 2008 to 2012. Data were derived from the national drug-sensitive TB electronic database (ETR.Net). As expected from routine data, there are concerns about certain aspects of data quality. Data were known to be incomplete for 2008 (Mpumalanga and KwaZulu-Natal) and 2010 (Gauteng) due to database management problems which resulted in the loss of some patient records. This impacts primarily on case-finding numbers, and to a lesser extent on treatment outcomes and results presented in percentage form.

Data on the demographic profile of TB across the country are presented, followed by a report on case-finding and treatment outcome data.

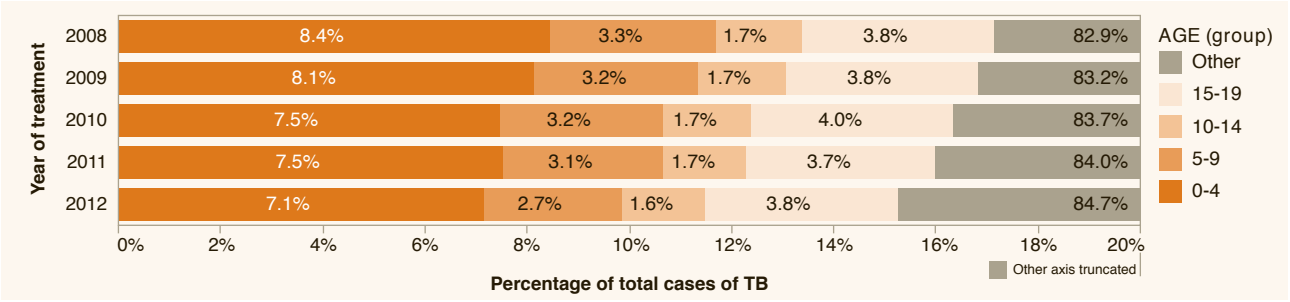
Demographic profile

Age group distribution

In Figure 1 it can be seen that the distribution of cases in the age groups 0–4 years, 5–9 years, 10–14 years and 15–19 years has remained fairly constant between 2008 and 2012, with the largest distribution being in the 0–4 year age group and the lowest distribution being in the 10–14 year age group, as expected.

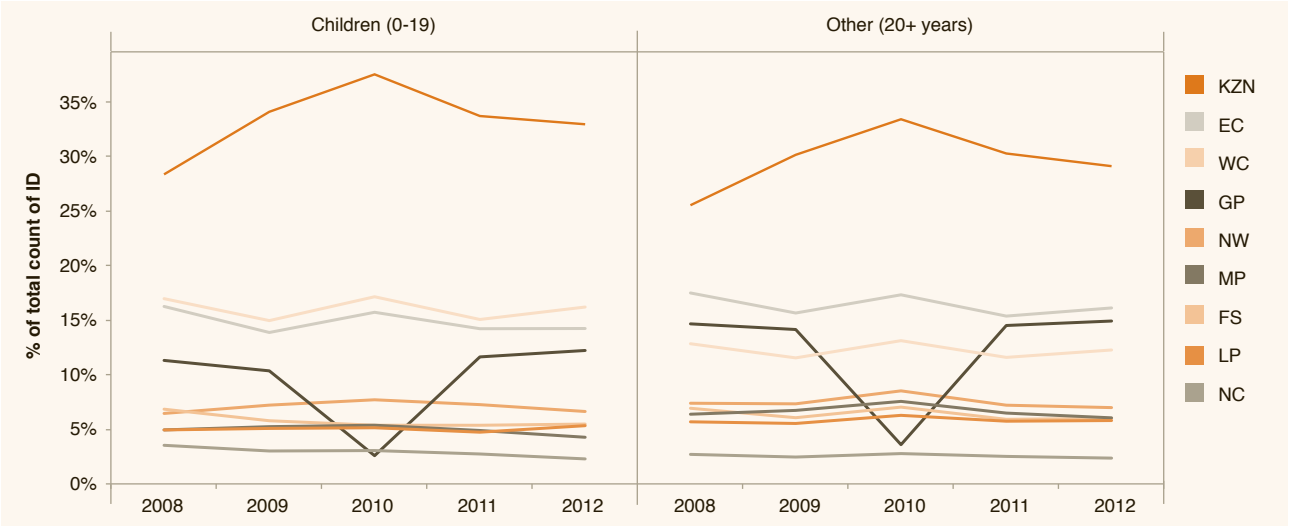
The distribution of cases by age group aligns closely with the general provincial picture for all TB case-finding, with the high-burden provinces of KwaZulu-Natal (KZN), Eastern Cape (EC) and Western Cape (WC) also having the highest load of cases in the age group 19 years and under (Figure 2). The data losses experienced by the provinces can be seen on these graphs; Gauteng Province (GP) is clearly illustrated, while Mpumalanga Province (MP) and KZN are less obvious.

Figure 1: Age distribution of TB case finding, 0–19 years, as a percentage of total cases



Source: ETR.Net.

Figure 2: Percentage of cases by province for children (0–19) and all other ages, 2008–2012



Source: ETR.Net.

Distribution of males to females

Table 1 shows the distribution of males and females. In the age groups 0–4 and 5–9, there are more males than females being diagnosed, whereas this balance shifts in the 10–14 and 15–19 year age groups. This pattern may be attributed to the increased risk of HIV infection as the child gets older and hence a more typical pattern following the trend of the more female-driven HIV and AIDS epidemic. This could also reflect health-seeking behaviours in males who are known to attend health facilities to a lesser degree than females.[5,6] The pattern remains constant in 2008 and 2012 as shown in Figure 3. Males outnumber females in all these age groups in the population, however the pattern of slightly higher incidence (TB case-finding per 100 000 population) among males in the 0–4 and 5–9 age groups remains, as does the shift to higher incidence in females in the 10–14 and 15–19 age groups (Table 2).

Table 1: Distribution of case finding by gender in children, 2008–2012

	2008		2009		2010		2011		2012	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
0-4	16 071	14 978	17 425	15 970	13 883	12 866	15 331	14 219	12 910	12 023
5-9	6 037	6 032	6 756	6 601	5 819	5 669	6 202	6 068	4 819	4 660
10-14	2 780	3 320	3 076	3 889	2 813	3 377	2 947	3 622	2 621	3 050
15-19	5 629	8 304	6 221	9 321	5 822	8 429	5 967	8 515	5 525	7 723

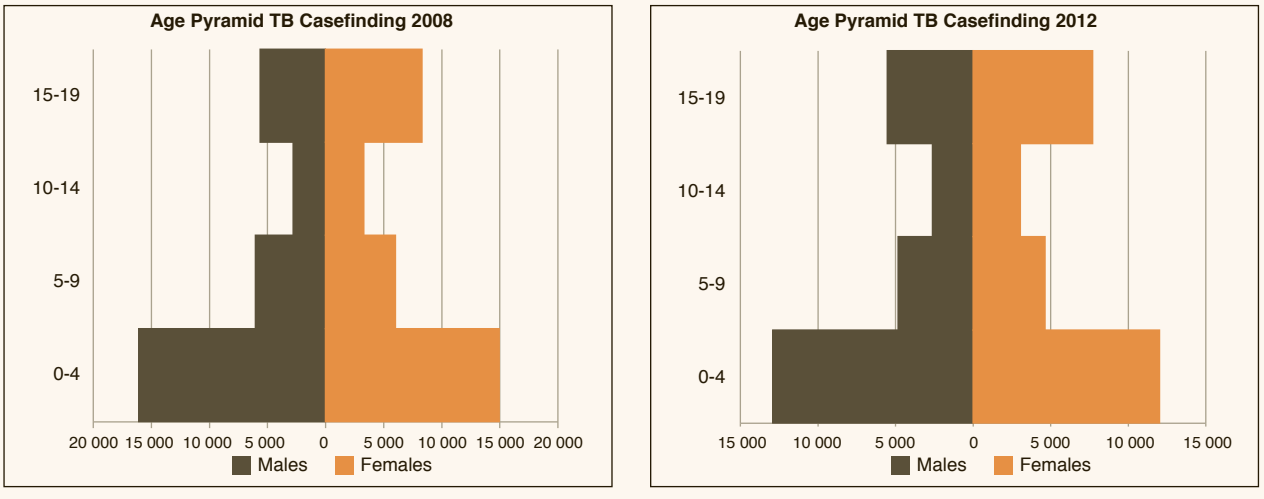
Source: ETR.Net.

Table 2: Incidence of TB (case finding per 100 000 population) by gender in children, 2008 and 2012

		2008		2012	
	Age	Male	Female	Male	Female
Population	0-4	2 603 490	2 570 453	2 667 566	2 627 718
	5-9	2 567 947	2 551 336	2 547 643	2 529 309
	10-14	2 607 728	2 592 210	2 546 776	2 540 948
	15-19	2 516 392	2 495 721	2 586 968	2 577 001
Incidence	0-4	617.3	582.7	484.0	457.5
	5-9	235.1	236.4	189.2	184.2
	10-14	106.6	128.1	102.9	120.0
	15-19	223.7	332.7	213.6	299.7

Source: Stats SA mid-year estimates times series (released with 2013 estimates) and ETR.Net.

Figure 3: Age pyramids of TB case finding in children, 2008 and 2012



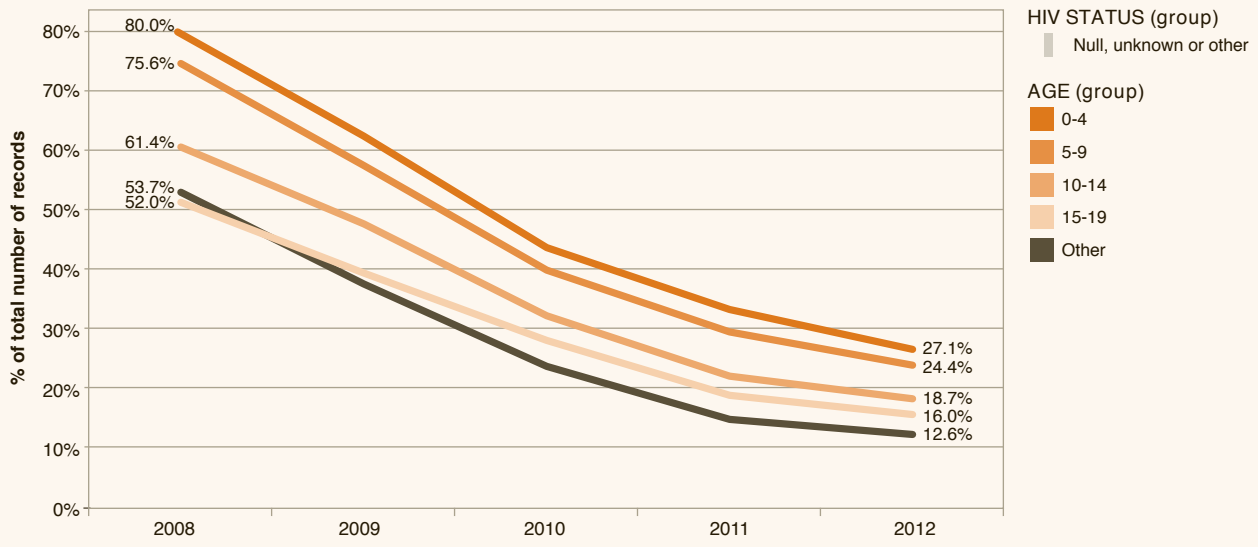
Source: ETR.Net.

HIV status

The testing of TB patients for HIV has gained momentum in recent years following changes in the National Department of Health policies. This is reflected in the decreased percentage of cases where the HIV status is unknown from 2008 to 2012 as shown in Figure 4. Cases where HIV status is unknown have dropped by more than half across all age groups.

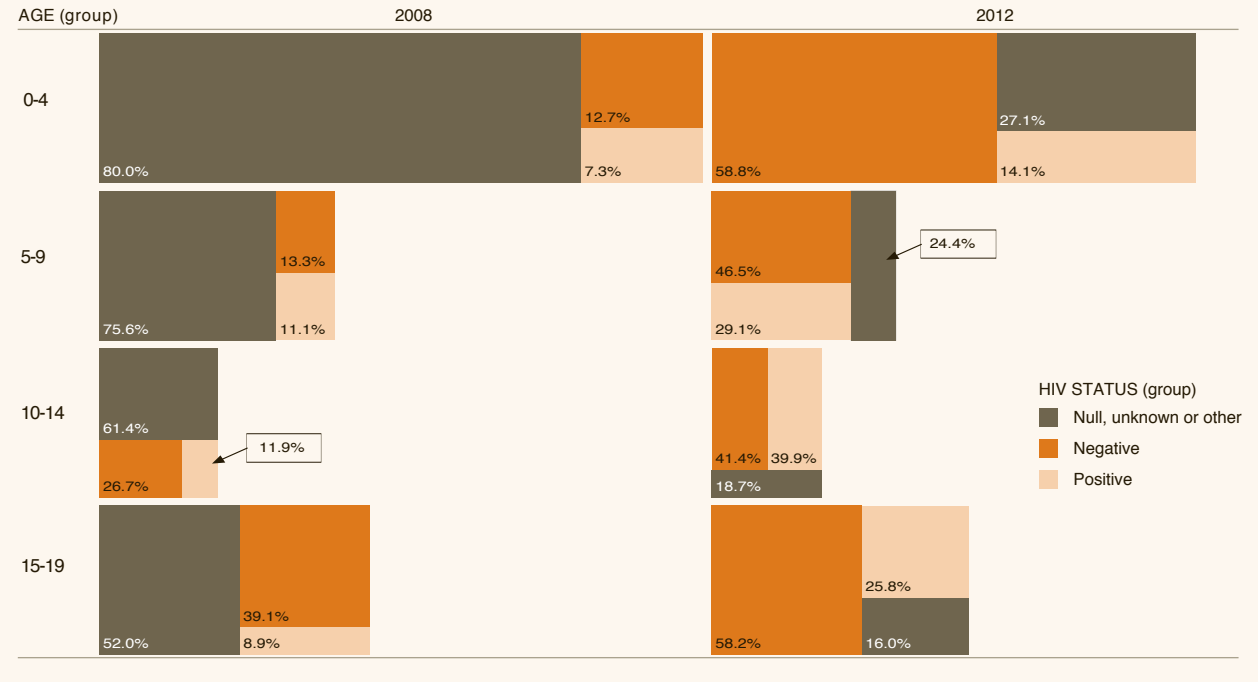
The positivity rate has increased proportionally by 2–3 times across all age groups, as seen in Figure 5, as a result of the substantial improvement in testing for HIV status. The greatest increase in TB-HIV cases was found in the age group 10–14 years (11.9% of all cases in this age group in 2008 to 39.9% in 2012).

Figure 4: Percentage of cases with HIV status unknown by age group, 2008–2012



Source: ETR.Net.

Figure 5: Tree-map showing the number (size) and percentage (label) of TB cases according to HIV status by age group, 2008 and 2012



Source: ETR.Net.

When considering only the cases where the HIV status was known, the highest HIV prevalence was also in the 10–14 year age group in 2012 (Table 3). The trends are difficult to interpret due to the change in the proportion of cases with known HIV status over the period.

Table 3: Percentage HIV+ of those with known HIV status, by age group, 2008–2012

	2008	2009	2010	2011	2012
0-4	36.5	34.4	29.3	22.4	19.4
5-9	45.5	46.3	47.0	41.7	38.5
10-14	30.8	39.2	47.1	47.6	49.1
15-19	18.6	25.4	29.9	29.7	30.7

Source: ETR.Net.

Case-finding

The WHO estimates that in high-burden settings, childhood TB cases comprise 10–20% of the total TB caseload.[2] Until the last decade, TB reporting has largely been focused on smear-positive cases known to drive transmission. Hence childhood TB was overlooked and data on childhood TB were limited since most cases are smear-negative. Age-specific estimates of TB incidence (including an adjustment for smear-negative cases) based on TB data for 2000 attributed 10.7% of incident cases globally to children aged 0–14 years.[7] In the same analysis in South Africa, 16.1% of TB was estimated to have occurred in children younger than 15 years old, with a case rate of 501 per 100 000 population in this age group.[7] Seventy-five per cent of all childhood TB cases globally were recorded for high TB-burden countries, with an increase in childhood TB cases noted in many regions of the world, including America and Europe.[7]

In a 1998 study that reviewed TB notifications over a 10-year period (1985–1994) in two urban communities in Cape Town (high TB burden and antenatal HIV prevalence 0.37% in 1991), among all childhood cases the proportion occurring in children aged 0–4 years ranged from 25 to 49% and in the 5–14 year age group from 7–12% (n=1 744) in that period.[8] The TB case notification rate among children aged 0–5 years was 3.5 times that in adults, highlighting the high burden of childhood TB in that setting.[8] Although this study might have only been representative of similar urban settings, it nonetheless served as an early indicator of the burden of childhood TB in high TB-burden settings in South Africa. The limitation of this study was that it was confined to two peri-urban communities in Cape Town at the beginning of the HIV epidemic, and therefore the findings cannot be extrapolated to the general South African context.

Childhood TB case notifications in South Africa have declined slightly from 63 151 cases in 2008 to 53 331 in 2012. This mirrors the decrease in TB case-finding for cases 20 years and older, which decreased from 305 495 cases in 2008 to 296 263 cases in 2012. The proportion of cases under 20 years commenced on treatment showed a slight decline, from 17.1% of total cases in 2008 to 15.3% of all cases in 2012 (Table 4). The proportion of cases by age group varied widely at the district level, which may be due to different population age structures and the completeness of case-finding, among other factors (Figure 6).

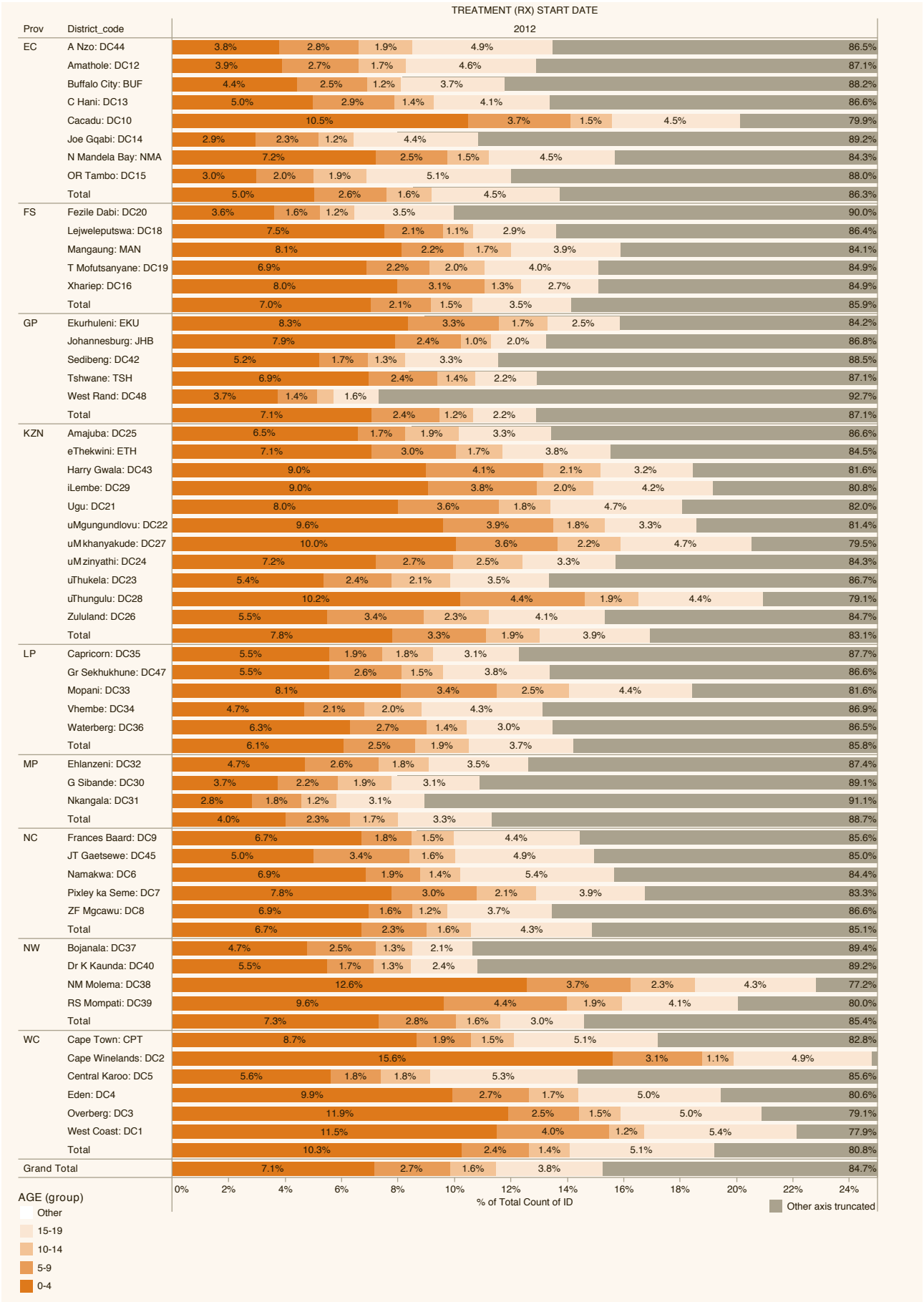
Table 4: Number and percentage of TB cases by age group, 2008–2012

	2008		2009		2010		2011		2012	
AGE (group)	n	%	n	%	n	%	n	%	n	%
0-4	31 049	8.4	33 395	8.1	26 749	7.5	29 550	7.5	24 933	7.1
5-9	12 069	3.3	13 357	3.2	11 488	3.2	12 270	3.1	9 479	2.7
10-14	6 100	1.7	6 965	1.7	6 190	1.7	6 569	1.7	5 671	1.6
15-19	13 933	3.8	15 542	3.8	14 251	4.0	14 482	3.7	13 248	3.8
Total 0-19	**63 151**	**17.1**	**69 259**	**16.8**	**58 678**	**16.3**	**62 871**	**16.0**	**53 331**	**15.3**
20+ years	305 495	82.9	342 465	83.2	300 283	83.7	330 343	84.0	296 263	84.7
All ages	368 646	100.0	411 724	100.0	358 961	100.0	393 214	100.0	349 594	100.0

Source: ETR.Net.

Note: Substantial number of missing records in 2010.

Figure 6: Age distribution of TB case finding, 0–19 years, as a percentage of total cases, 2012



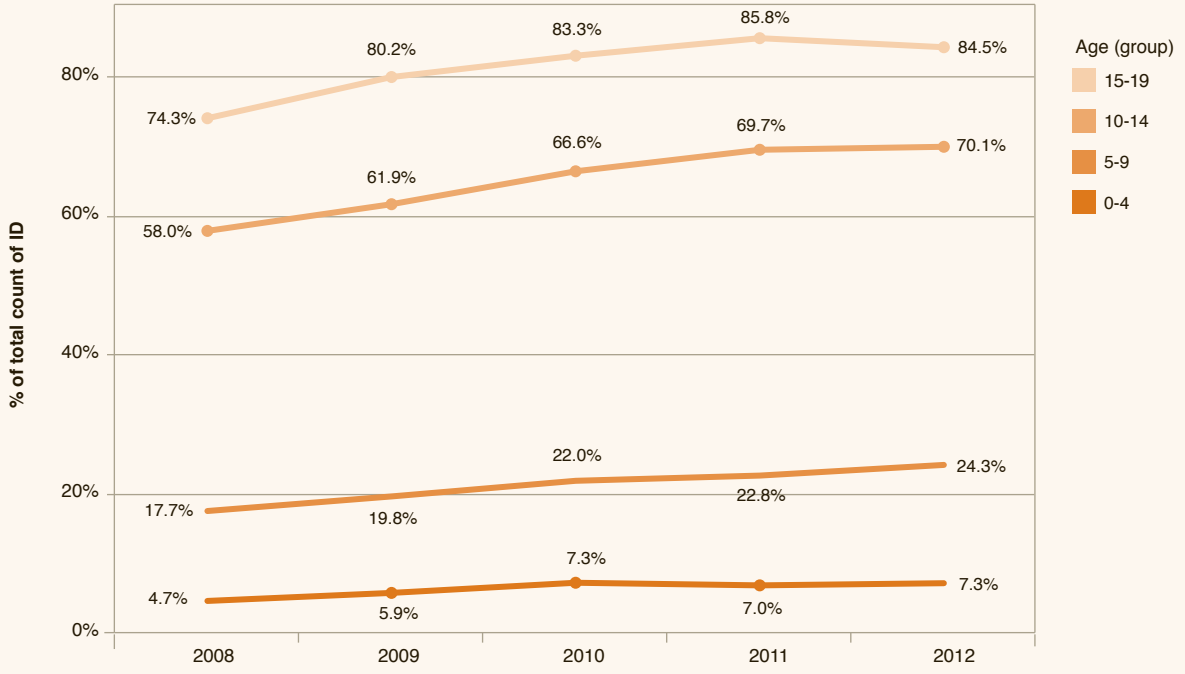
Source: ETR.Net.

Basis for diagnosis

The challenges faced by clinicians in determining a definitive diagnosis of TB in young children are well described in the literature, and most persist to this day.[7,9,10-14] This is mainly due to the difficulties in obtaining sputum samples, the paucibacillary nature of disease in young children, the lack of a standard case definition, and the difficulties of interpreting radiological features that is pivotal for diagnosis in the absence of bacteriological confirmation. This is further complicated by "the increased presence of extra-pulmonary disease in young children [and] the lower public health priority previously given to childhood TB".[2,7]

Bacteriological coverage rates (percentage of cases of PTB for which sputum microscopy results were available) improved with each age group, as expected, and all age groups showed increases between 2008 and 2012 (Figure 7), suggesting an overall increase in cases with microscopy results. However, bacteriological coverage remained very low in the age group 5–9 years (24.3% in 2012) even though these children should be able to provide sputum samples with encouragement.[15]

Figure 7: Bacteriologic coverage (% PTB cases with smear results available) by age group, 2008–2012



Source: ETR.Net.

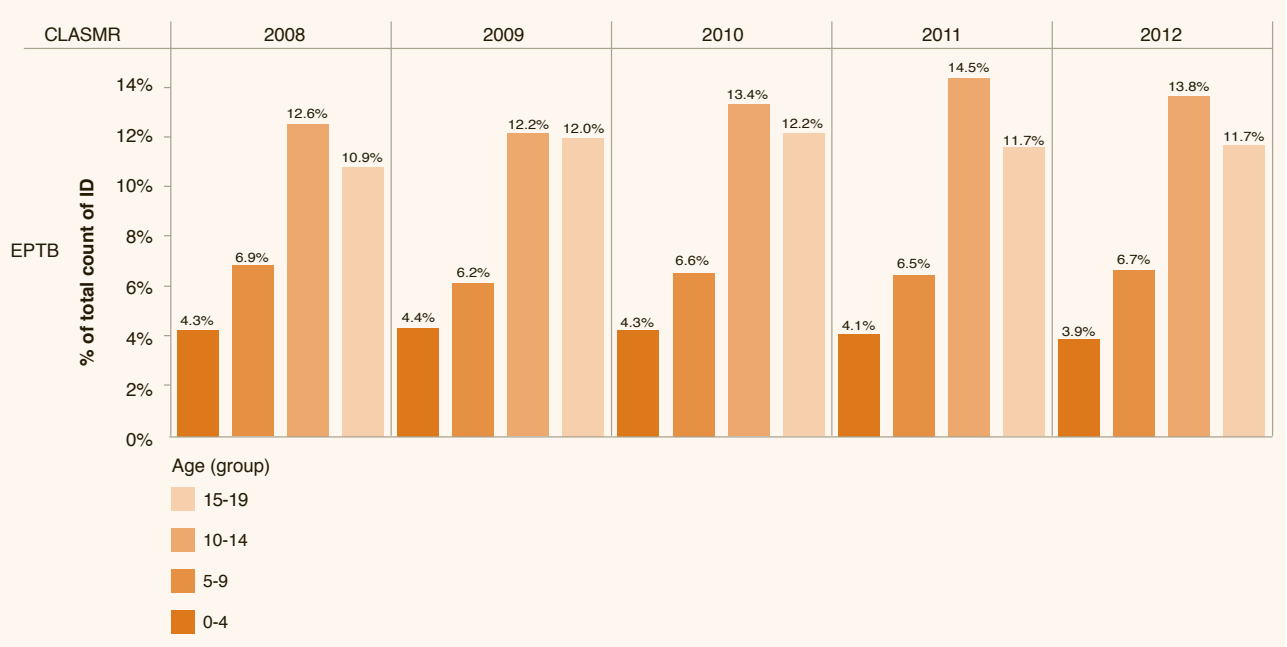
Site of disease

Although pulmonary disease comprises the bulk of TB cases, children, particularly in the 10–19 year age groups, experience a substantial proportion of extrapulmonary disease.

Data from the ETR.Net show that extrapulmonary TB (EPTB) cases make up between 3.9% and 14.5% of all cases aged 0–19 years, with the proportion of EPTB cases highest in the 10–14 year age group (Figure 8).

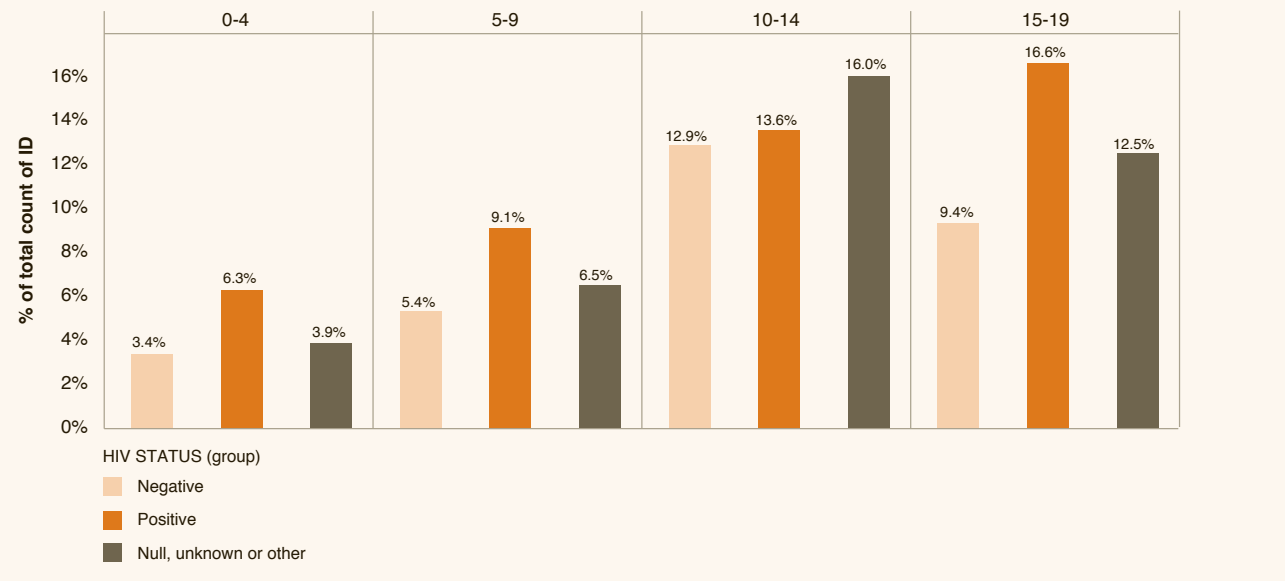
A study in India reported EPTB in 15–20% of HIV-negative cases and 20–70% of HIV-positive cases, while in a Thai study, 40% of HIV-infected patients had EPTB.[16,17] The data in Figure 9 indicate higher proportions of EPTB in HIV-positive children, as has been observed in adults. The largest difference in proportions between the HIV-positive and HIV-negative EPTB cases was in the 15–19 year age group (16.6% of TB cases are EPTB in those known to be HIV-positive, compared to 9.4% with EPTB in those with known HIV-negative status).

Figure 8: Percentage of TB cases that are EPTB by age group, 2008 –2012



Source: ETR.Net.

Figure 9: Percentage of TB cases that are classified as EPTB by age group and HIV status, 2012



Source: ETR.Net.

Treatment outcomes

Outcome data among children and adolescents aged 0–19 years were analysed and are presented in this section. Outcome data for the years 2008–2010 were not included due to quality concerns described in the case-finding section, while data for 2012 were incomplete at the time of this analysis.

Treatment outcome definitions in children and adolescents with TB are reported in the same categories applied to adult cases, and are generally defined as follows (based on revised WHO definitions):[18]

Cured — A pulmonary TB patient with bacteriologically confirmed tuberculosis at the beginning of treatment and who was smear- or culture-negative in the last month of treatment and on at least one previous occasion.

Treatment completed — A TB patient who completed treatment without evidence of failure BUT there is no record to show that sputum smear or culture results in the last month of treatment and on at least one previous occasion were negative, either because they were not done or because results were not available.

Treatment failed — A TB patient whose sputum smear or culture is positive at month 5 or later during treatment.

Died — A TB patient who dies for any reason before starting or during the course of treatment.

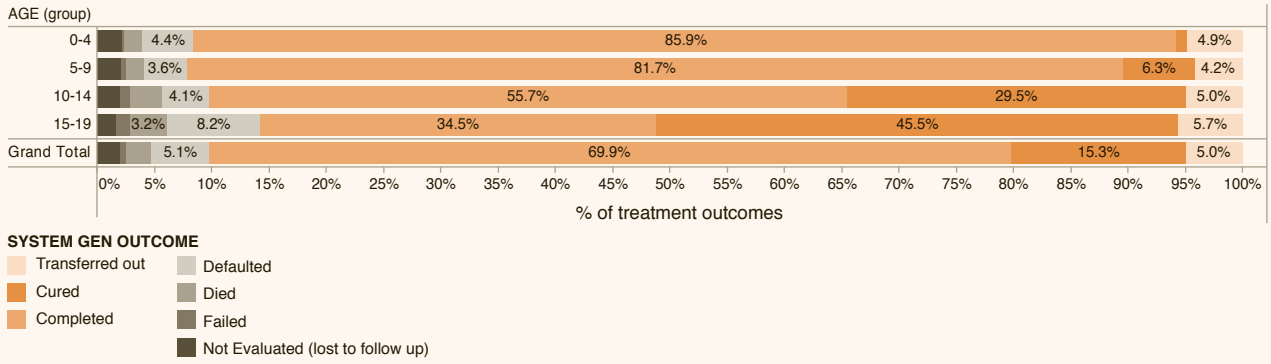
Lost to follow-up — A TB patient who did not start treatment or whose treatment was interrupted for two consecutive months or more. (This was previously called default. The term default is used in this chapter.)

Not evaluated — A TB patient for whom no treatment outcome is assigned. This includes cases "transferred out" to another treatment unit and where the treatment outcome is unknown to the reporting unit. Patients who were transferred out are recorded as a separate category in the system-generated outcomes from ETR.Net and are therefore reported as a separate category in this chapter.

National profile

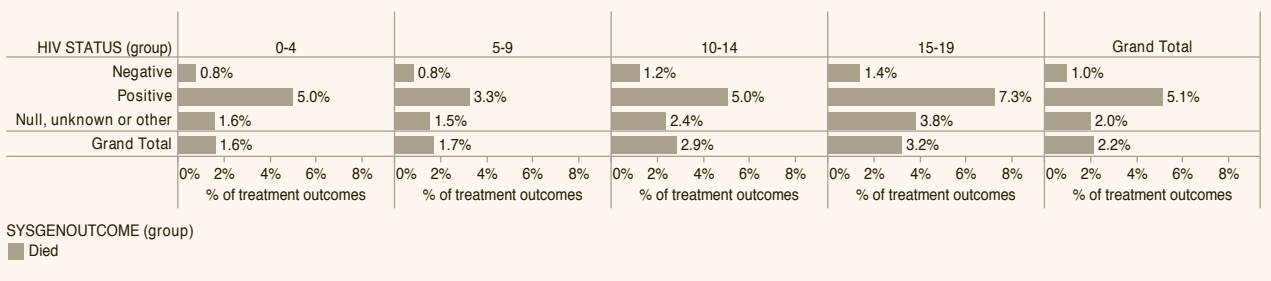
Outcome data were available for 62 454 children and adolescents aged 0–19 years in 2011. Of these, 69.9% completed treatment, 15.3% were cured, 5.1% defaulted, 2.3% died on treatment, 0.5% experienced treatment failure, and 7.0% were transferred out or not evaluated. Analysis of outcomes by age categories showed successful outcomes (cure and treatment completion) reaching 80% in all the age groups (86.6% – 0–4 years, 88.0% – 5–9 years, 85.2% – 10–14 years and 80.0% – 15–19 years). Figure 10 shows treatment outcomes by age group in 2011.

Figure 10: Treatment outcomes by age group in children and adolescents in South Africa, 2011



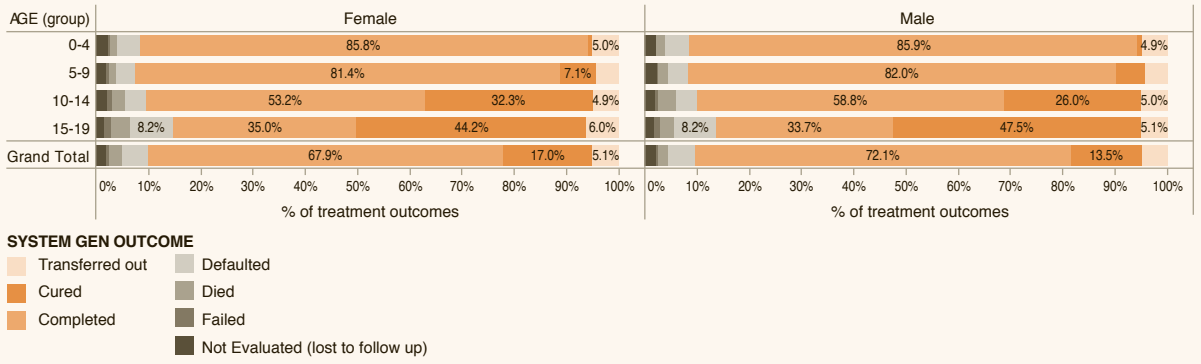
Source: ETR.Net.

Figure 11: Mortality outcomes in children and adolescents by age group and HIV status, 2011



Source: ETR.Net.

Figure 12: Treatment outcomes by gender in children and adolescents in South Africa, 2011



Source: ETR.Net.

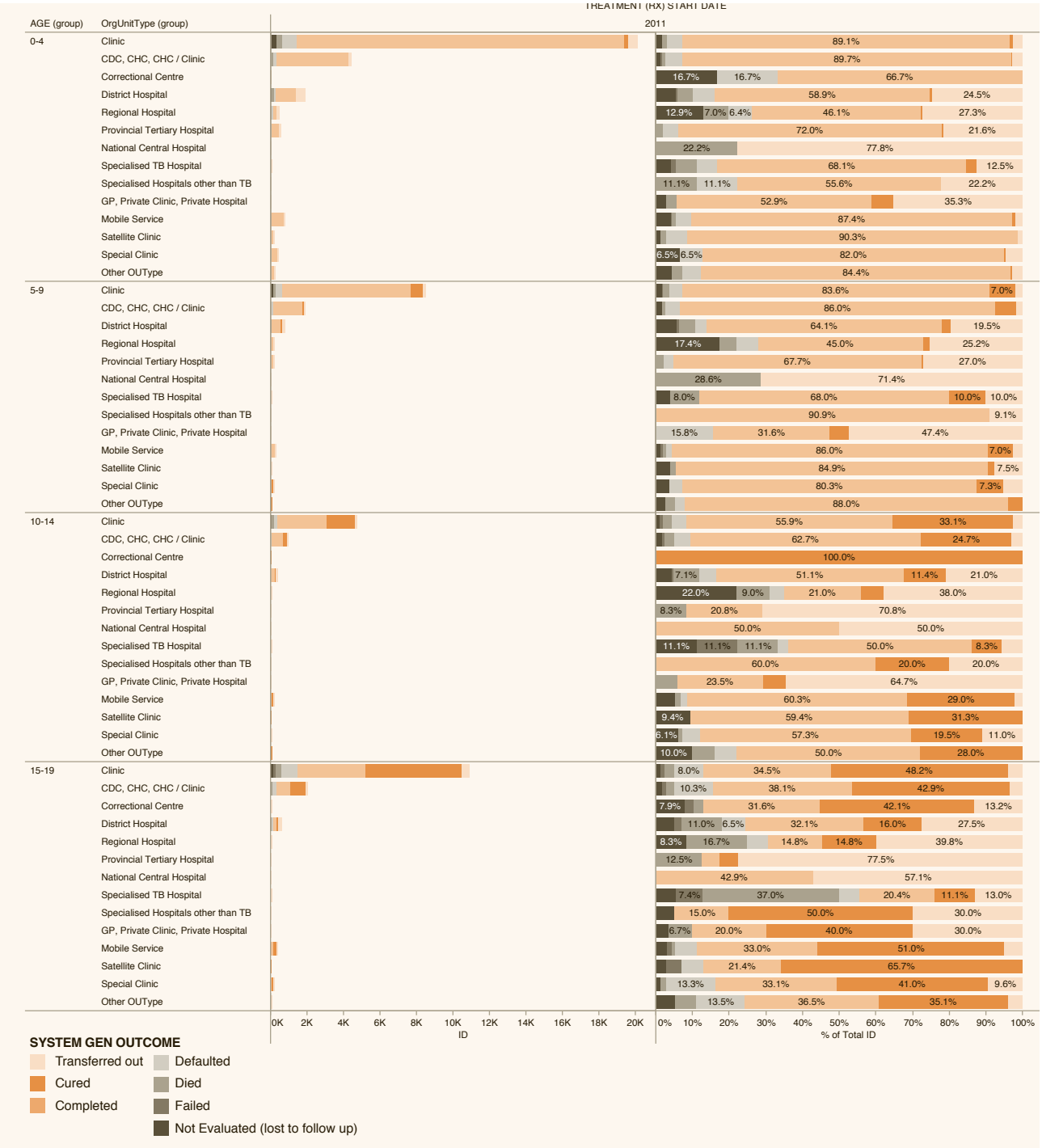
The proportion of defaulters was relatively similar in the 0–4, 5–9 and 10–14 year age groups, with the greatest percentage observed in older adolescents (15–19 years, 8.2%), a value twice that in the 10–14 year age group (4.1%). Similarly, older adolescents also had the largest mortality and failure treatment percentages (3.2% and 1.3% in 15–19 years respectively). Overall, mortality was generally low in all the age groups, ranging from 1.6% in the 0–4 year age group, 1.7% in those aged 5–9 years, 2.9% in those aged 10–14 years, and 3.2% in the 15–19 year age group. Tuberculosis is generally severe in the youngest children with poorly developed immune systems,[19] hence a greater proportion of mortality would be expected in the 0–4 year age group. However, in this analysis, mortality in the 15–19 year age group was significantly greater than that seen in children aged 0–4 years ($p<0.001$). This could be due to HIV-associated mortality, a poorer prognosis associated with poor adherence to treatment among adolescents, or other causes of mortality in adolescents who are on treatment for tuberculosis.[20-23] Various analyses have shown high levels of injury- and trauma-related mortality in young people. Studies have also shown that adolescents struggle to adhere to chronic medication due to various factors attributed to and associated with the period of adolescence.[24,25] However, a more detailed analysis taking into account a range of clinical, social and other factors is required to fully explain this observation.

In all the age groups, more than 6% of cases were either transferred out or not evaluated. HIV-associated mortality was high in all age groups, with the highest proportion (7.3%) being in the 15–19 year age group (Figure 11). Mortality percentages among those aged 0–4 and 5–9 years were similar (1.6% and 1.7 % respectively) but higher in children aged 5–9 years who generally have a lower risk and burden of TB.[19] Although massive strides have been made with regard to prevention of mother-to-child transmission (PMTCT) of HIV and antiretroviral treatment provision in general in South Africa, this high proportion of mortality could be partially attributed to the impact of HIV infection, as illustrated by the substantially higher death rates in cases known to be HIV-positive (Figure 11). Outcomes did not differ much by gender (Figure 12).

Treatment outcome by facility type

Figure 13 shows that across the country, childhood TB is successfully managed at a primary care level, with the majority of children completing treatment or achieving cure. Poor outcomes (default, death and failure of treatment) occurred across all types of health facilities in all age categories in 2011. However, hospitals had higher levels of default and mortality. Higher levels of mortality would be expected from hospitals, since the sicker patients and more complicated cases with a greater likelihood of mortality are seen there. With regard to default, patients may fail to return to hospital because of difficulties in accessing the hospital, especially in rural areas where the hospital may be a long distance from where patients live and they might have infrequent or no means of transportation. It is also possible that, as a result of access problems, some patients may choose to continue treatment at their local clinic and be erroneously classified as defaulters. Notable also is the high level of transfers out from private care, which most likely reflects transfer to the public health sector where TB treatment is provided free of charge. Treatment failure cases were mainly recorded in specialised TB hospitals and were most frequent in the 10–14 and 15–19 year age groups.

Figure 13: Treatment outcomes in children by age group and facility type (number and percentage of cases), 2011



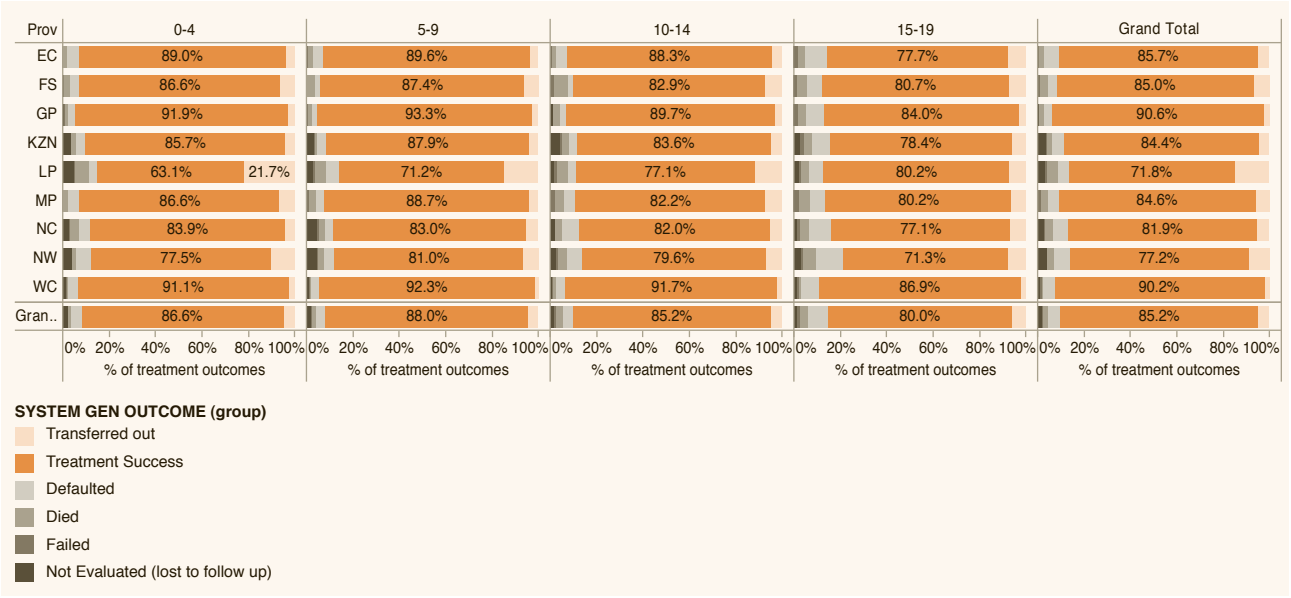
Source: ETR.Net.

Treatment outcomes by province

Figure 14 shows treatment outcomes for children and adolescents across the nine provinces in South Africa. The percentage achieving successful treatment outcomes (cure and treatment completion) in all age categories 0–4, 5–9, 10–14 and 15–19 ranged from 63.1% (age group 0–4 years in LP) to above 93% (age group 5–9 years in GP). However, across all provinces, there is a concerning proportion of young patients who did not complete treatment (defaulted), albeit largely confined to older adolescents aged 15–19 years (8.2% defaulter rate). Default from treatment is a problem in many TB programmes across all age groups. Given the long duration of treatment (at least six months), the side-effects of the drug and the fact that people feel better long before they complete the recommended course of treatment, many patients stop taking their medication prematurely. However, these patients require a longer course of treatment when they eventually return to care, and are at risk of mortality without adequate treatment.[26,27] Therefore, greater efforts and innovative methods are needed to encourage adherence to and completion of treatment among TB patients. The highest defaulter rate overall was in North West Province (6.6% in children 0–19 years). The Eastern Cape and Northern Cape also had high defaulter rates.

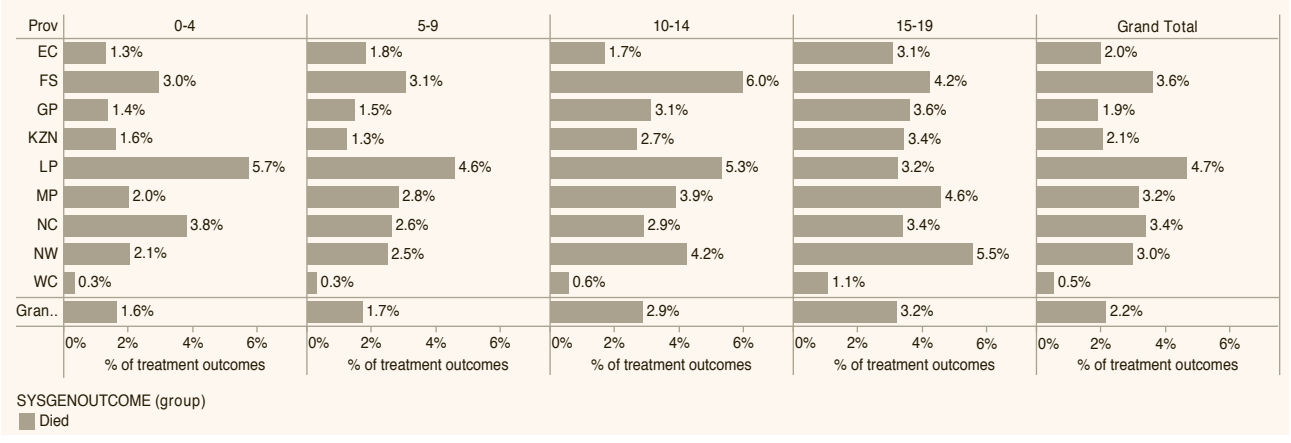
Mortality per province is shown in Figure 15 for each age group. Limpopo Province (LP) had the highest mortality, followed by Free State, while the WC and GP had the lowest mortality rates. The WC in particular has extremely low mortality in all age groups. While provinces vary greatly in socio-demographic, economic, disease-burden profiles and other factors, there is need to investigate how successful practices in GP and WC could be adapted and replicated in other provinces with higher mortality rates.

Figure 14: Treatment outcomes in children by age group and by province, 2011



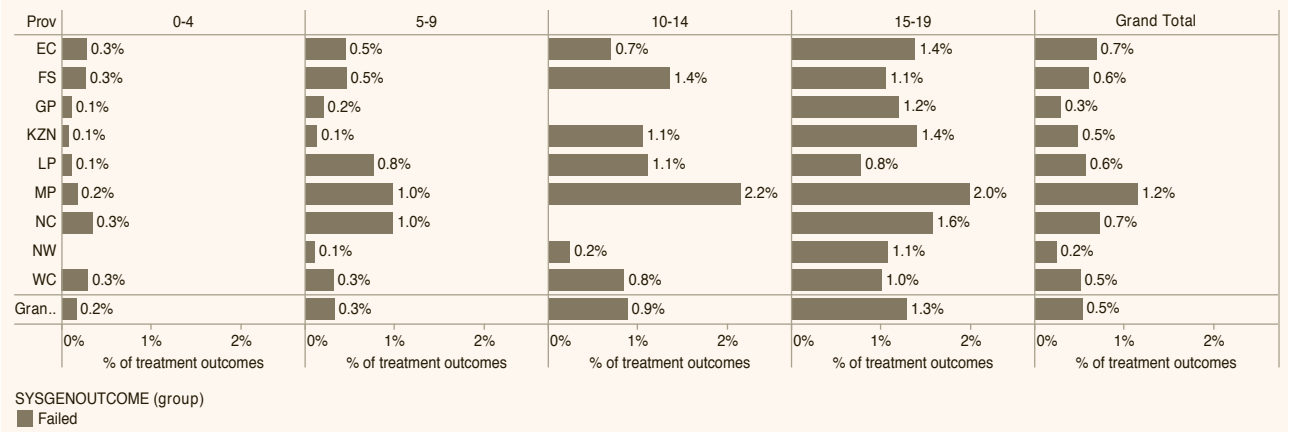
Source: ETR.Net.

Figure 15: Mortality outcomes in children by age group and by province, 2011



Source: ETR.Net.

Figure 16: Treatment failure in children by age group and by province, 2011



Source: ETR.Net.

Mortality was greater in the 10–14 year and 15–19 year age groups, as described for the national profile.

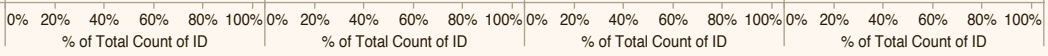
All provinces recorded a proportion of children and adolescents who experienced treatment failure (Figure 16). The cases were concentrated in older adolescents: 1.3% in the age group 15–19 years recorded treatment failure. Mpumalanga Province recorded the highest failure rates of 2.2% in the 10–14 year age group, 2.0% in the 15–19 age group and 1.2% overall (age 0–19 years). Although the overall proportion is low, these data are concerning, given the increasing burden of drug-resistant tuberculosis in South Africa.

Treatment outcomes by district

The proportion of children and adolescents achieving successful treatment ranged from a low of 61.3% in Capricorn (LP) to a high of 93.1% in Ekurhuleni (GP). In 30 districts, treatment success rates were ≥85% overall among children and adolescents. Default was highest in Waterberg (LP) at 10%, followed by Pixley ka Seme (NC) at 9.7% and then by Buffalo City and OR Tambo Districts (EC) with 8.7 and 8.2% default respectively. The mortality rate at district level ranged from 0.4% in Overberg (WC) to 7.2% Mopani (LP). Waterberg (LP) had the second-highest mortality rate at 6.4%. Other districts with high mortality rates in 2011 were Frances Baard (NC) with 5.6%, and Thabo Mofutsanyana (FS) and Bojanala (NW) each reporting 4.9% mortality in the 0–19 year age group in 2011. Treatment failure was above 1% in 13 districts, with the highest proportions reported in Central Karoo (WC) at 1.8% and JT Gaetsewe (NC) with 1.7%.

Figure 17: Treatment outcomes in children by age group, by district, 2011

Prov	District_code	0-4	5-9	10-14	15-19
EC	A Nzo: DC44	87.9%	87.4%	91.5%	78.7%
	Amathole: DC12	84.5%	90.9%	86.7%	76.1%
	Buffalo City: BUF	87.9%	89.1%	93.0%	77.2%
	C Hani: DC13	87.7%	93.1%	87.7%	77.9%
	Cacadu: DC10	94.2%	91.3%	90.7%	80.2%
	Joe Gqabi: DC14	89.6%	82.7%	94.1%	78.5%
	N Mandela Bay: NMA	90.7%	90.0%	87.7%	76.4%
	OR Tambo: DC15	83.5%	87.8%	84.1%	77.8%
	Total	89.0%	89.6%	88.3%	77.7%
FS	Fezile Dabi: DC20	89.4%	93.5%	85.0%	79.5%
	Lejweleputswa: DC18	86.4%	87.9%	89.4%	82.2%
	Mangaung: MAN	80.3%	81.5%	82.8%	75.6%
	T Mofutsanyana: DC19	92.5%	92.0%	75.5%	83.7%
	Xhariep: DC16	94.7%	86.8%	91.4%	88.7%
	Total	86.6%	87.4%	82.9%	80.7%
GP	Ekurhuleni: EKU	94.5%	94.4%	93.3%	88.0%
	Johannesburg: JHB	92.4%	94.5%	91.2%	83.6%
	Sedibeng: DC42	91.5%	92.2%	87.5%	78.1%
	Tshwane: TSH	90.0%	90.7%	86.2%	83.1%
	West Rand: DC48	85.9%	92.9%	81.6%	83.5%
	Total	91.9%	93.3%	89.7%	84.0%
KZN	Amajuba: DC25	94.0%	94.3%	79.2%	78.7%
	eThekwini: ETH	86.6%	90.0%	84.5%	77.9%
	Harry Gwala: DC43	81.8%	81.7%	78.9%	68.9%
	iLembe: DC29	78.9%	76.7%	75.2%	82.8%
	Ugu: DC21	81.0%	87.3%	81.1%	76.4%
	uMgungundlovu: DC22	85.3%	89.1%	82.4%	81.1%
	uMkhanyakude: DC27	76.5%	76.6%	78.9%	65.6%
	uMzinyathi: DC24	90.7%	87.2%	83.0%	82.4%
	uThukela: DC23	86.7%	91.7%	84.6%	82.2%
	uThungulu: DC28	93.4%	94.0%	93.8%	86.5%
	Zululand: DC26	86.3%	92.7%	86.7%	79.9%
	Total	85.7%	87.9%	83.6%	78.4%
LP	Capricorn: DC35	50.9% 39.0%	65.0% 27.5%	67.9% 25.6%	73.8%
	Gr Sekhukhune: DC47	70.9%	73.1%	81.0%	88.1%
	Mopani: DC33	71.2%	75.7%	83.0%	86.8%
	Vhembe: DC34	72.0%	71.7%	79.8%	80.6%
	Waterberg: DC36	58.8% 26.9%	69.9%	72.7%	67.8%
	Total	63.1% 21.7%	71.2%	77.1%	80.2%
MP	Ehlanzeni: DC32	89.3%	88.3%	81.9%	80.9%
	G Sibande: DC30	79.5%	86.7%	81.4%	74.6%
	Nkangala: DC31	88.1%	92.6%	84.9%	84.6%
	Total	86.6%	88.7%	82.2%	80.2%
NC	Frances Baard: DC9	82.6%	79.8%	73.2% 17.1%	75.9%
	JT Gaetsewe: DC45	79.8%	85.7%	20.0% 77.1%	84.0%
	Namakwa: DC6	88.2%	94.7%	100.0%	87.5%
	Pixley ka Seme: DC7	78.2%	76.3%	85.0%	20.8% 62.3%
	ZF Mgcawu: DC8	90.9%	96.7%	76.9%	80.2%
	Total	83.9%	83.0%	82.0%	77.1%
NW	Bojanala: DC37	78.1%	77.5%	75.6%	73.9%
	Dr K Kaunda: DC40	82.5%	84.3%	87.4%	68.9%
	NM Molema: DC38	71.8% 16.5%	80.7%	76.3%	66.4%
	RS Mompati: DC39	84.3%	82.9%	82.8%	78.1%
	Total	77.5%	81.0%	79.6%	71.3%
WC	Cape Town: CPT	91.8%	94.2%	92.0%	87.7%
	Cape Winelands: DC2	89.6%	87.0%	88.5%	87.5%
	Central Karoo: DC5	96.0%	100.0%	100.0%	90.0%
	Eden: DC4	89.7%	88.1%	93.2%	83.6%
	Overberg: DC3	89.8%	93.1%	97.0%	81.7%
	West Coast: DC1	92.5%	95.9%	90.7%	86.4%
	Total	91.1%	92.3%	91.7%	86.9%
Grand Total		86.6%	88.0%	85.2%	80.0%



SYSTEM GEN OUTCOME (group)

- Transferred out
- Treatment Success
- Defaulted
- Died
- Failed
- Not Evaluated (lost to follow up)

Source: ETR.Net.

Table 5: Treatment outcomes (%) in children 0–19 years by district, 2011

Prov	District	n	Transferred Out	Treatment Success	Defaulted	Died	Failed	Not evaluated
EC	A Nzo: DC44	1 099	6.9	85.7	4.5	2.5	0.4	0.0
	Amathole: DC12	938	7.5	82.9	6.4	1.9	1.3	0.0
	Buffalo City: BUF	745	3.0	85.1	8.7	1.3	1.2	0.7
	C Hani: DC13	964	5.3	86.4	4.7	1.8	1.0	0.8
	Cacadu: DC10	1 430	3.4	90.6	4.2	1.1	0.3	0.3
	Joe Gqabi: DC14	378	5.3	85.2	6.3	2.1	0.5	0.5
	N Mandela Bay: NMA	2 036	3.6	86.7	6.9	1.5	1.0	0.2
	OR Tambo: DC15	1 830	6.0	82.3	8.2	3.3	0.2	0.1
	Total	***9 420***	***5.0***	***85.7***	***6.3***	***2.0***	***0.7***	***0.3***
FS	Fezile Dabi: DC20	375	4.0	87.7	3.2	3.7	0.8	0.5
	Lejweleputswa: DC18	725	6.6	86.1	2.8	3.3	1.0	0.3
	Mangaung: MAN	1 112	9.7	79.8	6.8	3.1	0.4	0.2
	T Mofutsanyana: DC19	795	5.2	87.7	1.6	4.9	0.4	0.3
	Xhariep: DC16	289	2.1	91.3	2.4	2.4	1.0	0.7
	Total	***3 296***	***6.6***	***85.0***	***3.9***	***3.6***	***0.6***	***0.3***
GP	Ekurhuleni: EKU	1 897	2.1	93.1	1.8	2.2	0.5	0.2
	Johannesburg: JHB	3 199	3.1	91.5	3.4	1.3	0.2	0.4
	Sedibeng: DC42	631	2.7	87.8	7.0	2.1	0.5	0.0
	Tshwane: TSH	1 847	2.7	88.6	5.0	2.7	0.2	0.9
	West Rand: DC48	504	2.6	86.5	3.0	1.6	0.2	6.2
	Total	***8 078***	***2.7***	***90.6***	***3.7***	***1.9***	***0.3***	***0.8***
KZN	Amajuba: DC25	424	2.6	88.0	5.9	3.3	0.2	0.0
	eThekwini: ETH	6 457	4.2	85.0	6.1	1.6	0.3	2.8
	Harry Gwala: DC43	900	8.8	78.7	7.8	2.7	0.8	1.3
	iLembe: DC29	1 381	4.3	78.8	3.9	1.1	0.6	11.4
	Ugu: DC21	1 598	7.7	81.1	4.6	2.1	0.7	3.8
	uMgungundlovu: DC22	1 685	6.5	84.9	4.7	2.0	0.1	1.8
	uMkhanyakude: DC27	1 703	3.8	74.8	2.9	2.5	1.4	14.6
	uMzinyathi: DC24	819	6.3	87.4	2.0	3.4	0.9	0.0
	uThukela: DC23	728	4.5	86.4	5.6	3.2	0.3	0.0
	uThungulu: DC28	2 445	2.6	92.4	3.2	1.0	0.7	0.2
	Zululand: DC26	1 900	2.9	86.5	6.0	3.5	0.2	0.8
	Total	***20 040***	***4.6***	***84.4***	***5.0***	***2.1***	***0.5***	***3.6***
LP	Capricorn: DC35	612	28.8	61.3	3.8	2.9	0.2	3.1
	Gr Sekhukhune: DC47	322	10.2	79.8	3.1	4.3	0.9	1.6
	Mopani: DC33	712	5.9	77.8	3.4	7.2	0.8	4.9
	Vhembe: DC34	518	10.2	76.4	5.6	2.1	0.0	5.6
	Waterberg: DC36	438	16.9	65.1	10.0	6.4	1.1	0.5
	Total	***2 602***	***14.5***	***71.8***	***5.0***	***4.7***	***0.6***	***3.5***
MP	Ehlanzeni: DC32	1 812	5.5	85.7	4.2	2.9	1.4	0.3
	G Sibande: DC30	835	7.8	80.4	6.5	4.8	0.6	0.0
	Nkangala: DC31	563	4.8	87.7	4.8	1.6	1.1	0.0
	Total	***3 210***	***6.0***	***84.6***	***4.9***	***3.2***	***1.2***	***0.2***
NC	Frances Baard: DC9	555	9.9	79.6	3.2	5.6	0.9	0.7
	JT Gaetsewe: DC45	302	2.0	82.1	8.9	2.6	1.7	2.6
	Namakwa: DC6	165	4.8	90.9	3.0	0.0	0.0	1.2
	Pixley ka Seme: DC7	390	4.4	75.4	9.7	1.5	0.5	8.5
	ZF Mgcawu: DC8	377	1.6	87.8	5.6	4.2	0.3	0.5
	Total	***1 789***	***5.1***	***81.9***	***6.1***	***3.4***	***0.7***	***2.7***
NW	Bojanala: DC37	1 081	8.1	76.8	6.6	4.9	0.4	3.2
	Dr K Kaunda: DC40	963	7.7	80.6	7.7	3.0	0.4	0.6
	NM Molema: DC38	1 659	13.2	72.9	6.8	2.4	0.1	4.6
	RS Mompati: DC39	795	2.4	82.6	5.3	1.6	0.1	7.9
	Total	***4 498***	***8.9***	***77.2***	***6.6***	***3.0***	***0.2***	***4.0***
WC	Cape Town: CPT	5 221	2.0	91.0	5.7	0.5	0.4	0.4
	Cape Winelands: DC2	1 818	2.2	88.8	5.6	0.6	0.7	2.2
	Central Karoo: DC5	109	0.0	95.4	2.8	0.0	1.8	0.0
	Eden: DC4	1 107	2.1	88.1	3.9	0.8	0.5	4.7
	Overberg: DC3	529	4.3	89.0	4.7	0.4	0.2	1.3
	West Coast: DC1	737	3.0	91.6	2.2	0.7	1.4	1.2
	Total	***9 521***	***2.2***	***90.2***	***5.1***	***0.5***	***0.5***	***1.4***
Total		**62 454**	**5.0**	**85.2**	**5.1**	**2.2**	**0.5**	**2.0**

Source: ETR.Net.

Conclusion

This narrative presents important information on TB in children and adolescents in South Africa, and highlights the challenges of TB data management and its impact on reporting. As expected, the burden of childhood TB is high, with a large proportion concentrated in the 0–4 year and 15–19 year age groups. With momentum and focus on HIV counselling and testing (HCT) and a move towards integration of TB and HIV care, cases with unknown HIV status dropped significantly between 2008 and 2012. However, the proportion remains high, indicating a need for further effort to increase testing and recording of HIV status in all TB cases.

TB in children and adolescents accounted for 15.3% to 17.1% of all TB cases between 2008 and 2010. This is within the expected proportion for high TB burden countries. Given that the expected estimates are based on children aged 0–14 years, the cases recorded on ETR.Net may be underestimating the total disease burden in this age group. This is supported by the fact that in very young children, TB can easily be misdiagnosed as being other respiratory tract infections, hence some cases may be undiagnosed. The same could apply to older adolescents, especially males, who may not readily present to healthcare facilities even when symptomatic. These concerns extend to drug-resistant TB, which also tends to be undiagnosed and poorly quantified in children.[28]

Treatment outcomes present an encouraging picture, indicating successful treatment in the majority of cases. However, the proportion of defaulters, even though small, needs to be addressed given the negative consequences of defaulting from treatment. As expected, mortality was high among HIV-infected cases, with the highest proportion in those aged 15–19 years. Early initiation of ART has been shown to reduce mortality in HIV-infected patients and is thus recommended as early as possible for HIV-infected children (0–14) and adults, regardless of CD4 count.[29] Implementation of this guideline should be assessed in all facilities.

The provincial and district outcome profiles vary due to many factors. In many areas, outcomes are favourable, requiring a small proportion of unfavourable outcomes to be addressed. In other areas, more work is needed to reduce increasing numbers of those defaulting from treatment and mortality in children and adolescents.

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The extent and impact of TB drug stock-outs

15

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Drug stock-outs in public health facilities in South Africa have been referred to in recent media reports and publications as a public health crisis.

This chapter includes an analysis of tuberculosis (TB) drug stock-outs at district and provincial level in the public health system, using TB-related drug stock-out indicators collected by the District Health Information System and the Stop Stock Outs Survey. The analysis includes information on data quality and comparability from the data sources used and an assessment of the relationship between stock-outs and TB treatment outcomes. The chapter illustrates that TB drug stock-outs are pervasively evident in several districts in South Africa, posing challenges to patients who require regular access to TB drugs and compromising patient health. The reasons for TB drug stock-outs are multi-dimensional and range from a shortage of human resources to a lack of communication between suppliers, depots and health facilities. There is insufficient research determining the extent of TB drug stock-outs in South Africa and the impact of TB drug stock-outs on TB outcomes.

Data quality in our routine information system pertaining to TB drug stock-outs across health facilities in all the country's districts should be strengthened. In addition to the use of surveys, research methodologies should integrate data sources to understand TB drug stock-outs, and guidelines to prevent TB drug stock shortages in health facilities in South Africa should be developed.

The reasons for TB drug stock-outs are multi-dimensional and range from a shortage of human resources to a lack of communication between suppliers, depots and health facilities. There is insufficient research determining the extent of TB drug stock-outs in South Africa and the impact of TB drug stock-outs on TB outcomes.

i Health Systems Trust

Introduction

This chapter provides an analysis of tuberculosis (TB) drug stock-outs using available data sources and relevant literature and depicts the extent and impact of inadequate medicine supply within the public health system. The analysis includes information on data quality and variations between the data sources used. TB-related drug stock-out indicators from the District Health Information System (DHIS) and the Stop Stock Outs Survey at provincial and district level for financial years 2010/11 to 2012/13 are provided. The chapter concludes with an assessment of the relationship between the DHIS indicator "Any TB drug stock-out rate" and "TB treatment outcomes" from the electronic TB register (ETR.Net).

Primary data sources

The following primary data sources were used:

The District Health Information System

The DHIS, which was introduced nationally in the late 1990s, is designed to facilitate data collection, transfer, processing and information feedback in healthcare facilities, primarily in the public sector. Baseline data generated from the DHIS provides information on the current health status of populations in districts, health services, delivery points and frequencies.[1] This information is used for quality assurance, monitoring and supervision.

The National Stop Stock Outs Survey

The first national stock-outs survey was conducted between September and October 2013 by an independent civil society consortium which monitors medicine stock-outs and shortages in South Africa.[2] The telephonic questionnaire survey consulting 2 139 respondents (head nurse/matron or pharmacist) (response rate 91.3%) highlighted the magnitude of drug stock-outs, and found that 21% of public health facilities had reported a stock-out or shortage of antiretrovirals (ARVs) and/or TB medicine in the preceding three months.[2]

Electronic TB register

The electronic TB register (ETR.Net) is an electronic database, implemented in South Africa from 2004, that stores patient-level records on management of drug-susceptible TB patients registered in health facilities. The register includes basic demographic information, treatment regimens, test results and treatment outcomes.

Background

The limited supply of essential medicines has been a global challenge, with both developed and developing countries such as the United States of America, Australia, Canada, Afghanistan and Zimbabwe experiencing challenges in drug supply. The World Health Organization (WHO) conducts surveys through retrospective analysis of stock-cards from pharmacy records to measure the stock-out duration of medicines.[3] The WHO and Health Action International (HAI) monitor the prices of medicines (patient prices and government procurement prices) as well as medicine availability, treatment affordability and price components in the supply chain from manufacturer to patient including taxes and mark-ups.[4] However, the information collected does not address the length of stock-outs or provide further analysis on the magnitude of the stock-out and the dynamics of supply chain issues.

Developed and developing counties have experienced supply chain obstacles in procuring drugs as opposed to challenges of fluctuating market demands.[3] There are multiple reasons for the inadequate supply of drugs, and inefficiencies can occur at any stage of the supply chain. According to the Stop Stock Outs campaign, in developing countries, the reasons for inefficiencies in supply chain include: inadequate funds for procurement of medicines, inaccurate and non-participatory forecasting, inadequate buffer stock of essential medicines at all levels of the supply chain, inefficient distribution systems at national and regional levels, and inadequate record-keeping.[2]

Definitions

Traditionally, the term "stock shortage" was used specifically by the WHO and was defined as "having less stock of a medicine available in the facility than required for patients until the next order [is] received."[5] However, the Stop Stock Outs Survey Report uses the term "stock out" which includes a comprehensive definition of a short supply of drugs.[2] Its definition of "stock out" is:

> when a pharmacy (in a medical store or health facility) temporarily has no medicines on the shelf. It may affect one medicine, or many medicines, or in the worst case, all medicines. A stock out can be documented at one point in time or over a period of days, weeks or months. When there [are] good stock management systems in place, the stock out duration will be minimal or, ideally, never.

The use of the DHIS data elements supports the definition of drug stock-out as "a situation where there was no medication available to issue to a client". The data elements are collected according to whether any item on the list/category has been out of stock at any time during the reporting period.

Drug stock-outs in South Africa

South Africa has the largest antiretroviral (ARV) programme in the world, with the number of people requiring antiretroviral treatment (ART) and TB drugs growing rapidly.[6] Competent management of ART and TB drug stock-outs is imperative, as the number of patients experiencing complications and death due to non-adherence is increasing.[6] Over the past three years, drug stock-outs of TB and ARV drugs in public health facilities has been emphasised in media reports in South Africa. Recent media coverage highlights the inadequate supply of TB and ART drugs in healthcare facilities (including provincial depots) in all provinces, with the Eastern Cape, Gauteng and Free State receiving the most criticism.[2]

Impact of drug stock-outs and shortages

Drug stock-outs in South Africa have been labelled a national crisis that challenges patient care and threatens progress in new treatments.[2] This presents significant medical implications for the health system and its patients. At the individual level, stock-outs and shortages lead to incomplete doses, interruptions or default on treatment.[5] Patients incapable of treatment adherence are at higher risk of infections and complications, thereby increasing their risk of morbidity and mortality.[7] In cases of shortages, a common

practice is to prescribe alternative medicines. However, alternative treatments can have adverse outcomes and unintended side-effects.[8] More critical concerns include increased risk of drug resistance.

Drug resistance is a public health concern, as drug-resistant viral strains can be transmitted among populations.[5] Research in ART adherence warns of a coming "antiretroviral anarchy", "where the rapid emergence and transmission of resistant viral strains [c] ould ultimately limit treatment options".[5] Moreover, drug stock-outs mean that patients from low-income backgrounds without financial resources to access health facilities or purchase drugs from private institutions, are most at risk of serious health repercussions.[8] Additionally, healthcare professionals bear the brunt of the shortages as they are required to dedicate additional time and attention to solving these problems.[8]

The complexity of supply chain management

Factors contributing to drug stock-outs in South Africa are complex and multi-dimensional. Recently, inept supply chain management has been identified as a main catalyst of stock-outs.[6] Communication between suppliers, depots and health facilities is deficient.[6] According to drug suppliers, supply problems occur as a result of the shortage of pharmacists and inadequate resources.[6] Health facilities are also accused of failing to accurately estimate drug orders, as estimation of demand is complicated by unpredictable health trends, such as epidemics and emergencies, but may also be affected by prices and tenders causing drug shortages and stock-outs.[8] Clinic management issues are further complicated by the suppliers' capacity – or lack thereof – to timeously manufacture drugs that are deemed a priority.[6,8] Other reasons offered pertain to government failure to pay suppliers, as well as corruption.[6]

A joint integrated HIV, TB and prevention of Mother-To-Child Transmission (PMTCT) review indicated that there appears to be effective supply chain management from depot to facilities in most provinces.[9] The review was conducted in October 2013 and involved 160 individuals from multiple institutions representing a wide range of technical expertise in HIV, TB, PMTCT and cross-cutting systems.[9] The aims of the review included assessment of existing capacities and challenges for service delivery such as supply chain, information systems, laboratories and the health workforce.[9] The report relayed that challenges were centred around the weak quantification of the market size for TB drugs and commodities and that the procurement and supply management system is negatively influenced by human resource capacity constraints.[9] To elaborate, as in the afore-mentioned lack of skills, the system is managed by pharmacist assistants and professional nurses instead of pharmacists.[9] The lack of a full complement of staff has hampered the capacity for better management using electronic stock management systems.[9]

The report highlighted that most of the sites visited did not report significant drug stock-outs in the period immediately preceding the review.[9] Although the report indicated that stock-outs of ART during the previous 12 months had been minimal with no significant stock-outs of tracer drugs, it did not specify the situation for TB.[9] However, the report reveals that manufacturing limitations are hindering the roll-out of fixed-dose combinations of ARV drugs. Programmatic pharmacovigilance was regarded as underdeveloped, whereas regulatory pharmacovigilance appeared to be well developed.[9] It was argued that a dedicated pharmaceutical procurement and supply system exists, which uses an evidence-based approach to drug procurement, triangulating using all available data sources including programmatic data.[9]

A key challenge highlighted in the report was that some provinces carry a disproportionate level of risk in contracting suppliers, and non-tender compliance penalties carry more risk for provincial depots than is appropriate.[9] The cited example was that a shortage of human resources precluded adherence to the standard practice of notifying short stock delivery of pallet-loads of drugs within 48 hours.[9] The report indicates that in some provinces, security of stock control is sub-optimal.[9] There is no routine check to control for stock, and the review panel found open boxes and loose tablet bottles at sites.[9] In addition, the issue of the quality of suppliers' service was questioned and it was acknowledged that the current system was devoid of corresponding penalties for suppliers whose performance was poor.[9]

Development of a national stock information body

In South Africa, there is an absence of comprehensive early warning systems to report potential drug shortages.[6] To ease the impact of drug shortages and stock-outs, an overall system that co-ordinates information about national stock dissemination through the whole supply chain is urgently needed. The National Department of Health has initiated efforts towards establishing a system of this calibre.[6] The Department recognises that management and maintenance of a fully functioning drug supply chain is crucial to strengthen and improve the overall quality of services, and intends developing a computer software system at the national level that will act as a stock information mechanism to facilitate communication between drug depots, suppliers and health facilities.[6] The system will work on the basis of gathering and delivering information about drug supply demands across facilities in the country.[6] This continuous monitoring has the potential to relieve and reduce ongoing drug stock-outs.

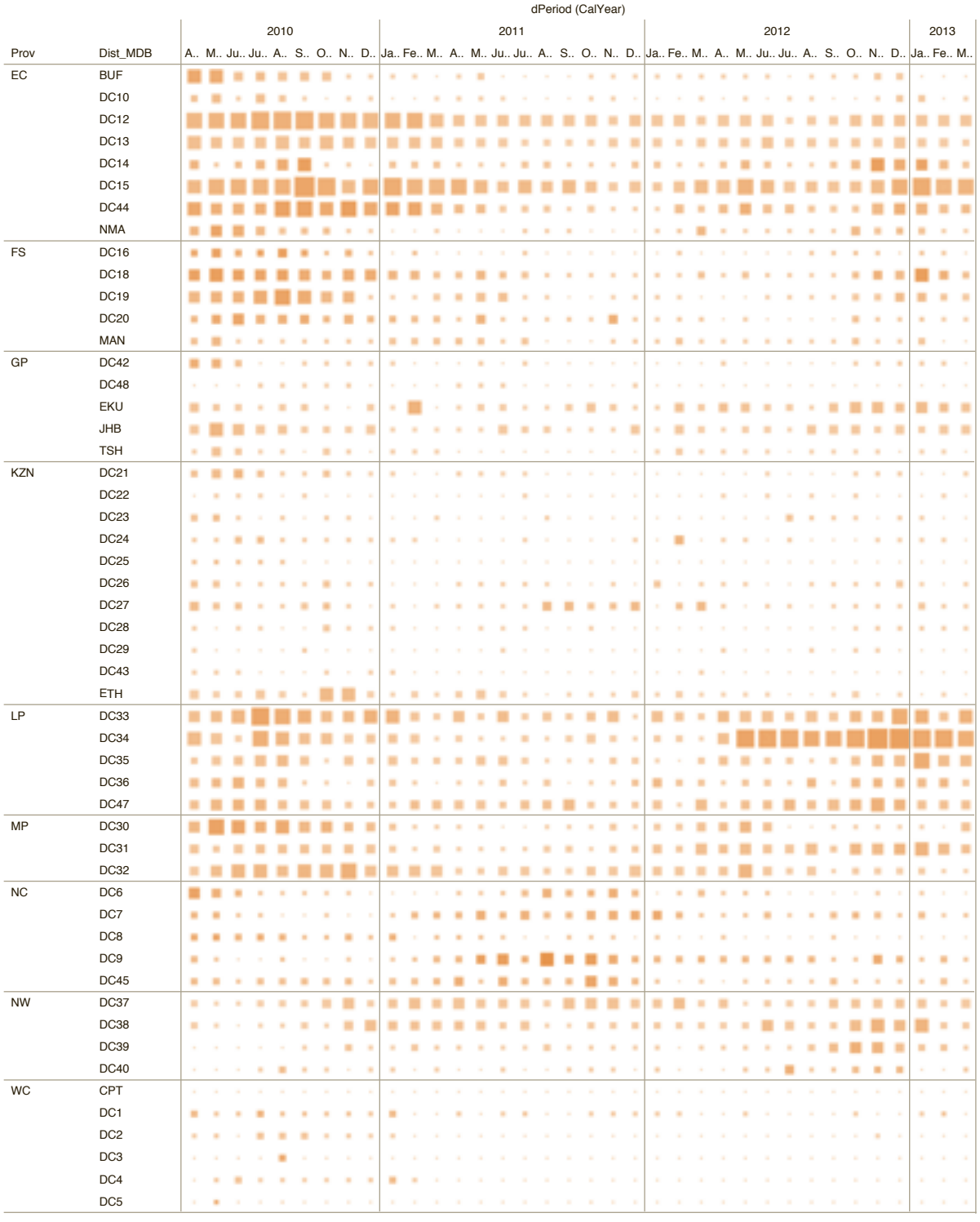
Data quality of indicators and data sources

DHIS indicators

The DHIS indicator used for this analysis is "Any TB drug stock out rate". This indicator measures the proportion of all fixed facilities that had a stock-out of any TB drug during the monthly reporting period. The numerator is "Any TB drug stock out", and the denominator is "All fixed facilities reporting". The National Indicator Data Set (NIDS) 2010 also included a comparable indicator "Any ARV drug stock out rate". This indicator measures the proportion of all fixed facilities that had a stock-out of any ARV drug during the monthly reporting period.

The third available indicator that tracks medicine availability in the DHIS is "Tracer items stock out rate", defined as "Any item on the PHC tracer item list in current use has been out of stock for ANY period during the month in a fixed clinic/CHC/CDC". This list includes Nevirapine 10mg/ml solution; Zidovudine 300mg tablets; DTaP-IPV/Hib (Pentavalent) Vaccine (EPI); Adrenaline 1mg/ml injection; Co-trimoxazole 50 or 100ml suspension; Metformin 500mg or 850mg tablets; Norethisterone or Medroxyprogesterone injection; Paracetamol 500mg tablets; Sodium Chloride .09% 1L, and RHZE 150/75/400/275mg tablets. The numerator is "Any tracer item drug stock out" and the denominator is "All fixed facilities reporting". The design of the data input form and the data capture screen does not allow for blanks for this indicator. As such, this data

Figure 1: Any TB drug stock-out rate by district, monthly from April 2010 to March 2013



Source: DHIS.

Note: With regard to the interpretation of this graph, the SIZE of each block represents the NUMBER of facilities in each district that reported any TB drug stock-out in that month. The DARKNESS of the block shading represents the indicator value (the PERCENTAGE of all reporting facilities that reported any TB drug stock-out in the month). The patches of large, dark shading thus indicate substantial, widespread, ongoing problems with drug supply.

element will always be zero (0) if there is no tracer drug stock-out, or one (1) if there is a tracer drug stock-out. Although the "Tracer items stock out rate" indicator may be a more accurate measure of medicine stock-outs in general, it is less specific to TB, its introduction to the NIDS is fairly recent, and data are incomplete or not collected for certain provinces during the period covered by this assessment. However, the tracer items indicator is the only one of the three that are included in the NIDS 2013. Consequently, this will be the only available indicator for future analyses of drug availability.

The quality of the "Any TB drug stock out" indicator was assessed through basic logical verification of validity of the monthly facility records on TB stock-outs, since numerator values can only be zero or one. Data quality issues are evident from financial years 2011 to 2013, although correction of these errors did not substantively change the overall stock-out rate. There is no way to verify through a desk review whether the binary outcome of each facility report of any stock-outs is accurate or not. Figure 1 illustrates one example of data visualisation used to explore the indicator.

Stop Stock Outs Survey indicators

To date there is a lack of research literature on stock-out data for TB (or medicines in general) in South Africa, prior to the widely publicised release of the Stop Stock Outs Survey. This study was the first telephonic interview survey regarding ARV and TB drugs conducted between September and October 2013. The data collection and entry methods for this telephonic survey indicated only a single type of TB and ARV drug at a time, covering: Stavudine (d4t), Efavirenz (efv), Lamivudine (3tc), Tenofovir (tdf), Abacavir (abc), Lopinavir/ritonavir (lop/rit), Fixed dose combination (fdc), Tenofovir/emtricitabine (truvada), Nevirapine (nvp), Isoniazid (inh), Rifampicin+Isoniazid (rh), Rif/Isoniazid/PZA/Ethambutol (rhze), Rifampicin (rifampicin), Zidovudine (azt), Pyrazinamide (pza), Streptomycin (str), Bactrim (bac), Lamivudine/Zidovudine (lamzid), Ritonavir (rito), Kanamycin (kan), didanosine (ddi) and Ethambutol (Etham). This design makes it difficult to discern TB or HIV drug stock-outs with certainty. The indicator reporting specifically on TB drug stock-outs is dramatically lower than the results for "Any ART/TB drug" and this is inferred to be an unreliable sub-set of the data, given that the data collection tool did not provide for separate collection of "Any TB drugs" and "Any ARV drugs". For this reason, the comparison with the DHIS focused on the "Any ART/TB drug stock out rate". Table 1 provides a comparison of the Stop Stock Outs Survey and the DHIS relevant to consider for the indicators "Any ART/TB drug stock out rate" and "Any TB drug stock out rate" respectively.

Table 1: Comparison between National Stock Out Survey and the DHIS

Stop Stock Outs Survey	DHIS
Survey data collected from telephonic interviews from September to October 2013. Data were available November 2013, post-report publication.	Data were collected routinely and collated annually but available monthly at facility level and can be aggregated to all levels. Data were extracted for financial years 2011 to 2013. Time lag for availability of national dataset is two to three months.
Sampling frame is limited to completeness of the list of facilities used and response rate of facilities contacted.[a] The number of facilities providing information for this survey was 2 139. Survey data were not obtained from facilities in Frances Baard District Municipality due to poor response rates. Uses approximations and subject to recall bias.	Covers all primary healthcare facilities (primarily public sector). Dataset may be affected by incomplete reporting (data element not activated for particular facilities) or by periodic missing or incorrect values for the stock-out data element.
Data are categorised into depot, sub-depot, hospital, and other (primary health facility, central packaging unit, direct supply).	Focuses on PHC across the 52 districts and nine provinces of South Africa.
Includes indicator values where the numerator is divided by the total number of facilities in each district that were contactable and agreed to answer the survey questions.	Includes indicator values where the numerator is divided by all fixed facilities reporting on that element.
Collects data on the number of stock-outs of ART and TB drugs categorised into: d4t;efv; 3tc; tdf; abc; lop/rit; fdc; truvada; nvp; inh; rh; rhze; rifampicin; azt; pza; str; bac; lamzid; rito; all drugs; kan; ddi; etham	Collects data on stock-outs through indicators; Any ARV drug stock-out rate, Any TB drug stock-out rate and Tracer items stock-out rate.

Stock-outs at provincial level

Drug stock-outs have affected all nine provinces, with Limpopo, Mpumalanga and the Free State being hit the hardest, according to the stock-outs survey.[2] The Free State leads with more than half of health facilities reporting drug stock-outs.[2] In January 2013, 53% of the clinics and hospitals serving the OR Tambo District of the Eastern Cape experienced ARV or TB drug stock-outs, including fixed-dose combination (FDC) ARVs.[6] Reports from non-government organisations indicated the severity of the drug stock-outs in the Eastern Cape, specifically in the Mthatha area, for the period March 2013 to May 2013, pointing to staff shortages, limited management capacity and procurement issues ultimately leading to drugs not being dispensed to patients.[10]

This section highlights the provincial picture from DHIS data during the 2010/11, 2011/12 and 2012/13 financial years and from the Stop Stock Outs Report for the period September to October 2013. Stock-outs during 2010/11 are of interest when considering the impact of medicine availability on TB treatment outcomes (latest treatment outcome data for 2011 at time of analysis). However, to compare routine data with the survey, the 2012/13 financial year was used, as it covers the period of the survey. Recent trends in stock control are also important to monitor, since they will contribute to future TB treatment

a "No response" was recorded for health facilities that were called a minimum of four times if they were unreachable on the first call.

outcomes. The methodology used to collect data on stock-outs is, however, quite different between the sources, as discussed in the previous section. In addition, the survey appears to systematically under-report on TB stock-outs (since data entry allowed for only a single type of TB and ART drug at a time), so further comparisons consider primarily the "Any ART/TB drug stock out rate".

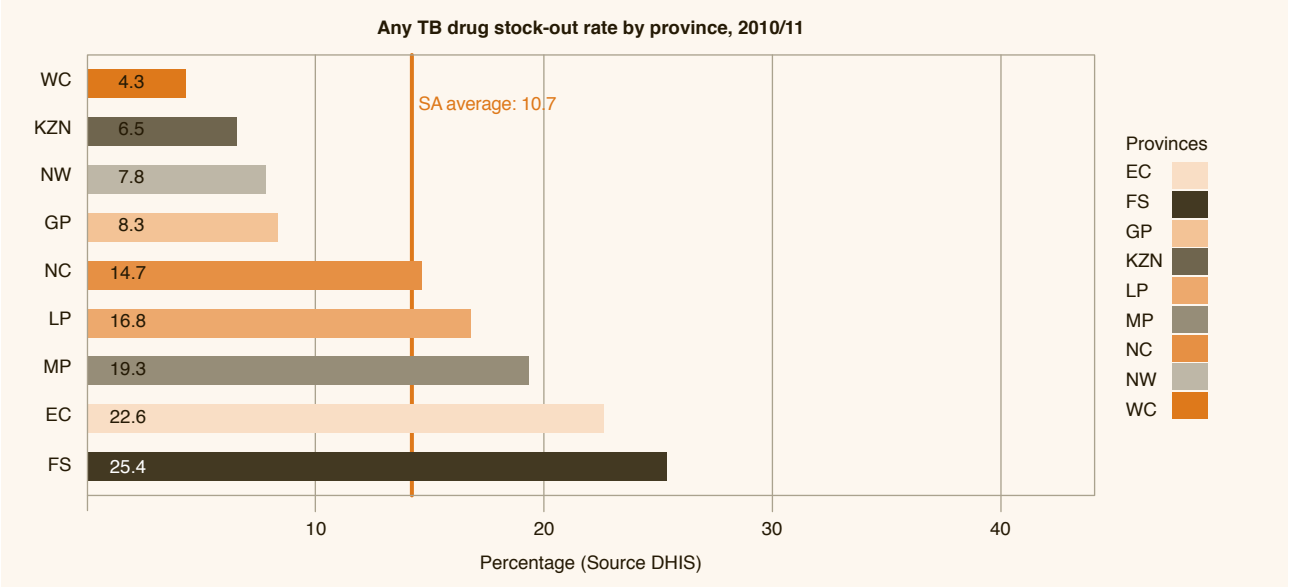
The TB drug stock-out rate (DHIS) has decreased from 2010/11 to 2012/13, although Limpopo Province (LP) and the North West (NW) have their highest TB drug stock-out rate in 2012/13 (Table 2). Changes in the number of fixed facilities reporting during any of the financial years may have impact on the stock-out rate. The Stop Stock Outs report indicates that LP (5.0%), Northern Cape (NC) and Free State (FS) (4.8%) and Eastern Cape (EC) (4.0%) were the provinces that had the highest stock-out rate of any TB drug. When considering any ART/TB drug stock-out rates – which seem to offer a more robust measure of stock problems – extremely high rates were found in FS (53.9%), LP (40.8%) and MP (25.9%).

Table 2: "Any TB drug stock-out rate" (2010/11–2012/13) and "Any ART/TB" – Stop Stock Outs Survey (2013) by province

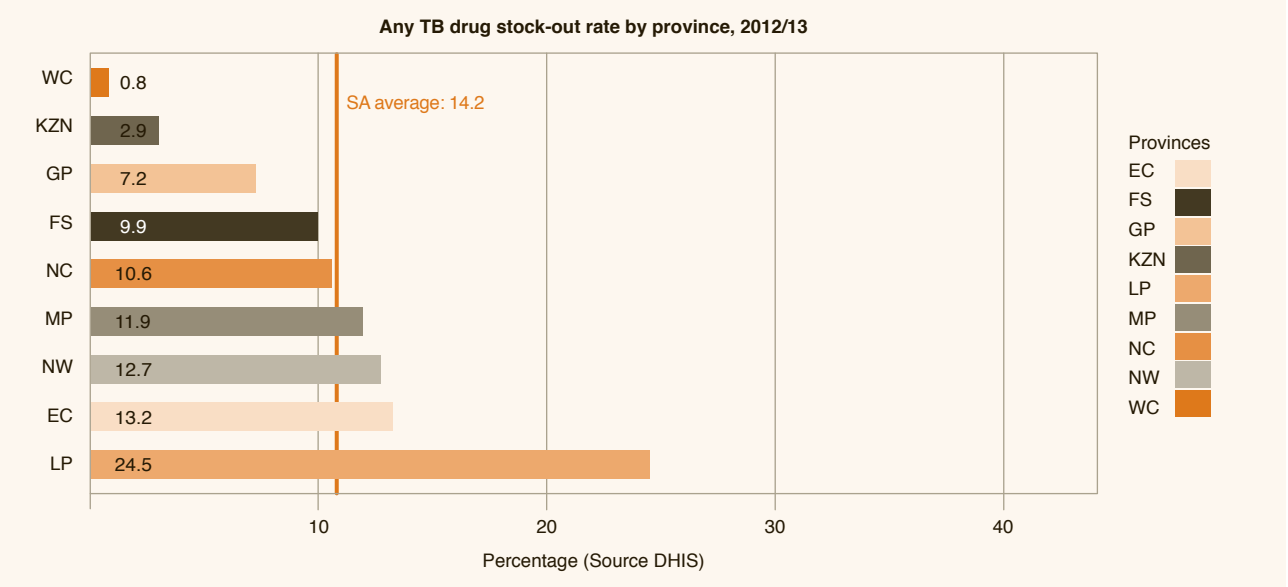
Province	DHIS (Any TB drug)			Survey (Any TB drug)	Survey (Any ART/TB drug)
	FY 2010/11	FY 2011/12	FY 2012/13	2013	2013
EC	22.6	10.0	13.2	4	19.9
FS	25.4	8.7	9.9	4.8	53.9
GP	8.3	4.6	7.2	2.1	20.4
KZN	6.5	3.7	2.9	1.5	13.6
LP	16.8	9.3	24.5	5.0	40.8
MP	19.3	8.4	11.9	1.3	25.9
NC	14.7	24.3	10.6	4.8	17.7
NW	7.8	9.3	12.7	0.5	4.4
WC	4.3	0.9	0.8	2.2	4.9
SA	14.2	7.9	10.8	3.2	21.5

Source: DHIS and Stop Stock Outs Survey, 2013.

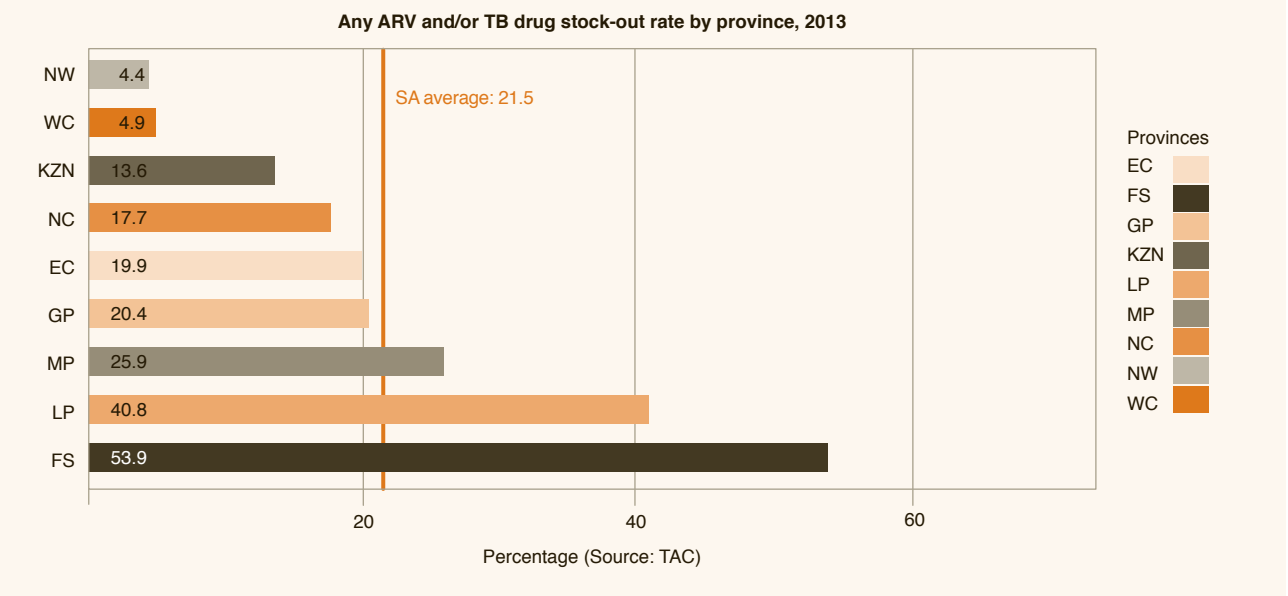
Figure 2: Ranking of provincial stock-out rates for "Any TB drug" (2010/11, 2012/13) and "Any ART/TB drug" (2013 survey)



Source: DHIS.



Source: DHIS.



Source: Stop Stock Outs Survey, 2013.

Drug stock-outs at the district level

This section highlights the district variation in drug stock-outs from DHIS data (2010/11 and 2012/13) and from the Stop Stock Outs Report for the period September and October 2013.

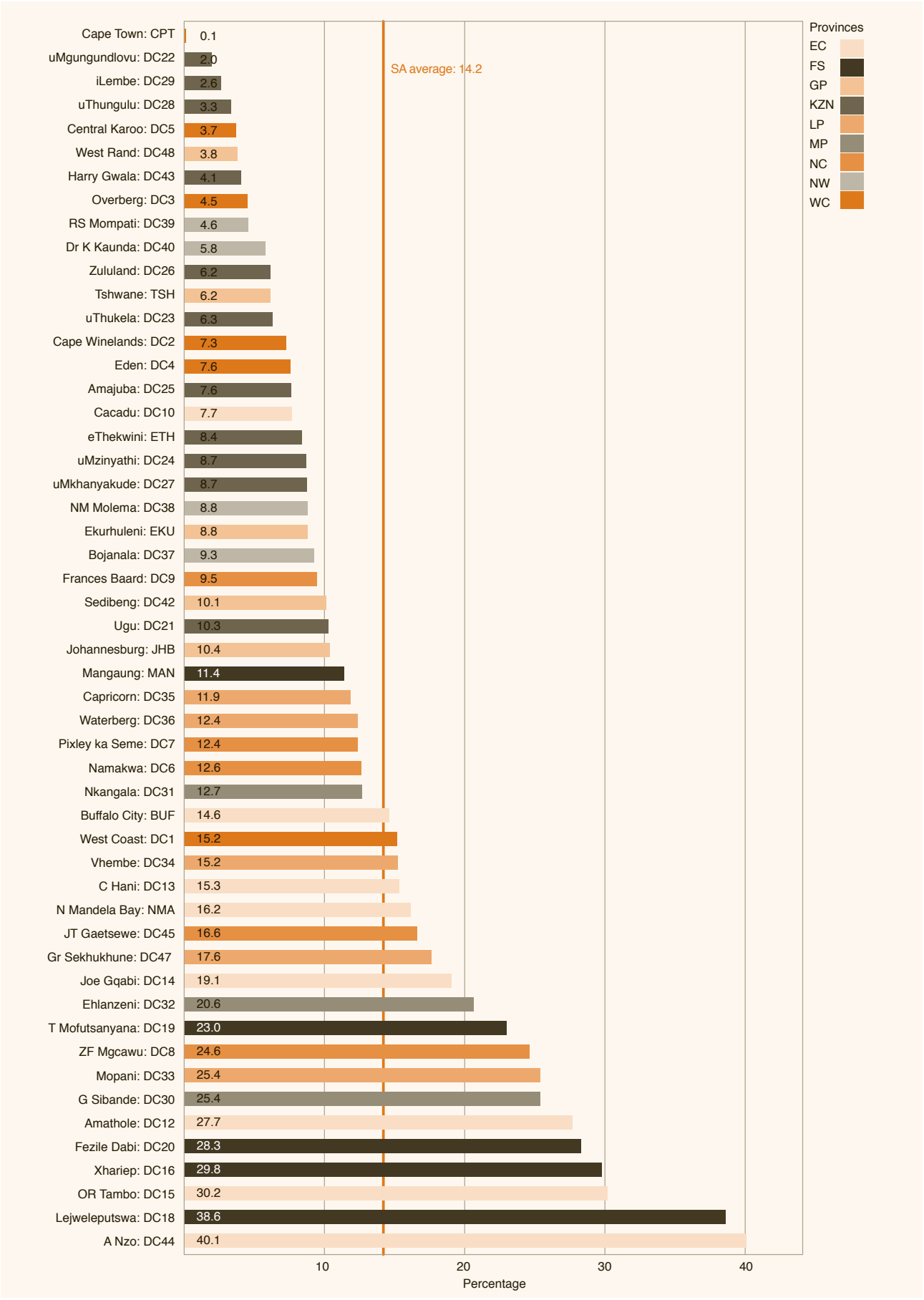
During 2010/11, 37% (19/52) districts had a stock-out of any TB drug above the national average of 14.2% (Figure 3). Four of the 10 districts with the highest stock-outs were located in the Free State (Lejweleputswa, Xhariep, Fezile Dabi and Thabo Mofutsanyana). Seven out of eight districts in the Eastern Cape had a stock-out rate above the national average.

During 2012/13, all five of Limpopo's districts fall within the top 10 districts with a stock-out rate above the national average, with a very high rate of 41.1% in National Health Insurance pilot site Vhembe (Figure 4). Other districts with a high stock-out rate are Joe Gqabi (23.0%) and OR Tambo (22.5%) in the Eastern Cape. The greatest increase in reported stock-outs between 2010/11 and 2012/13 was in Vhembe (25.9 percentage points). All districts in North West had a worsened rate in 2012/13. According to the DHIS data, the stock-out rates improved quite substantially in most Eastern Cape districts and in all districts of the Free State, notably Xhariep, Fezile Dabi and Lejweleputswa (22.6, 22.4 and 19.2 percentage points reduction respectively).

The 2013 stock-out survey showed that 21.5% of facilities surveyed had stock-outs of any ARV or TB drug, with a wide range at district level from no stock-outs to over 50% in five districts, of which three were in the Free State (Figure 5).

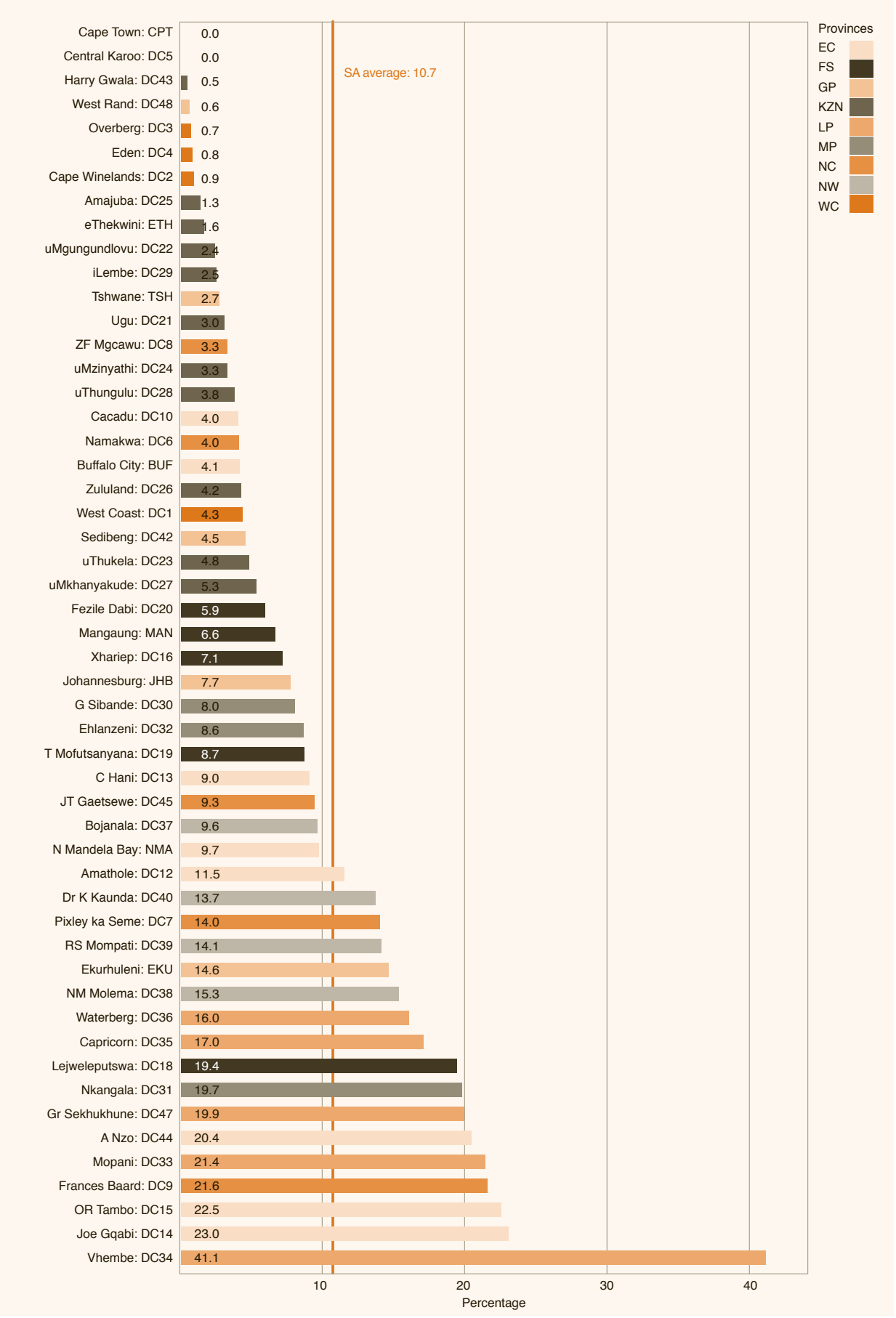
Maps of these indicators, with the intervals set to common ranges, highlight problem areas and where there are both differences and similarities over time and between the data sources (Map 1).

Figure 3: Any TB drug stock-out rate by district, 2010/11



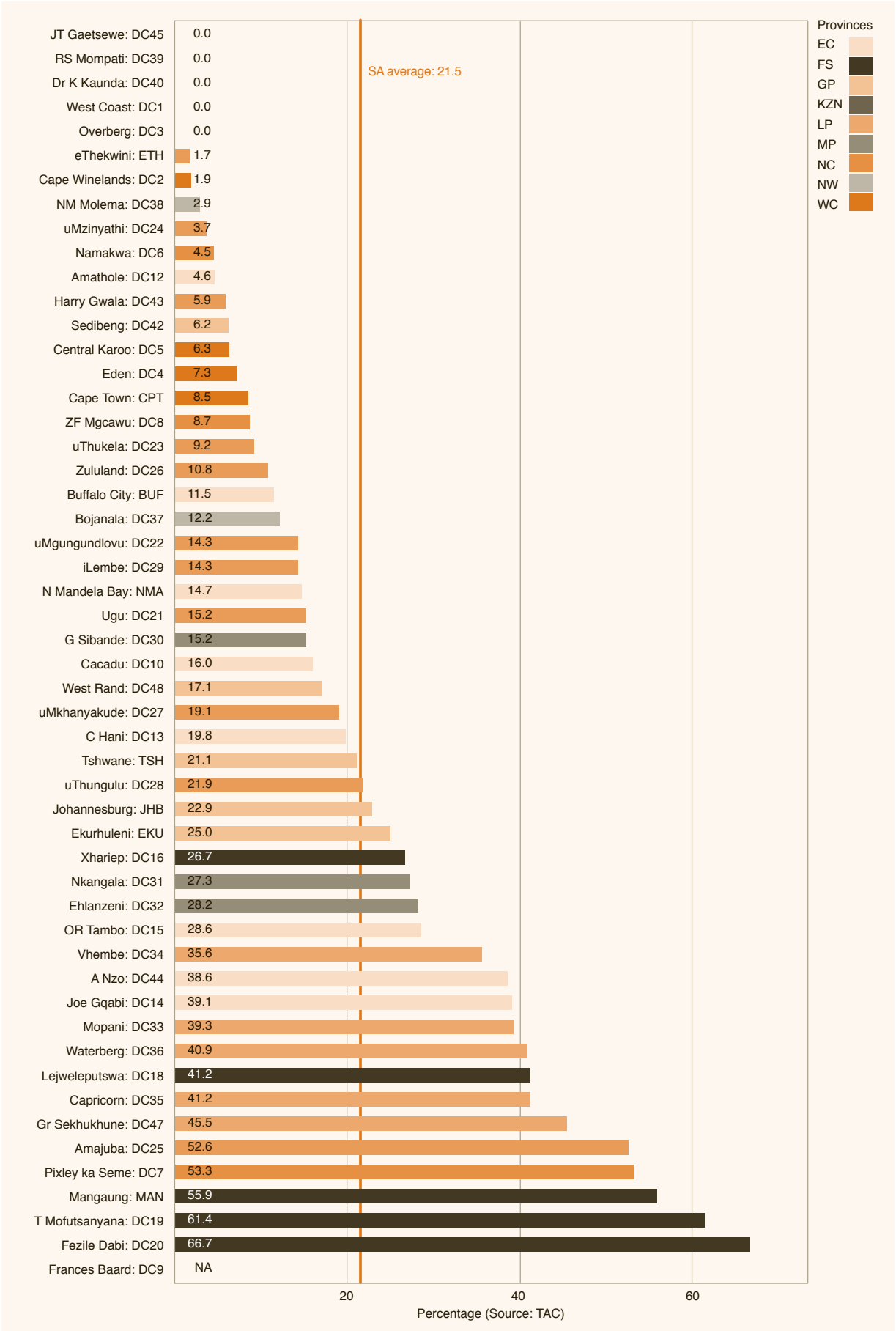
Source: DHIS.

Figure 4: Any TB drug stock-out rate by district, 2012/13



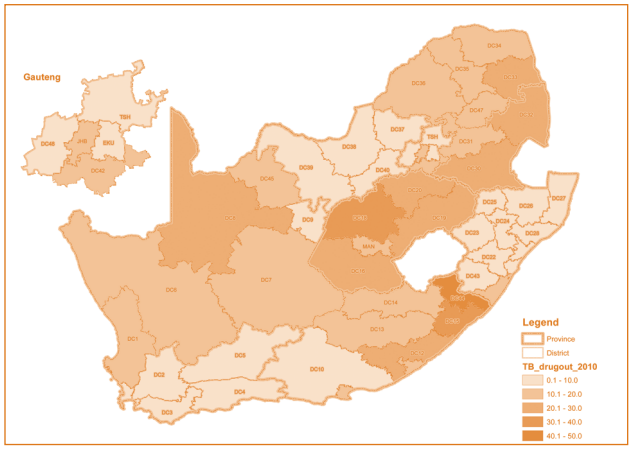
Source: DHIS.

Figure 5: Any ARV/TB drug stock-out rate by district, 2013

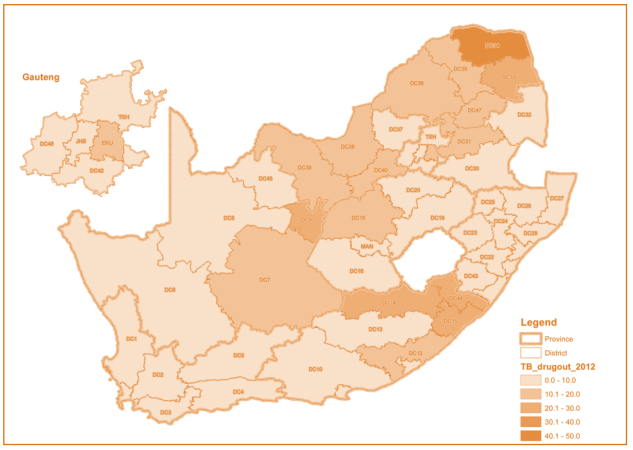


Source: Stop Stock Outs Survey, 2013.

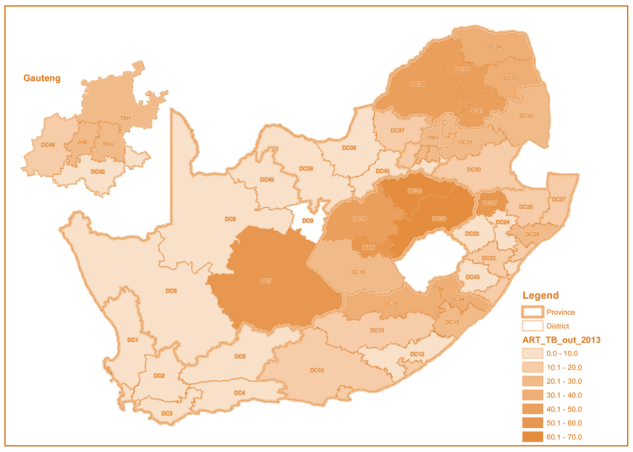
Map 1: Any TB drug stock-out 2010/11, 2012/13 and any ART/TB drug stock-out 2013 (survey)



Source: DHIS.



Source: DHIS.



Source: Stop Stock Outs Survey, 2013.

Comparison with DHIS and Stop Stock Out data

The scatterplot (Figure 6) indicates a positive correlation between the DHIS "Any TB drug stock-out rate" and the Stop Stock Outs ARV/TB indicator. However, the correlation between the 2010/11 data was somewhat stronger with the 2012/13 data.

Figure 6: Scatterplot of any TB stock-out rate (DHIS 2010/11 and 2012/13) and survey stock-out rates 2013 (any TB, any ART/TB drug) by district

Table 3: DHIS and Stop Stock Outs Survey data by district, 2010/11–2012/13 and 2013

		Any TB drug stock out rate (DHIS)			Any ART/TB drug (Survey)	Any TB drug (Survey)
Province	District	FY 2011	FY 2012	FY 2013	2013	2013
EC	A Nzo: DC44	40.1	10.8	20.4	38.6	1.8
	Amathole: DC12	27.7	12.7	11.5	4.6	2.3
	Buffalo City: BUF	14.6	3.9	4.1	11.5	1.9
	C Hani: DC13	15.3	6.9	9.0	19.8	2.8
	Cacadu: DC10	7.7	3.0	4.0	16.0	3.8
	Joe Gqabi: DC14	19.1	9.5	23.0	39.1	8.7
	N Mandela Bay: NMA	16.2	6.0	9.7	14.7	2.9
	OR Tambo: DC15	30.2	17.7	22.5	28.6	11.1
FS	Fezile Dabi: DC20	28.3	12.9	5.9	66.7	0.0
	Lejweleputswa: DC18	38.6	11.6	19.4	41.2	5.9
	Mangaung: MAN	11.4	8.9	6.6	55.9	8.8
	T Mofutsanyana: DC19	23.0	6.1	8.7	61.4	7.0
	Xhariep: DC16	29.8	3.6	7.1	26.7	0.0
GP	Ekurhuleni: EKU	8.8	7.6	14.6	25.0	4.6
	Johannesburg: JHB	10.4	5.5	7.7	22.9	0.0
	Sedibeng: DC42	10.1	2.3	4.5	6.3	0.0
	Tshwane: TSH	6.2	1.9	2.7	21.1	5.3
	West Rand: DC48	3.8	2.8	0.6	17.1	0.0
KZN	Amajuba: DC25	7.6	1.3	1.3	52.6	5.3
	eThekwini: ETH	8.4	3.8	1.6	1.7	1.7
	iLembe: DC29	2.6	1.6	2.5	14.3	0.0
	Harry Gwala: DC43	4.1	1.6	0.5	5.9	0.0
	Ugu: DC21	10.3	2.2	3.0	15.2	0.0
	uMgungundlovu: DC22	2.0	1.0	2.4	14.3	0.0
	uMkhanyakude: DC27	8.7	13.2	5.3	19.1	4.8
	uMzinyathi: DC24	8.7	3.6	3.3	3.7	0.0
	uThukela: DC23	6.3	1.4	4.8	9.2	0.0
	uThungulu: DC28	3.3	2.2	3.8	21.9	17.1
	Zululand: DC26	6.2	4.9	4.2	10.8	0.0
LP	Capricorn: DC35	11.9	6.9	17.0	41.2	10.4
	Gr Sekhukhune: DC47	17.6	13.1	19.9	45.5	5.5
	Mopani: DC33	25.4	12.9	21.4	39.3	0.0
	Vhembe: DC34	15.2	5.4	41.1	35.6	0.0
	Waterberg: DC36	12.4	9.4	16.0	40.9	4.5
MP	Ehlanzeni: DC32	20.6	9.7	8.6	28.2	1.0
	G Sibande: DC30	25.4	5.7	8.0	15.2	0.0
	Nkangala: DC31	12.7	8.7	19.7	27.3	2.3
NC	Frances Baard: DC9	9.5	44.3	21.6		
	JT Gaetsewe: DC45	16.6	21.8	9.3	0.0	0.0
	Namakwa: DC6	12.6	17.6	4.0	4.5	0.0
	Pixley ka Seme: DC7	12.4	27.5	14.0	53.3	13.3
	ZF Mgcawu: DC8	24.6	8.7	3.3	8.7	4.3
NW	Bojanala: DC37	9.3	12.9	9.6	12.2	2.0
	Dr K Kaunda: DC40	5.8	4.4	13.7	0.0	0.0
	NM Molema: DC38	8.8	9.0	15.3	2.9	0.0
	RS Mompati: DC39	4.6	5.5	14.1	0.0	0.0

		Any TB drug stock out rate (DHIS)			Any ART/TB drug (Survey)	Any TB drug (Survey)
Province	District	FY 2011	FY 2012	FY 2013	2013	2013
WC	Cape Town: CPT	0.1	0.2		8.5	5.6
	Cape Winelands: DC2	7.3	0.5	0.9	1.9	0.0
	Central Karoo: DC5	3.7	0.9		6.3	0.0
	Eden: DC4	7.6		0.8	7.3	2.4
	Overberg: DC3	4.5		0.7	0.0	0.0
	West Coast: DC1	15.2	7.1	4.3	0.0	0.0
SA		14.2	7.9	10.8	21.5	3.2

Note: No data for Cape Town and Central Karoo in 2012/13 (DHIS), which may be zero or missing. No data were recorded for Frances Baard in the survey.

Table 4: Ten worst-performing districts in relation to TB or ART/TB stock-outs

Rank	Any TB drug stock out (DHIS 2012/13)	%	Any ART/TB drug stock out (Survey 2013)	%
1	Vhembe: DC34	41.1	Fezile Dabi: DC20	66.7
2	Joe Gqabi: DC14	23.0	T Mofutsanyana: DC19	61.4
3	OR Tambo: DC15	22.5	Mangaung: MAN	55.9
4	Frances Baard: DC9	21.6	Pixley ka Seme: DC7	53.3
5	Mopani: DC33	21.4	Amajuba: DC25	52.6
6	A Nzo: DC44	20.4	Gr Sekhukhune: DC47	45.5
7	Gr Sekhukhune: DC47	19.9	Lejweleputswa: DC18	41.2
8	Nkangala: DC31	19.7	Capricorn: DC35	41.2
9	Lejweleputswa: DC18	19.4	Waterberg: DC36	40.9
10	Capricorn: DC35	17.0	Mopani: DC33	39.3

Note: No data were recorded for Frances Baard in the survey.

Table 5: Ten best-performing districts in relation to TB or ART/TB stock-outs

Rank	Any TB drug stock out (DHIS 2012/13)	%	Any ART/TB drug stock out (Survey 2013)	%
1	Harry Gwala: DC43	0.5	JT Gaetsewe: DC45	0
2	West Rand: DC48	0.6	Dr K Kaunda: DC40	0
3	Overberg: DC3	0.7	RS Mompati: DC39	0
4	Eden: DC4	0.8	Overberg: DC3	0
5	Cape Winelands: DC2	0.9	West Coast: DC1	0
6	Amajuba: DC25	1.3	eThekwini: ETH	1.7
7	eThekwini: ETH	1.6	Cape Winelands: DC2	1.9
8	uMgungundlovu: DC22	2.4	NM Molema: DC38	2.9
9	iLembe: DC29	2.5	uMzinyathi: DC24	3.7
10	Tshwane: TSH	2.7	Namakwa: DC6	4.5

Note: No data for Cape Town and Central Karoo (DHIS), which may be zero or missing. No data were recorded for Frances Baard in the survey.

Four districts (Mopani and Gr Sekhukhune in LP, Lejweleputswa in FS and Capricorn in LP) appear in the worst 10 districts for stock-outs, according to both the DHIS and survey sources as highlighted in Table 4. When considering the best-performing districts (excluding those for which there were no data), eThekwini (KZN), Cape Winelands and Overberg (WC) appeared in the best 10 as indicated in Table 5.

Relationship between TB outcomes and drug supply

The 2010/11 DHIS "Any TB drug stock out rate" was used as the variable to compare with TB treatment outcomes (all types of susceptible TB) from ETR.Net in 2011.

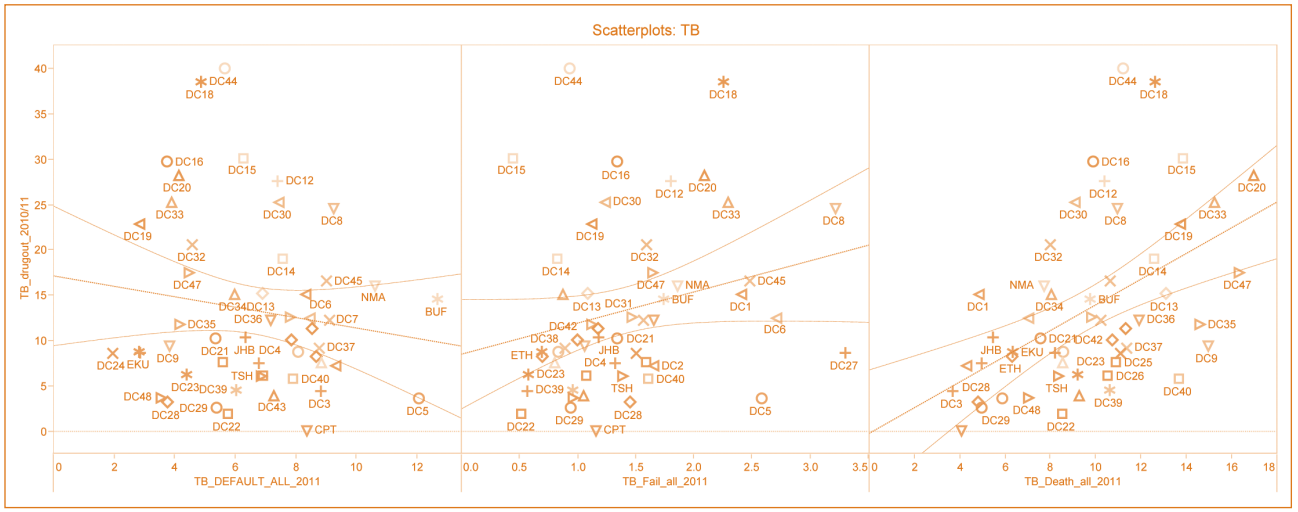
There is no linear relationship between TB stock-outs and TB treatment success (Figure 7). There is no clear relationship with defaulter rates, and a weak positive relationship between higher failure rates and higher stock-outs. However, there is a clear linear association between any TB drug stock-outs (DHIS) 2010/11 and ETR.Net TB outcome data, death (r= 0.5). This suggests that reducing stock-outs of TB drugs may be one factor that will reduce TB mortality rates in districts where death rates are high.

Stock-outs are only recorded for PHC facilities. Although there is a wide distribution of values, a tendency for higher death rates with higher stock-outs is evident. At district level, the relationship between stock-outs and the TB death rate in PHC facilities remains similar, which is not surprising since around 85% of treatment outcomes are at PHC level. There are a few districts where the death rates decline by more than five percentage points when filtered for only PHC facilities (OR Tambo, Fezile Dabi and Gr Sekhukhune), but at national level, the TB death rate only shifts from 8.6% (all TB, all levels of care) to 7.1% (treatment outcomes in PHC facilities).

Figure 7: Scatterplot of any TB drug stock-out rate and TB treatment success (all TB) by district, 2011

Source: DHIS and ETR.Net.

Figure 8: Scatterplot of any TB drug stock-out rate and TB defaulter, treatment failure and death rates (all TB) by district, 2011



Source: DHIS and ETR.Net.

Conclusion

The World Health Organization indicates the importance of ensuring patients' access to essential medicines and health products that they need.[11] This chapter confirms that there are indeed challenges to accessing TB drugs, which compromise patient health and increase the risk of patient mortality. Although the extent and location of stock-outs vary considerably over time and between the available data sources, it is clear that substantial stock issues prevail in several districts. The barriers, however, are multi-dimensional and there is a need to conduct more research using existing information to determine the impact of drug stock-outs on TB outcomes.

The National Drug Policy of 1996 indicated that standard operating procedures (SOPs) will be developed with practical guidelines to cover all administrative procedures to effectively manage and control the storage and distribution of drugs and medical supplies, including methods to define minimum and maximum stock levels;[12] however, this chapter points to the need for SOPs to be reviewed and revised, and for the development of guidelines to prevent stock shortages.

The routine information system (DHIS) to monitor drug stock-outs across health facilities in all districts of South Africa should be strengthened and attention should be paid to improving the data quality of stock-out indicators. Greater use of the available data for research and monitoring of health system performance will help to improve data quality. There is also value in repeating surveys related to stock-outs, although the methodology and rigour of such surveys should also be improved. Greater integration of data sources will enable analysis that policymakers can use to assess the adoption of strategies, identify systemic barriers and develop implementation strategies that speak to this public health concern.

Acknowledgements

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16

Lean Management in the South African public health sector: a case study

Author:

Jessica Price[i]

Emerging Public Health Practitioner Award

The public hospital sector in South Africa services 80% of the patients across the country with limited resources. Complaints about the quality of care are common, relating not only to the actual medical services offered, but also to those factors which have a direct impact on the patient experience of the facility. Debates around the optimisation of resources and matching of patient load with resource availability are not new in the South African context. However, more recently, the "Lean Management" method has been used effectively across the globe to improve the patient experience without necessarily investing additional financial resources.

This chapter gives an account of one relatively modest but effective intervention in an orthopaedic outpatient clinic at the New Somerset Hospital (NSH) in Cape Town in 2013. This project aimed to reduce patient waiting times in the clinic, and improve patient satisfaction. Four key interventions were piloted, including new X-ray forms, additional signage, a new numbering system of patients and staggering of patient appointments. Initial results showed a 39.4% reduction in patient waiting time. At three-month follow-up, an 18.2% reduction in waiting time had been sustained. The key Lean methodology variable was the ratio of "non-value-added:value-add time". This ratio improved from 5.76 at baseline to 3.76 in the short term and 3.45 at three-month follow-up. Qualitative data indicated that both patients and staff were more satisfied with the system.

This project added to the growing evidence of the potential for Lean Management in health care and has demonstrated the potential to achieve significant improvements in efficiency without additional resource investment.

The Lean Management method has been used effectively across the globe to improve the patient experience without necessarily investing additional financial resources.

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Introduction

The public hospital sector in South Africa services 80% of the patients across the country with limited resources. Complaints about the quality of care are common, relating not only to the actual medical services offered, but also to those factors that have a direct impact on the patient experience of the facility. Such factors include waiting times, staff attitudes, drug shortages, unreliable services, and navigation of the process. Often the problem is principally the shortage of resources, but management of resources is frequently suboptimal.

The themes of optimisation of resources and matching of patient load with resource availability are not new debates in the South African context. However, more recently, the "Lean Management" method has been used effectively across the globe to improve the patient experience without necessarily investing additional financial resources. It is for this reason that the principles of Lean Management should be of keen interest to practitioners, planners and all those committed to improving the quality of the public health service in the country. This chapter gives an account of one relatively modest but effective intervention in an orthopaedic outpatient clinic at the New Somerset Hospital (NSH) in Cape Town. Based on Lean principles – and without the addition of any further funding – the intervention achieved between 18% and 39% reduction in patient waiting times and improved staff and patient satisfaction, on the strength of a consensual commitment by all the key role-players and stakeholders in the hospital.

Since the principles of Lean Management are unfamiliar to many in the South African healthcare arena, this chapter begins with a brief outline of the origins and substance of this body of management theory.

Lean Management

Lean thinking originated in the corporate sector. First described by Ohno in the running of the Toyota motor vehicle company in Japan, Lean refers to a management style centred on the elimination of wasteful blockages in system flows – be they of people or of products. The Toyota understanding of Lean is as a toolset, management style and philosophy that come to define a company culture as a Lean culture.[1] Ohno noted that:

> all we are doing is looking at the timeline from the moment a customer gives us an order to the point when we collect the cash. And we are reducing that timeline by removing the non-value-added wastes.[1]

This quote highlights a focus on improving efficiency by removing all elements of the process that do not add value to the final product, rather than by hastening constructive activities. For all the apparent obviousness of the Lean principle, the tendency in health care has been to do the opposite; for example, as patient loads increase, doctors cut consultation time (a valuable activity) rather than consider ways to reduce patient waiting time (an example of waste).

This basic Lean principle – that systems could become vastly more efficient by removing "non-value-added waste" – has since been applied and advocated beyond the industrial assembly line, including in the field of healthcare provision. Kitch et al. suggest that Lean health care is:

> a methodology to organise complex processes to get the right patient to the right place for the right treatment at the right time.[2]

This is achieved using the five principles of Lean thinking, as outlined by Hobson:

- Specify value
- Identify all steps in the value stream and eliminate all steps that do not add value
- Appropriately sequence the value-adding steps so the services flow smoothly for the customer (patient)
- Allow customers (patients) to pull value from the next upstream activity
- Pursue perfection through continuous improvement.[3]

Value and Waste

As already noted above, a primary aim of Lean Management is to maximise value and reduce waste. However, the understanding of "value" and "waste" are unique in a Lean setting. "Value" is best understood as being anything for which a customer is willing to pay money. This is more difficult to apply in the public health sector, where patients are not required to pay for health services. Therefore in the latter context, "value" could be represented as those services for which a patient is willing to wait. In a hospital setting, examples of value may include a consultation with a doctor, radiological imaging, or a surgical procedure.

As such, "waste" is therefore best understood as those processes, or parts of processes, that do not move a patient closer to being cured or discharged, and therefore do not add value.[1] Typically, value and waste are both defined from the perspective of the patient/customer. However, if interventions were designed to assist staff, the staff member would become the customer and so would also be considered in the understanding of value and waste.

It is also worth distinguishing between necessary non-value-added activities and unnecessary non-value-added activities (or waste). Necessary non-value-added activities do not contribute value directly to the customer/patient, but they are required to assist in the administration and effective functioning of the company/hospital and to improve communication. A typical example of such an activity in health systems is that of opening new patient folders (or retrieving old patient records). A patient would not be prepared to pay to have a new folder opened, but patient care is improved by having a record of previous visits and all doctors' notes in a single place for future consultations. Therefore, opening a new patient folder is a necessary non-value-added activity.[1] Most interventions aim to eliminate waste rather than focus on necessary non-value-added activities.

Eight different types of waste have been identified; Table 1 includes examples of each type of waste that are typically apparent in health care.[1]

Table 1: Eight different kinds of waste

Waste	Examples
Errors	Mistakes such as the wrong identity number on file; patient given wrong medication
Duplication	Making several admission files for one patient
Queuing	Patients waiting at admission or for a bed in the ward; supplies in the store room waiting to be used
Resources	Wasting materials or equipment such as overstocked medication expiring on the shelf
Movement	Carrying files around the hospital; patients moving long distances between departments
Over-processing	Doing unnecessary work e.g. in the hospital laundry one person folds towels, only to have nurses unfold them and store them flat
Inspection	Double-checking because the task was not done right the first time
Human potential	Not making time for employees to formulate and implement improvement recommendations

Source: Graban, 2009.[1]

Flow through a system

Lean literature often describes "flow" using a visualisation of a river. The river flows smoothly unless there are rocks or obstacles in the way which impede its course.[1] Similarly, as patients move through a process, there may be obstructions that cause delays and backlogs. An aim of Lean efforts is to minimise these obstructions (wastes) so as to allow for smooth movement of the patient through the clinic process.[1,2]

Lean philosophy suggests that flow is optimised when one achieves "single-piece flow", i.e. where only one item reaches the next stage of the process at a time and therefore can be processed without delay.[1] This is based on a production line in which items move along a conveyor belt. Ideally only one item should reach the station at a time. Single-piece flow is obtained by creating smaller and smaller batches of product until ultimately the system functions on single-item batches. In healthcare, single-piece flow would be achieved if one patient at a time arrived at a service, and completed that step of the process just as the next patient arrived. While this may be ideal from a patient perspective (as patients would be attended to immediately), this may pose some problems for staff. For example, doctors would generally not support a system that might require them to wait idly for a patient to arrive (e.g. if patients run late or are delayed at a previous service), in favour of having a queue of patients waiting for them.[1] Reducing batch sizes of patients so as to have the least number of patients waiting as is practical would logically be an appropriate compromise. Appointment slots effectively batch patients: a single-appointment slot for all patients creates one large batch, whereas multiple appointment slots divide patients into multiple smaller batches.

Perhaps more importantly for clinics, at least when Lean Management is first being introduced, is to aim for a steady flow rather than single-piece flow. Avoiding large peaks in demands followed by lags ensures optimal use of resources, in that all resources available are being used consistently throughout the day. When flow is uneven, either increased resources are required to meet the peak demands (which then remain unused during lag periods), or significant delays are caused during peak periods. For example, if all patients arrive at 08h00, additional file clerks and computers are required to allow for increased processing of patients. However, by 10h00, these additional file clerks and computers are all unused as patient arrivals would have slowed dramatically. The file clerks cannot easily be reallocated to other jobs in the hospital, (as with laboratory staff who may face increased demand as the total number of patients move through the hospital process). They are therefore a wasted resource for the remaining hours of their shift. Unsteady flow creates a backlog at each step of the process, just as even flow reduces backlogs at all stages of the process.

Continuous improvement

No company or health facility is perfect. As noted by a group of Toyota executives, "no problem is [a] problem".[4] All projects need continuous re-evaluation and adjustment so as to continue to improve operations. The Lean Management theory recommends that the system should be designed to include mechanisms for continuous improvement. Moreover, staff at all levels should be empowered to suggest and make changes that they believe would improve the functioning of the team. Encouraging staff to take ownership of the project and adopt a Lean philosophy enables the creation of an environment in which staff feel vested in the success of the organisation and empowered to provide input rather than feeling indifferent towards or being wary of criticising operational functioning.

The Plan-Do-Check-Act (PDCA) Cycle is one suggested mechanism to encourage an attitude of continuous improvement. All activities should be reviewed, with problems identified, suggested changes planned and piloted, their impact checked and further changes made.

Lean Management in health care

Increasingly there is recognition of the potential role for Lean thinking in health care. Graban's *Lean Hospitals* makes the case that Lean is a method of assisting hospitals in providing quality patient care in the face of rising healthcare costs and increasing patient loads while also addressing and relieving staff frustrations.[1]

A growing body of evidence demonstrates the success of Lean thinking in improving health care. Flinders Hospital in South Australia and Great Ormond Street Children's Hospital in the United Kingdom call themselves Lean hospitals, signifying the integration of Lean thinking into the broader strategic planning of the hospitals.[5,6] Flinders Hospital's programme "redesigning care" started in 2003 and has resulted in reduced congestion, additional capacity (an extra 20 patients could be seen in the emergency department per day after 18 months), improved ward turnover, a restored capacity for elective surgery and an improvement in staff morale and

recruitment.[2] Many other hospitals have individual Lean departments or units.[3] In South Africa, Lean projects have been run in over 20 different health facilities. In 2003, hospice home care nursing used Lean Management to improve reimbursement processes by medical aids for medication distributed by homecare nurses. GF Jooste hospital in the Western Cape used Lean Management methodologies to improve flow between their casualty department and other wards, while a tertiary hospital in the Western Cape used Lean principles to reduce the waiting time at the outpatient pharmacy from four hours to less than one hour. Other projects have applied Lean Management principles to address problems with accessing patient records and opening new folders, pathology laboratory turnaround times, and medical supply chain issues.[a]

New Somerset Hospital – a case study

NSH is a secondary-level hospital in Greenpoint, Cape Town, servicing the Metro West District of the Cape Metropole, offering both inpatient and outpatient specialist services to a population exceeding 500 000 people.[7] The Hospital runs 30 specialist outpatient clinics each week. These clinics, while offering a valuable service, have experienced high levels of patient dissatisfaction, particularly in relation to long waiting times.[7] These problems are exacerbated in the Orthopaedics Outpatient Department (OOPD) clinics, which service between 40 and 70 patients at each clinic, many of whom are "walk-in" patients, i.e. they do not have a booked appointment on the ClinicCom[b] system. This project aimed to use Lean Management techniques to reduce patient waiting times by 10%, improve patient satisfaction (measured by a patient satisfaction survey), streamline patient flow and ease patients' movement through the OOPD process.

Methodology

This study was designed as a before-and-after intervention. A Lean Team including all major stakeholders in the OOPD process as well as hospital management conducted a situational analysis using Lean tools, including value stream maps, an A3 tool, root-cause analysis, fishbone diagrams and the "5 whys".[1] The PDCA cycle was used to develop, pilot and review interventions.

Four interventions were piloted:

i) New X-ray forms were issued enabling pre-ordering of X-rays for patients.

ii) Signs on reception windows, arrows on the floors, and posters giving clear directions to patients for navigating the OOPD process were installed.

iii) Patients were given numbered stickers in order of arrival at the hospital

iv) Staggered appointments were booked – patients were batched into three appointment times for each OOPD clinic. All patients were notified of their new appointment time via telephone.

Data were collected during January 2013, including two weeks prior to intervention and one week post-intervention. Medium-term follow-up was done at three months – data were collected from three OOPD clinics in May and June 2013.

The effects of the intervention were measured using timesheets to track patients through each stage of the OOPD process. Patient satisfaction surveys were used to gather qualitative data. Analysis was done using Microsoft Excel.

Key findings

Data were collected for close to 60% of patients attending OOPD during the study period. Results are analysed in terms of the three key areas:

- Reduction in patient waiting time
- Streamlining of patient load
- Improved patient and staff satisfaction

Reduction in patient waiting time

Baseline data suggested that the average clinic visit took four hours and 44 minutes. Of this, an average of three hours and 56 minutes was spent waiting, while the average time spent on value-added activities was only 41 minutes. This corresponded to a non-value-add:value-add ratio (NVA:VA) of 5.76 (i.e. for every unit of value-added time, patients waited for 5.76 units of time – see Table 2). The largest contributor to value-added time was the doctor's consultation.

Table 2: Summary of baseline, short- and medium-term results

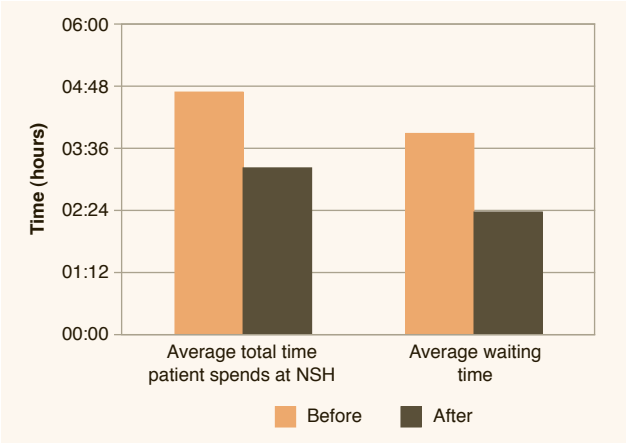
	Pre-intervention hrs:mins	Post-intervention hrs:mins	Percentage change (baseline to immediately post-intervention)	Medium-term results	Percentage change (baseline to medium-term)
Average total time at clinic	04:44	03:16	-31.0	04:01	-13.4
Average total waiting time	03:56	02:23	-39.4	03:13	-18.2
Average consultation duration	00:28	00:36	+28.6	00:56	+100
Non-value-add:value-add ratio	5.76	3.76	-	3.45	-

a Lean Projects in South Africa are described by Dr Zameer Brey in a Powerpoint presentation provided to the author. Understanding Patient Flow and Novel approaches to dealing with its challenges. 2012.

b ClinicCom is the computer system used at NSH (and many public healthcare facilities). It allows for basic patient information (demographic details, contact information, financial records) to be recalled and clinic appointments to be booked.

Immediately post-intervention, the total time spent at the clinic was reduced by 31%, while patient waiting time was reduced to only two hours and 23 minutes (a 39.4% reduction; see Table 2; Figure 1). The non-value-add:value-add ratio post-intervention was 3.76 (Table 2).

Figure 1: Patient times pre- and post-intervention



At medium-term follow-up, sustained improvements were seen in the reduction of total time at clinic (a reduction of 13.4%) as well as total waiting time (18.2%).

Figure 2 shows the initial process map highlighting each stage of the OOPD process. This can be compared to Figure 3 detailing the process post-intervention. Notable changes seen in Figure 3 that contributed significantly to the reduction in patient waiting time and increased "value" include:

- The pre-ordering of follow up X-rays resulting in the removal of the fourth step of the process (doctors screening the folders). This was associated with a reduction in waiting time from passing the nursing station to seeing the doctor for the consultation. Initially this took 161 minutes. This was reduced to 64 minutes.
- An increase in the average consultation duration from 28 minutes pre-intervention to 36 minutes post-intervention. Doctors reported that they experienced less pressure when there were fewer patient folders waiting at any point. They therefore felt able to spend slightly longer with each patient.

A reduction in waiting time improves the patient experience and the perceived quality of care offered. The recognition of patient time as valuable also represents a subtle but important change in staff attitudes towards patients. The current process design of the health system appears not only to prioritise the doctor's time over patients' time, but also to devalue patients' time in that there is very little understanding or flexibility in the system to accommodate patients' needs. For example, patients who arrive late at a clinic (or who nurses perceive to have arrived later than is acceptable) may be sent home and told to return on another day. Also, current process design requires patients to move backwards and forwards between departments rather than synchronising activities; outpatient department (OPD) clinics start when doctors finish ward work, and not at a set time. By designing systems that aim to minimise patient waiting time, one limits waste in other sectors; for example, patients are able to return to work earlier in the day. This is especially valuable in the case of OPD patients, where many patients are required to have follow up for chronic diseases, but are still actively employed (in contrast to in-patients, or those too ill to work).

Figure 2: Process map pre-intervention

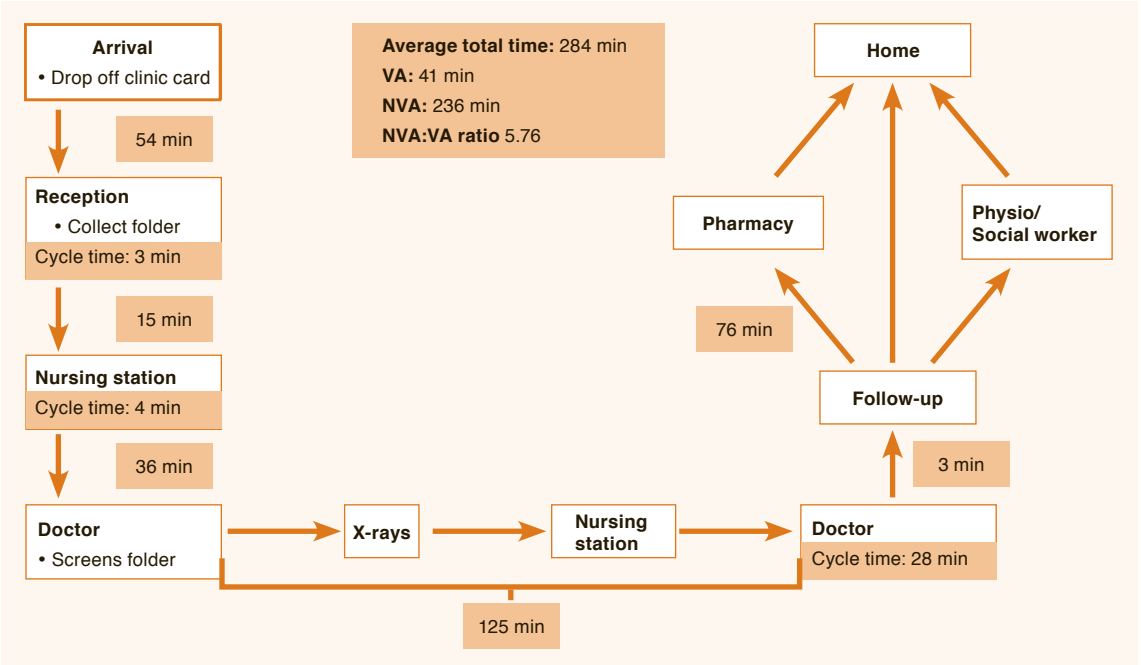
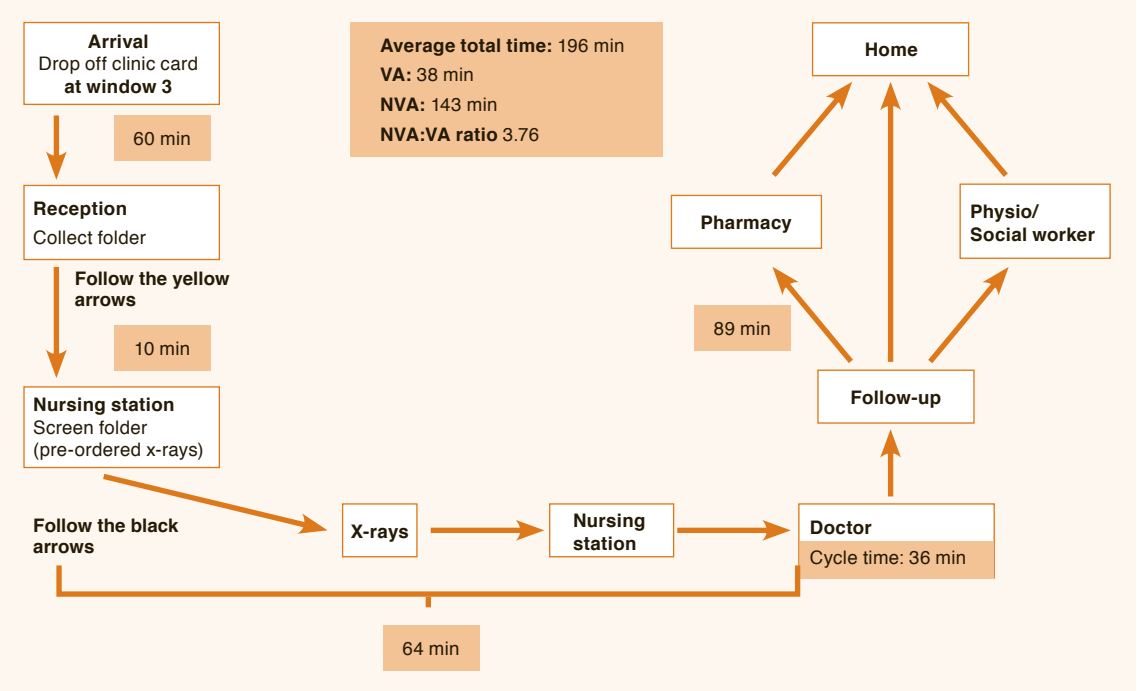


Figure 3: Process map post-intervention



By reducing patient waiting time, the total time spent at the clinic is also reduced. Patients are seen more quickly, which increases the capacity of the clinic. At NSH, using an average of 43 patients seen per clinic and a mere 13% reduction in total time at the facility would allow an additional five patients to be seen at each clinic. This would amount to an additional 550 patients per year, even with an increase in the average duration of the consultation (i.e. still maintaining value-added activities).

Streamlining patient load

Analysis of the patient load relative to the availability of doctors highlights the failure to match supply of staff with varying demand through the day. Figure 4 shows the number of patients arriving each hour pre- and post-intervention, as well as when the doctors arrive. Prior to the intervention, the majority of the patients arrived before 09h00 (dark grey bars), despite the fact that the doctors only arrive at 10h00. Following the introduction of staggered appointment slots, patients arrived more evenly, with fewer than 10 people arriving each hour, and fewer than five people waiting at the clinic at 08h00 (brown bars).

Figure 5 demonstrates the cumulative effect of patient arrivals. At baseline, patients continued to accumulate until 10h00, such that when the doctors arrived at the clinic there were already over 30 patients waiting to be seen. Post-intervention, fewer than 15 people were waiting to be seen at 10h00, a reduction of over 50%.

The reduction in cumulative patient load contributed to the effect seen in the process map in Figure 3, whereby doctors felt able to take an extra few minutes with patients in the consultation.

Other practical implications of the reduction in cumulative patient load relate to the availability of space – whereas prior to the intervention, seating was insufficient for the patient load, post-intervention all patients were accommodated comfortably in the waiting area. The pressure on wheelchairs and porters was also reduced with the streamlining of patient arrivals.

Challenges related to limited space, staff and equipment are commonplace in health facilities across the country. The findings from this study offer an alternate solution to ease this burden; for example, instead of ordering more wheelchairs or increasing seating, which would all be used in the morning and mostly stand vacant by the afternoon, one could better manage the flow of patients requiring those facilities so that demand were steady throughout the day.

Patient and staff satisfaction

Qualitative data collected from the patient satisfaction surveys prior to the intervention showed that 40% of people regarded waiting time as acceptable. This in itself was surprising, given that the average waiting time was close to four hours, and demonstrates patients' low expectations of the quality of service on offer. Nonetheless, this improved to 66% post-intervention. Patients' comments post-intervention included: "Today was a very efficient visit"; "Improved waiting time for folder" and "I think the new system can work". However, additional problems remained, with one patient noting that perhaps "patients should be notified telephonically of what to expect when they arrive".

At medium-term follow-up, there remained a definite improvement in people's experience of the system. Patients noticed a positive difference in the service, with one patient writing that "waiting time much less, even other patients mentioned it". However, some problems persist. Comment from a second patient noted that "the service is more efficient – however the appointment is at 8 am and doctors only arrived after 9 am". Another patient noted a long waiting period to receive a folder, although the patient commented that "the first time [I attended this clinic] I waited till after 14h00 and now I am leaving at 12h00".

Figure 4: Patient arrival versus doctor availability

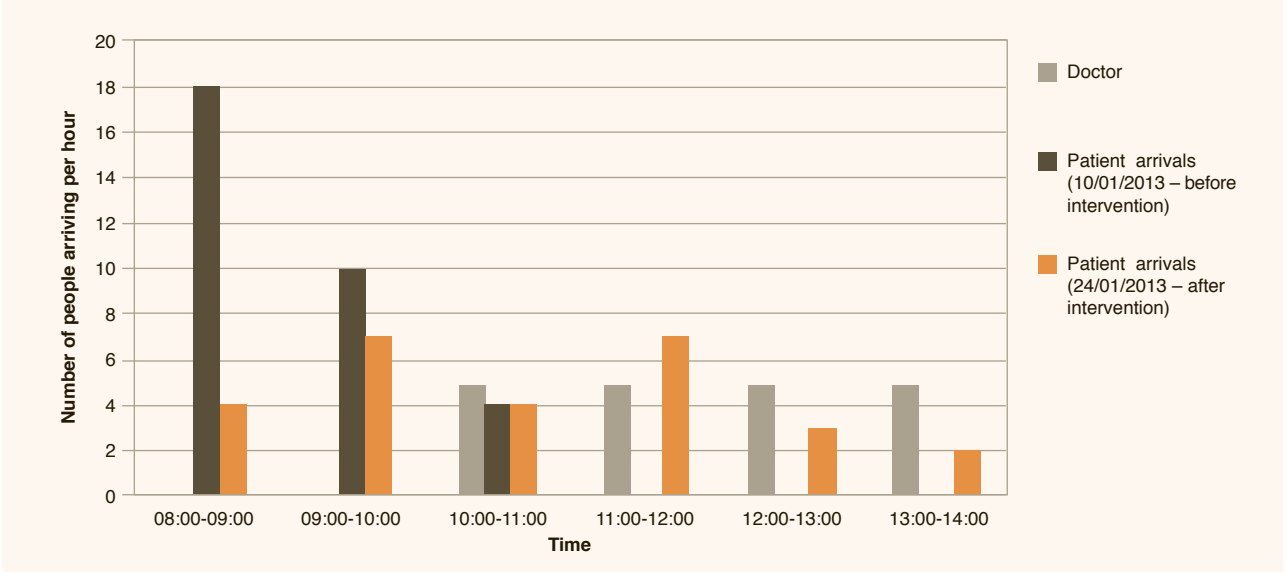
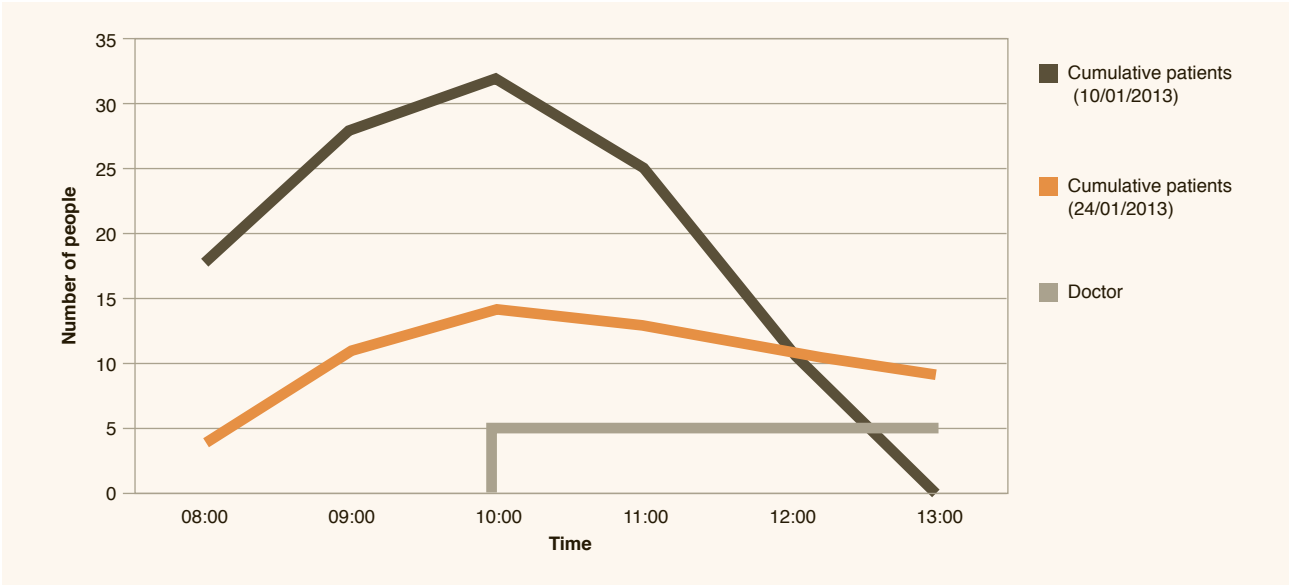


Figure 5: Patient load versus doctor availability



Staff feedback also indicated a general satisfaction with the interventions initiated in January. Those stationed in OPD felt that the clinic was less chaotic, and one nursing sister noted that "everyone has a seat now; before, people had to stand even with their crutches". The doctor in charge commented: "We are more efficient and therefore we can see more patients". The head administrator in reception noted that the staggered clinic appointments have helped to even the load in the mornings and that the staff were less stressed. He has continued to make improvements in the reception by changing the layout of the office. The communication between administrative staff, nursing staff and doctors has also improved; this was attributed to the regular team meetings, which are core to the Lean methodology of "Plan-Do-Check-Act".

In addition, there has been a change in staff attitude towards Lean Management as a set of tools to improve systems throughout the Hospital. The Lean Team staff members active on this project have since undertaken further projects at other OPD clinics and at inpatient services, using Lean methodology to address specific challenges.

Cost-effectiveness

This project was deemed cost-effective by the Hospital. Printing was the sole expenditure incurred in the study; all other changes were conducted with existing resources, although the Hospital did not have to bear the costs of a Lean consultant, as this role was fulfilled by the author. The only opportunity cost to the Hospital was the allocation of staff hours for the regular team meetings (which took them away from their regular responsibilities during those hours).

Conclusion

Public health care in South Africa faces many challenges, including a growing patient load and limited resources (e.g. funding, staff, equipment, bed space). Patients are required to spend many hours waiting for medical care, whether to see a healthcare professional, for special investigations or to receive medication. This project has contributed to the growing evidence of the potential for Lean Management to address such challenges in health care. The case demonstrates the potential for Lean methodologies to reduce waiting time in the OPD setting, which represents just one of the many examples of waste in the healthcare sector. Moreover, by reducing waste and maximising value-added activities, the quantity and quality of care provided are increased.

The findings also demonstrate that significant improvements in efficiency are possible, such that increased quantity and quality of care can be offered without additional resource investment. This is especially important in altering the mind-set of healthcare providers who typically assume that only an increase in resources can achieve an improvement in the quality and coverage of health services.

Recommendations

Lean Management has already been incorporated into some provincial and national health plans.[c] However, there is a paucity of published empirical evidence focusing on Lean projects within South Africa, which limits opportunities to share key learnings. Further research and implementation of Lean projects is recommended, with the recognition that such projects can be undertaken at all levels of care.

In addition, the following specific recommendations arise from this project:

- Signage: the value of clear signage to assist patients in finding their way around the hospital should not be underestimated. Numbering reception windows, or sticking colour-coded arrows on the floor to direct patients to different departments are simple, effective interventions.
- Staggering the appointment slots streamlines the patient load. This could easily be applied to other OPD clinics that are burdened with similar issues of long waiting times and an unsteady flow of patients throughout the day. Such an intervention would depart from current common practice, whereby all patients are told to arrive at the same time for an OPD clinic. Mechanisms to ensure that patients keep to their appointment slots should also be considered. For example, the reception staff may explain that folders will only be given to patients at the correct appointment time; this should establish a precedent that arriving early is disadvantageous. This message would be reinforced when patients experience the reduced waiting time at a later appointment slot.
- It is worth considering the establishment of a set start-time for OPD clinics. At NSH, clinics have suggested start-times. However, should a ward-round finish late, the clinic will start late, and similarly should a round finish early, the clinic may start early. Starting the clinic late has the clear disadvantage of increasing patient waiting time, and creating a backlog of patients as more and more arrive before consultations begin. However, starting clinics earlier than scheduled may also be undesirable, as this sets the precedent for patients to arrive very early in the morning, often well before their appointment time, in the hope that the clinic may start early. This also places pressure on reception staff, who must ensure that patients have folders and are ready to be seen should a doctor decide to arrive early. This adds to their workload at their busiest time (the early morning) only to have patients wait for the doctors in OPD.
- Based on the success of this project, its minimal cost and its value as a learning experience, it is recommended that further Lean projects be made available for both undergraduate and postgraduate students. This would facilitate cost-effective implementation of small Lean projects. Crucially, there are few opportunities that offer this sort of practical exposure to systems improvement, and yet almost all health professionals will work in a facility which could benefit from Lean Management in one way or another. The skills gained by students who participate in such projects would empower them to improve dysfunctional systems in their own workplace, rather than simply perpetuating the problems and waiting for management or the Department of Health to provide a solution.

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c e.g. 2020 Strategic Framework for health care in the Western Cape includes a focus on improving patient experience and patient journey.[8]

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Health and Related Indicators

17

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Introduction

Although the corresponding chapters of both the 2011 and 2012/13 editions of the *South African Health Review* had noted the demands that a future National Health Insurance (NHI) system would pose for health information systems, the question of whether more accurate and comprehensive data on health status and health services are available remains open.[1,2] In particular, there appears to be little progress being made to integrate routine health information systems between the public and private sectors. The 2012/13 *Review* noted a "more inward focus, one clearly located in the growing influence of the Negotiated Service Delivery Agreements (NSDA)". In the National Department of Health's 2012/2013 Annual Report, the message from the Deputy Minister contained this indication of future plans: "Initiatives have begun towards establishing a National Public Health Institute to strengthen the capacity of the National Laboratory Services on one hand and on the other hand to ensure a more comprehensive integrated surveillance of diseases".[3] The inward focus is clearly evident in the National Department of Health's Annual Performance Plan 2013/14, despite the statement that "effective stewardship has been provided to the entire health sector" (Figure 1).[4]

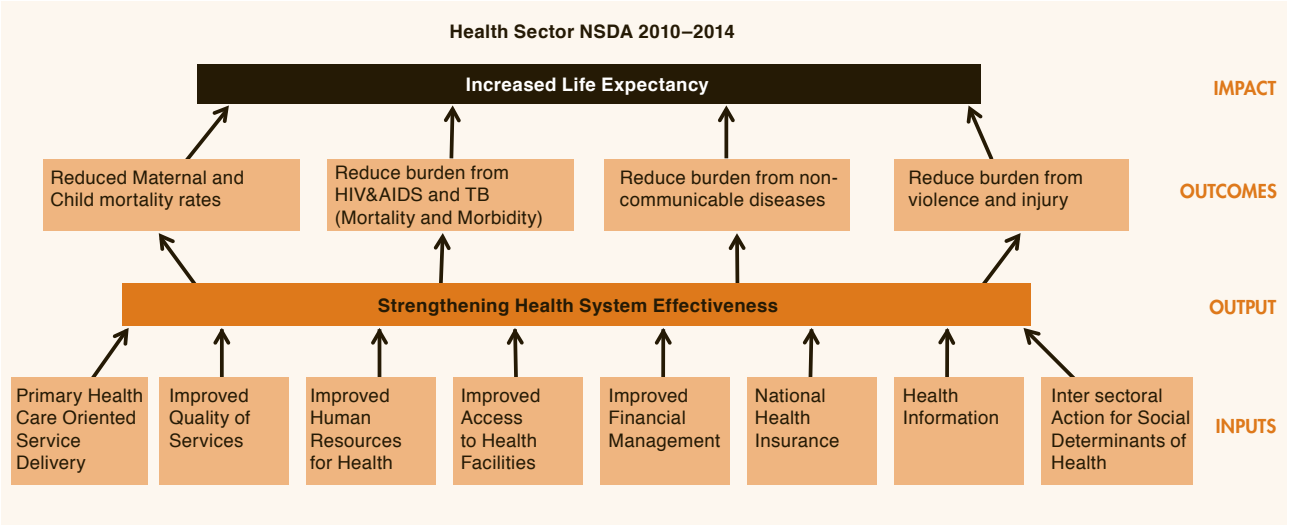
The Annual Performance Plan 2013/14 drew attention to the varying assessments by different institutions of South Africa's performance in relation to the Millennium Development Goals (MDGs), and the role of the Health Data Advisory and Co-ordination Committee (HDACC) in resolving such differences. The official South Africa progress report was issued in October 2013.[5] One of the key developments in this area – the publication of the officially sanctioned Annual Health Statistics (AHS) report, compiled on behalf of the National Department of Health (NDoH) by a team from Health Systems Trust (HST), the Medical Research Council of South Africa (MRC) and the University of Cape Town – was finally achieved, with little fanfare.[6] The document ultimately placed on the NDoH website in April 2014 reflected the initial 2012 publication. There is no indication yet of when the Annual Health Statistics 2013 report will be published.

In September 2013, the Department of Performance Monitoring and Evaluation (DPME) of the Presidency issued the results of the Management Performance Assessments of National and Provincial Departments.[7] The National Department of Health was assessed as having a "challenge with providing evidence of Strategic Plans". In terms of routine indicators, the National Indicator Data Set (NIDS) 2013, which specifies the data elements to be collected by the routine data collection systems of all provinces, is now being implemented. The list of indicators is given in the appendix: National Indicator Data Set 2013 indicators, effective April 2013. These have been revised and updated, but the first annual reports based on the new NIDS are only expected from May 2014.

South Africa's 2013 progress report on the MDGs identified those indicators for which progress was rated as "unlikely" by the 2015 deadline. The health-related targets assessed as "unlikely" were life expectancy, maternal mortality rate, condom usage at last high-risk sex, and the proportion of the population aged 15 to 24 years with comprehensive knowledge of HIV/AIDS.[5] Other indicators similarly rated were predominantly related to measures of poverty. South Africa is far from alone in not meeting the maternal mortality targets, for instance, which have declined by 47% globally in two decades (from 400 maternal deaths per 100 000 live births in 1990 to 210 in 2010).[8] The global target is a 75% reduction by 2015. Globally, progress towards the MDG targets was also emphasised in the World Health Statistics 2013 report.[9] However, caution should be exercised in interpreting even those indicators reflected as "likely", as these may reflect poor quality data or problems with denominator choices (as with estimates of immunisation coverage).[10]

Globally, the emphasis is now on the development of a new set of targets for the post-2015 period in order to maintain momentum, but also to refocus efforts on the most resistant problems. At an instrumental level, the data from the Global Burden of Disease Study (GBD) 2010 have been used to identify absolute targets for each country for the period from 2015 to 2030.[11] It is worth repeating

Figure 1: Negotiated Service Delivery Agreement framework for the health sector, 2010–2014



Source: NDoH Annual Performance Plan 2013/14.[4]

the views expressed by Jeffrey Sachs on the impact of the MDGs:

> The MDGs have been the most successful global undertaking in history to co-ordinate action to fight extreme poverty in all its forms: income, hunger, disease, lack of schooling, and deficient basic infrastructure. Most importantly, they have helped sub-Saharan Africa to enter an era of economic growth and disease reduction by focusing domestic and international policies, expertise, and finance on recalcitrant challenges, such as AIDS, tuberculosis, malaria, low farm yields, and children out of school. The MDGs have mobilised an unprecedented focus on the global poor by promoting the cancellation of unaffordable debts; prompting the establishment of new organisations such as the Global Fund to Fight AIDS, Tuberculosis and Malaria; and encouraging new technologies for diagnostics, medicines, supply chains, microfinance, and infrastructure. They will not be met in full, but the MDGs have made their mark despite the hurdles of wars, the global financial crisis, tax evasion, and debilitating corruption in rich and poor countries alike.[12]

Thus, while the exact nature of the proposed Sustainable Development Goals (SDGs) may still be debated, their potential value at a global and national level is well accepted. Though motivated by a different timeline – the 20th anniversary of the 1993 World Development Report – a Lancet Commission has identified the potential for achieving a "grand convergence" in health by 2035, recognising that "collectively we have the financial and the ever-improving technical capacity to reduce infectious, child, and maternal mortality rates to low levels universally".[13] One of the key concepts identified by this Commission is that of "progressive universalism", referred to as "a pathway to universal health coverage (UHC)". The Commission identified what it referred to as "two pro-poor pathways to achieving UHC within a generation", both of which have direct relevance for South Africa's plans for NHI. The first pathway is described as "publicly financed insurance [which] would cover essential health-care interventions to achieve convergence and tackle NCDs and injuries"; the second would provide "a larger benefit package, funded through a range of financing mechanisms, with poor people exempted from payments". Designing appropriate indicators to measure the "overall quantity, quality and equitable delivery of services", while also reflecting the degree to which financial protection is working, will be key to measuring progress towards universal health coverage.[14]

Philosophically, there has been renewed attention paid to the degree to which health and economic development are interdependent. Frenk et al. have called for a move from national sovereignty to global solidarity, noting that "no single stakeholder – not even the most powerful government or corporation – is single-handedly able to address all the health threats that affect it. Many determinants of health have globalised, such as the dissemination of patterns of work, lifestyles, diets, and other aspects of consumption that are conducive to diseases once thought to affect only rich societies – diabetes, cardiovascular disease, cancer – now affecting many of the world's poorer citizens in equal or greater measure."[15] This concept was expanded by the Lancet – University of Oslo Commission on Global Governance for Health, which noted that "unacceptable health inequities within and between countries cannot be addressed within the health sector, by technical measures, or at the national level alone, but require global political solutions".[16] Such global efforts will need global indicators of progress, and accurate data on which to base those indicators. A plausible set of targets has been identified as:

- to reduce the proportion of the world's people whose income is less than $2 a day or that is undernourished to below 1 in 10;
- to increase global completion of secondary schooling in the population aged ≥25 by 50%;
- to increase global average life expectancy to 75 years;
- to reduce global maternal mortality to below 1/1 000 births;
- to reduce global mortality among children under 5 to half its level in 2010;
- to halt, and have begun to reverse, trends towards greater population disparities in the number of girls and boys at age five in every country where such trends have been manifest;
- to have reversed the global trend towards deforestation.[17]

The last of these targets highlighted the contested linkage between globalisation, climate change and human health, and also the need for closer intersectoral collaboration. As McMichael has argued: "For populations to live sustainably and with good long-term health, the health sector must work with other sectors in reshaping how human societies plan, build, move, produce, consume, share, and generate energy".[18] This approach is consistent with one that recognises and acts upon the identified social determinants of health.[19]

Consistently, this chapter of the *South African Health Review* has maintained a focus on the quality of health information and the indicators derived from routine and survey data. Abouzahr et al. have shown, based on data from 70 countries, that the completeness of vital registration data is associated with better health outcomes, independent of the level of national income.[20] This is an elegant demonstration of the value of quality data. However, building the capacity to use health information for health systems strengthening requires additional inputs. The World Health Organization (WHO) defines a health information system as comprising health information system resources, indicators, data sources, data management, information products, dissemination and use.[21] Nutley and Reynolds have shown how data availability, defined as "data synthesis, data communication, and access to data", needs to be improved in order to support decision-making.[21] It is for this reason that the delay in publishing, updating and widely disseminating the Annual Health Statistics (AHS) is so critical. Interestingly, these authors point to the University of the Witwatersrand's use of data from the Agincourt Demographic Surveillance Site in student training programmes as an example of best practice. That example needs to be replicated at scale, with access to the raw data from as wide a range of sources as possible. Crucially, efforts to bridge the all-too-persistent public-private gap need to be redoubled, if any meaningful tracking of progress towards universal health coverage is to be achieved. Attention should also be paid to the parlous state of connectivity in the public sector, and the extent to which such systems as PERSAL (salaries and personnel), Logis (procurement), MedSAS (medicines procurement) and BAS (finance) fail the test of interoperability. A telling figure was cited by the former Superintendent-General of Health in the Eastern Cape Province, who noted that 242 of the 920

clinics in the Province lacked a telephone.[22] If such basic equipment is missing, the chances of finding interoperable and connected systems are slim.

Data sources and collection

Characteristically, 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. Although known issues of data quality or interpretation are highlighted where available, it is not possible in such a broad chapter to verify, adjust and correct every data source in detail. The reader is advised to be cautious about which types of indicators are presented and whether their use is suitable for the intended purpose. The data provided in this chapter are only a sub-set of those available. More data, particularly those showing trends over time, are stored in the Health Statistics Database, which can be accessed on the HST website (www.hst.org.za). In addition, a substantial set of district-level data are presented in the District Health Barometer reports, which can also be accessed from the HST website.

Indicator definitions: The definitions of all indicators appearing in the tables are given at the end of the chapter.

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 in the General Household Surveys and mid-year population estimates. This may result in different values being published compared with 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.

Demographic indicators

Context	Demographic indicators are critical input variables for many other indicators, as they provide denominator data over time. In order to monitor progress towards equity, South Africa still tracks ethnic differences, using four self-attributed categories (African, Coloured, Indian and White). These categories are thus used to show data that are available by ethnic group.
New data sources	Some of the key new sources of national data included in this section are: • Statistics SA mid-year population estimates 2013 • Statistics SA Recorded Live Births 2012 • Statistics SA Gender Statistics in South Africa 2011
Key issues and trends	Mid-year population estimates are used for calculating many indicators that have population-based denominators. As there are questions about the accuracy of the 2013 estimates, and in particular about the estimates for districts as opposed to provinces, caution should be exercised when interpreting the results obtained. This may be particularly important when the indicator uses estimates of the numbers in younger age bands. The routine data indicators presented in this edition still make use of the previous population time series implemented in 2010, which differs substantially from the post-Census estimates.

The Statistics SA (Stats SA) 2012 mid-year population estimates were delayed in order to incorporate findings from the Census 2011, and resumed with the issue of the 2013 report. The 2013 mid-year estimate of the national population was 52 982 000, of which 42 284 100 (79.8%) were estimated to be African, 4 766 200 (9.0%) Coloured, 4 602 400 (8.7%) White and 1 329 300 (2.5%) Indian.[23] The most populous province was estimated to be Gauteng (12 728 400; 24.0%), followed by KwaZulu-Natal (10 456 900; 19.7%).

The mid-year population estimates are particularly important for the calculation of denominators for health-related indicators, as they provide age distributions. Dorrington has pointed out that the 2013 estimates show an age distribution that is markedly different from that revealed in the 2011 Census.[24] By projecting the 2011 Census numbers backwards to 2001 and then forwards to 2013, Dorrington produced an alternative set of mid-year population estimates that were consistent with the age distribution shown by the Census 2011, and to a large extent, with the Census 2001. Dorrington was at pains to explain that the purpose of the exercise was not to produce the best estimate, but rather to show that an alternative was possible. Nonetheless, this warning is worth considering: "Since the District Council/Metro estimates in the official mid-year estimates were derived to be consistent with the provincial estimates, they too suffer from the distorted age distribution of the provincial estimates and should be used with care for any work that is sensitive to distribution of the DC/Metro population by age, taking further cognisance of the fact that the method used to correct both the 2011 and 2001 Census data for undercount is not robust at levels of spatial disaggregation finer than those defined by the provincial boundaries". Figure 2 shows the extent of differences in the total population estimates by province.

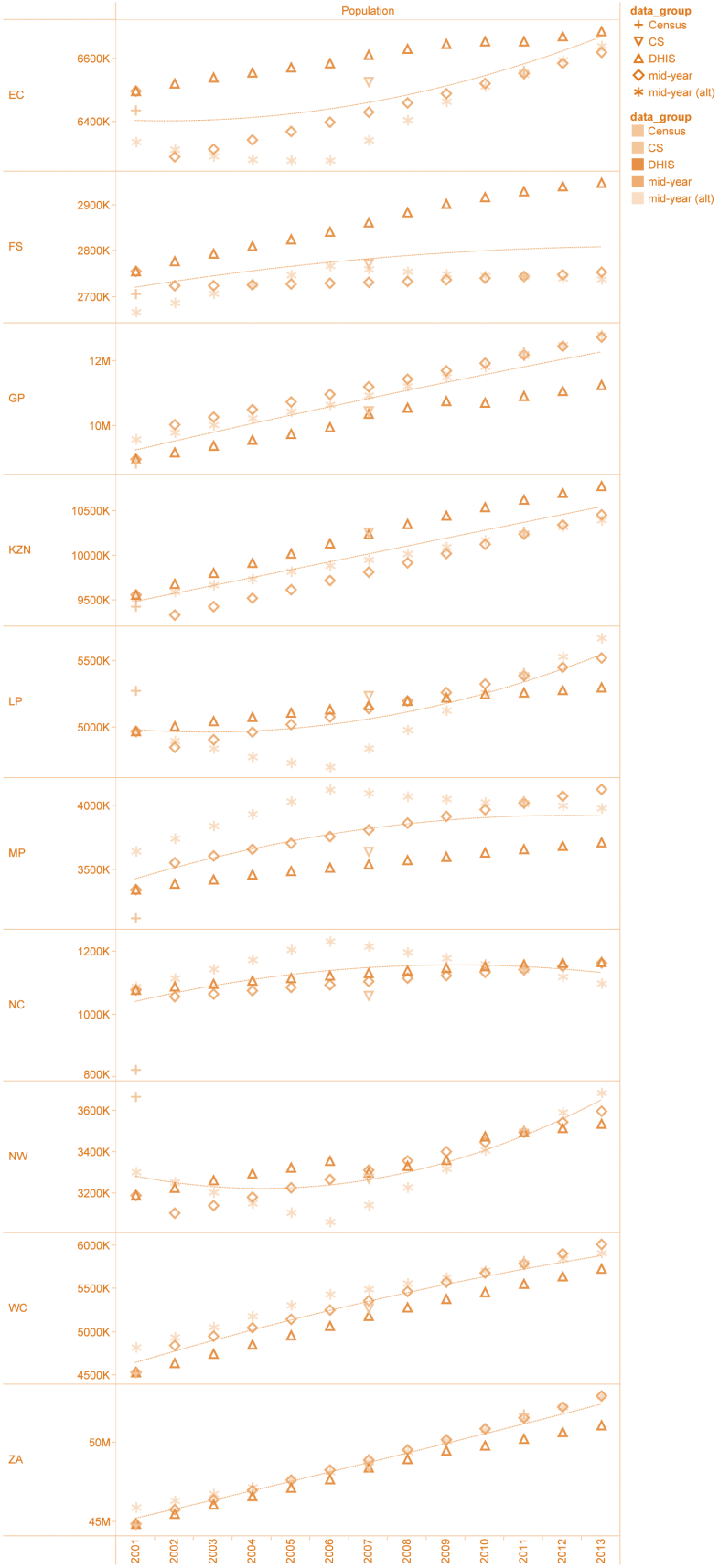
As demonstrated by Abouzahr et al., investment in the quality and completeness of vital registration pays handsome dividends.[20] Stats SA differentiates between the total number of births registered in the year in which they occurred (current registrations) and those registered later than the year of birth (late registrations). The proportion of late registrations has dropped dramatically over time, from 78% in 1998 to 21% in 2012 (Figure 3).[25] The age of mothers is also of interest for health service planning. In 2012, the median age of mothers was 27 years, but 12.2% of mothers were aged 15–19 years. The total number of births that occurred in 2012 was 926 264 (as at 28 February 2013), of which 186 457 (20.1%) occurred in Gauteng and 185 764 (20.1%) in KwaZulu-Natal. By 30 June 2013, the updated number of birth occurrences for 2012 was 972 858.

Drawing on a range of its own data (Census 2001, the Time Use Survey 2010, the General Household Survey 2011 and the Quarterly Labour Force Survey 2011), Stats SA has produced a gendered analysis to follow the 2002 publication "Women and Men in South Africa: Five Years".[26] Although these data are difficult to portray in the tables provided herein, they do provide a useful resource for researchers as well as health planners. An example is provided by the figures on levels of attendance at childcare facilities, which might be considered as access points for health promotion campaigns, including vaccinations. It was shown that 62.2% of White children under seven years of age attended early childhood development, school or another form of childcare facility in urban areas. However, only 33.5% of Indian children in urban areas attended these types of facilities. Not surprisingly, only 21.0% of children in rural areas attended such facilities.

The launch of the online data repository and visualisation tool in 2013 by the INDEPTH Network[a] provides summary statistics as well as access to detailed demographic data collected in health and demographic surveillance systems of several countries, including Agincourt, Africa Centre and Dikgale in South Africa. Although not nationally representative, these data can nonetheless be used to validate routine data sources and allow for more nuanced research.

a http://www.indepth-ishare.org/

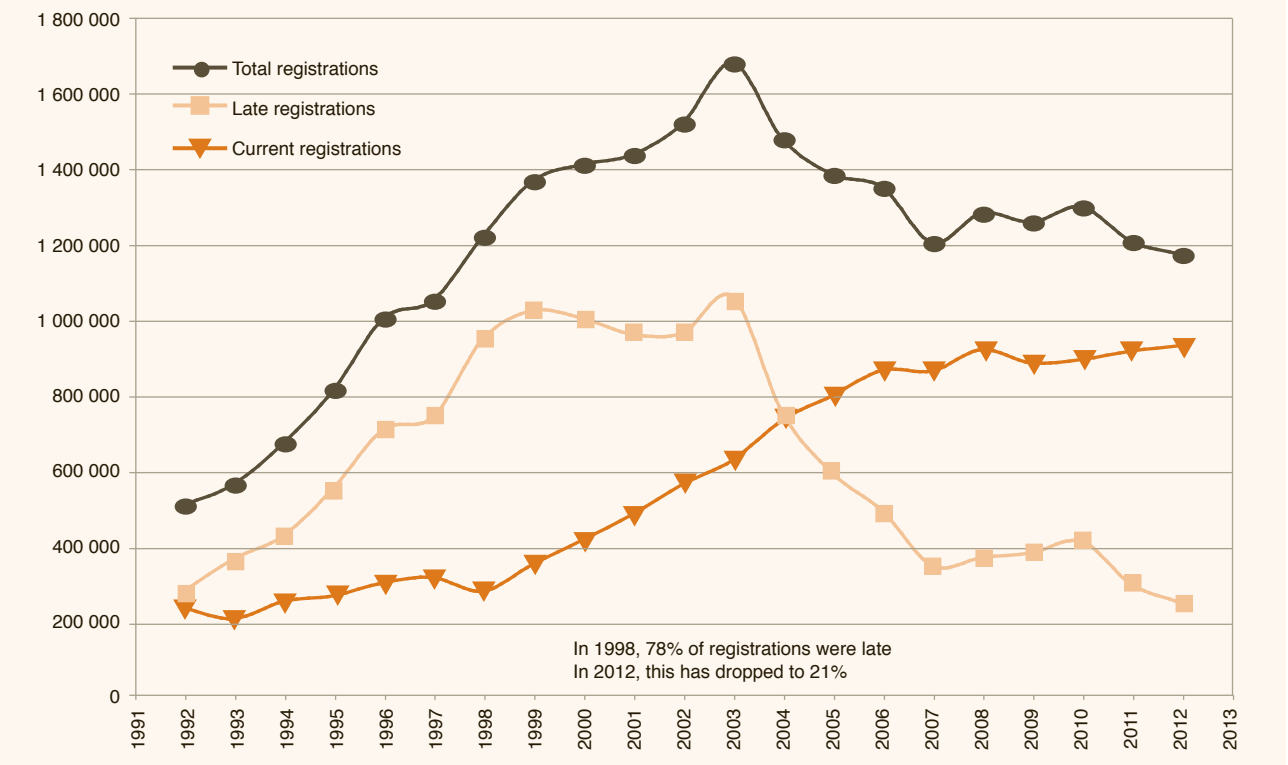
Figure 2: Trends in population estimates by source, 2001–2013



Source: Compiled from Census 2001,[27] Census 2011,[28] Community Survey 2007,[29] DHIS (extracted June 2013),[30] Stats SA mid-year estimates,[23] CARe Alternate mid-year estimates.[24]

Note: The DHIS population time series has subsequently been revised based on new Stats SA data. However, the population estimates included here were the ones in the system during the period in which all the DHIS indicators presented in this chapter were extracted, and prior to the release of the 2013/14 data-file.

Figure 3: Number of birth registrations in South Africa, 1998–2012



Source: Stats SA Recorded Live Births 2012.[25]

Table 1: Demographic indicators by province

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Age dependency ratio (children 0-14 + aged 65+ years/population 15-65 years)											
2011 Census	66.0	52.8	38.9	58.4	67.3	56.0	55.7	52.2	44.9	52.6	a
2013 mid-year	63.7	49.4	39.7	60.5	60.2	55.8	55.5	53.7	46.9	52.3	b
Ageing index (ratio of people 65+ to every hundred under 15 years)											
2011 Census	20	19	18	15	18	15	19	19	23	18	c
2013 mid-year	19	19	20	15	16	14	20	19	21	18	b
Annual population growth rate											
2011 2001-2011	0.44	0.14	2.68	0.69	0.79	1.83	1.44	1.62	2.52	1.44	d
2011 2010-2011 female	-	-	-	-	-	-	-	-	-	1.24	e
2011 2010-2011 male	-	-	-	-	-	-	-	-	-	1.43	e
2011 2010-2011 total	-	-	-	-	-	-	-	-	-	1.33	e
2012 2011-2012 female	-	-	-	-	-	-	-	-	-	1.24	e
2012 2011-2012 male	-	-	-	-	-	-	-	-	-	1.44	e
2012 2011-2012 total	-	-	-	-	-	-	-	-	-	1.34	e
2013 2012-2013 female	-	-	-	-	-	-	-	-	-	1.25	e
2013 2012-2013 male	-	-	-	-	-	-	-	-	-	1.44	e
2013 2012-2013 total	-	-	-	-	-	-	-	-	-	1.34	e
Area (square km)											
2011	168 966	129 825	18 178	94 361	125 754	76 495	372 889	104 882	129 462	1 220 813	a
Area as a % of total area of South Africa											
2011	13.8	10.6	1.4	7.7	10.3	6.3	30.5	8.7	10.6	100.0	a
Average household size											
2011 Census	3.7	3.2	3.0	3.9	3.7	3.7	3.7	3.2	3.4	3.4	f
Crude death rate (deaths per 1 000 population)											
2011 Stats SA	-	-	-	-	-	-	-	-	-	11.7	g
2011 mid-year	-	-	-	-	-	-	-	-	-	11.3	g
2011 unadjusted	-	-	-	-	-	-	-	-	-	10.0	h
2012 mid-year	-	-	-	-	-	-	-	-	-	11.0	g
2013 mid-year	-	-	-	-	-	-	-	-	-	10.6	g

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Population - Census											
2011 Census	6 562 053	2 745 590	12 272 263	10 267 300	5 404 868	4 039 939	1 145 861	3 509 953	5 822 734	51 770 561	a
Population – DHIS estimates											
2011	6 654 852	2 930 369	10 929 388	10 622 198	5 261 983	3 661 839	1 158 080	3 497 832	5 553 968	50 270 509	i
2012	6 671 956	2 941 267	11 091 033	10 703 919	5 282 562	3 689 833	1 162 538	3 519 130	5 641 880	50 704 118	i
Population – Stats SA mid-year estimates published in 2013											
2011	6 553 889	2 744 120	12 202 306	10 236 872	5 388 120	4 022 088	1 143 254	3 496 855	5 792 096	51 579 599	e
2012	6 586 307	2 748 506	12 463 886	10 345 539	5 452 206	4 074 763	1 153 090	3 546 631	5 904 017	52 274 945	e
2013	6 620 100	2 753 200	12 728 400	10 456 900	5 518 000	4 128 000	1 162 900	3 597 600	6 016 900	52 982 000	e
Population – Alternative mid-year estimates published by Dorrington (CARe)											
2011	6 552 271	2 744 081	12 173 409	10 247 322	5 391 469	4 018 510	1 140 818	3 500 295	5 778 418	51 546 593	j
2012	6 598 016	2 741 872	12 500 034	10 323 049	5 532 562	4 001 055	1 121 013	3 595 240	5 848 400	52 261 241	j
2013	6 643 539	2 739 460	12 828 185	10 398 662	5 674 918	3 983 036	1 100 570	3 691 291	5 917 618	52 977 280	j
Population % by province											
2011 Census	12.7	5.3	23.7	19.8	10.4	7.8	2.2	6.8	11.2	100.0	a
2011 mid-year	12.7	5.3	23.7	19.8	10.4	7.8	2.2	6.8	11.2	100.0	e
2012 mid-year	12.6	5.3	23.8	19.8	10.4	7.8	2.2	6.8	11.2	100.0	e
2013 mid-year	12.5	5.2	24.0	19.7	10.4	7.8	2.2	6.8	11.4	100.0	e
Population % composition											
2011 60+	9.7	8.3	6.8	7.6	8.6	7.0	8.5	8.3	8.9	8.0	a
2011 <15 years	33.0	29.1	23.7	31.9	33.9	31.2	30.1	29.6	25.1	29.1	a
2011 female	52.9	51.6	49.5	52.5	53.3	51.1	50.7	49.3	50.9	51.3	a
Population density (people per km2)											
2011 Census	38.8	21.1	675.1	108.8	43.0	52.8	3.1	33.5	45.0	42.4	c
2013 mid-year	39.2	21.2	700.2	110.8	43.9	53.9	3.1	34.3	46.5	43.4	k
Public sector dependent population – based on medical scheme coverage reported in General Household Survey (GHS)											
2011	5 849 615	2 438 067	8 033 100	8 954 513	4 809 452	3 127 211	1 000 581	2 983 651	4 198 800	41 422 899	l
2012	5 868 400	2 251 026	8 849 359	9 073 038	5 016 030	3 483 922	935 156	3 046 556	4 416 205	42 917 730	m
2013	5 898 542	2 254 823	9 037 191	9 170 708	5 076 530	3 529 414	943 123	3 090 329	4 500 661	43 498 215	n
Public sector dependent population – based on population minus number of beneficiaries reported by Council for Medical Schemes											
2011	5 839 121	2 347 208	9 113 881	8 927 661	4 951 729	3 439 449	961 571	2 995 366	4 485 643	43 053 190	o
2012	5 876 689	2 340 441	9 431 946	8 979 213	4 999 234	3 453 452	954 191	3 013 175	4 555 217	43 595 472	p
2013	5 905 162	2 345 677	9 635 428	9 076 596	5 059 976	3 500 518	962 893	3 057 951	4 645 067	44 186 981	q
Total fertility rate											
2011 mid-year	-	-	-	-	-	-	-	-	-	2.4	e
2011 mid-year 2006-2011	3.1	2.4	2.0	2.9	2.9	2.8	2.8	3.0	2.3	-	e
2012 mid-year	-	-	-	-	-	-	-	-	-	2.4	e
2013 mid-year	-	-	-	-	-	-	-	-	-	2.3	e
2016 mid-year 2011-2016	2.7	2.1	1.9	2.7	2.7	2.5	2.7	2.7	2.1	-	e

Reference notes (indicator definitions from page 328 and references from page 335)

a Census 2011. Census in Brief.[28]
b Stats SA Mid-year Estimates. Calculated from 2013 mid-year estimates.[23]
c Census 2011.[31] Calculated.
d Census 2011. 2001-2011. Per cent per annum. As recorded in Census 2011 Municipal Fact Sheet.[32]
e Stats SA Mid-year Estimates. 2013 mid-year estimates.[23]
f Census 2011. Statistical release P0301.4.[33]
g Stats SA Mid-year Estimates.[34] 2011 mid-year estimates. CDR assumption used in population projections.
h Stats SA Causes of death 2011.[35]
i DHIS Population Estimates.[30]
j CARe Alternate mid-year.[24]
k Stats SA Mid-year Estimates.[23] Calculated from 2013 mid-year estimates and areas reported in Census 2011.
l Stats SA GHS 2010.[36] Calculated using provincial medical scheme coverage (GHS 2010) and DHIS Population Estimates for 2011.
m Stats SA GHS 2012.[38] Calculated using provincial medical scheme coverage (GHS 2012) and Stats SA mid-year estimates (2013) for 2012.
n Stats SA GHS 2012.[38] Calculated using provincial medical scheme coverage (GHS 2012) and Stats SA mid-year estimates (2013) for 2013.
o Medical Schemes 2011-12.[37] Calculated from total number of beneficiaries subtracted from total population (Stats SA mid-year estimates 2013 for the year 2011).
p Medical Schemes 2012-13.[39] Calculated from total number of beneficiaries subtracted from total population (Stats SA mid-year estimates 2013 for the year 2012).
q Medical Schemes 2012-13.[39] Calculated from medical scheme coverage calculated from the number of beneficiaries in 2012 and the total population (Stats SA mid-year estimates 2013 for the year 2013).

Table 2: Demographic indicators by ethnic group

	African	Coloured	Indian	White	Other	All	Ref
Ageing index							
2011 Census	14	17	34	84	23	18	a
Population – Census							
2011 Census	41 000 938	4 615 401	1 286 930	4 586 838	280 454	51 770 561	b
Population – Stats SA mid-year estimates published in 2013							
2011 mid-year	40 978 616	4 665 291	1 293 771	4 641 920	-	51 579 599	c
2012 mid-year	41 624 670	4 716 470	1 311 431	4 622 373	-	52 274 945	c
2013 mid-year	42 284 132	4 766 172	1 329 302	4 602 386	-	52 982 000	c
Population – Alternative mid-year estimates published by Dorrington (CARe)							
2011 mid-year (alt)	41 093 212	4 595 462	1 281 227	4 576 693	-	51 546 593	d
2012 mid-year (alt)	41 765 450	4 647 301	1 295 636	4 552 853	-	52 261 241	d
2013 mid-year (alt)	42 441 443	4 698 312	1 309 755	4 527 770	-	52 977 280	d
Population % by ethnic group							
2011 Census	79.2	8.9	2.5	8.9	0.5	100.0	b
2011 mid-year	79.5	9.0	2.5	9.0	-	100.0	c
2012 mid-year	79.6	9.0	2.5	8.9	-	100.0	c
2013 mid-year	79.8	9.0	2.5	8.7	-	100.0	c

Reference notes (indicator definitions from page 328 and references from page 335)

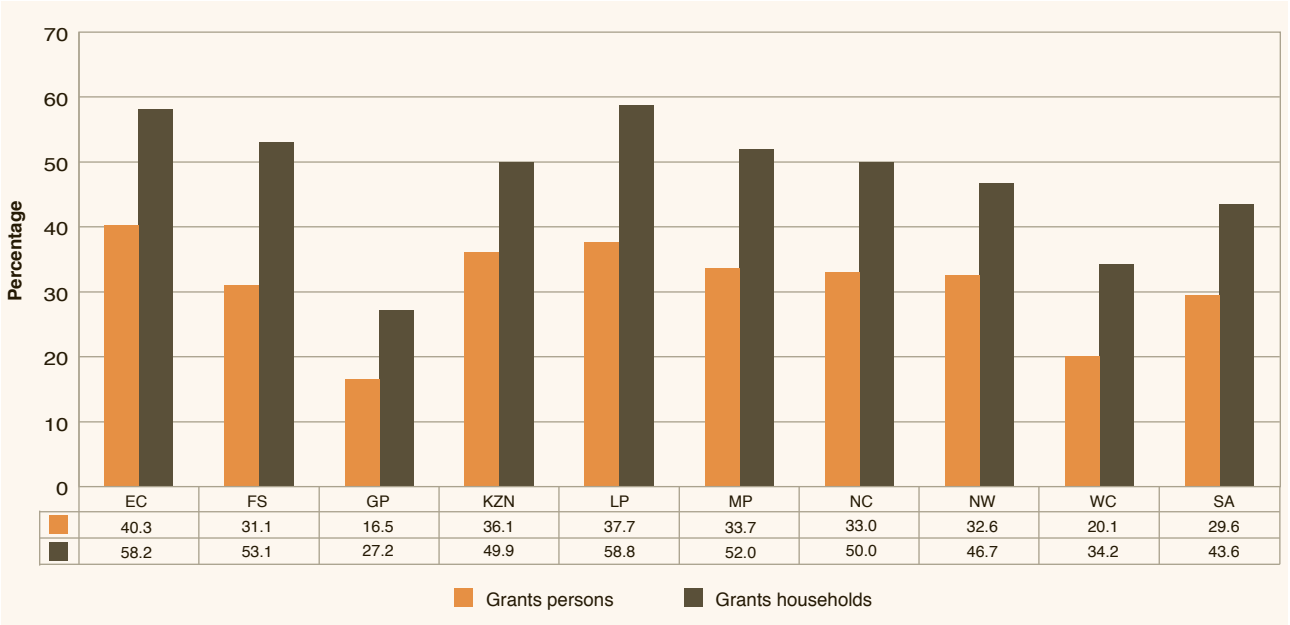
a Census 2011.[31] Calculated.
b Census 2011. Census in brief.[28]
c Stats SA Mid-year Estimates. 2013 mid-year estimates.[23]
d CARe Alternate mid-year.[24]

Socio-economic indicators

Context	Socio-economic indicators remain key as they describe many of the social determinants of health, such as access to clean water and effective sanitation. As global efforts to define a post-2015 development agenda progress, socio-economic indicators will retain their central role, even as emphasis shifts from communicable to non-communicable diseases.
New data sources	Nationally, new data have been reported in the: • Development Indicators 2012 • Stats SA General Household Survey (GHS) 2012 • Stats SA Quarterly Labour Force surveys • Stats SA publications drawing on the Living Conditions Surveys and the General Household Surveys • Stats SA Poverty Trends in South Africa 2006-2011 • National Income Dynamics Study Wave 3 (2012) • South African Index of Multiple Deprivation (SAIMD) 2011 Internationally, data of interest have been reported in the: • United Nations Development Program (UNDP) Human Development Report 2013 • UNDP report "Humanity Divided: Confronting Inequality in Developing Countries" 2013 • United Nations Children's Fund (UNICEF) reports on Progress on sanitation and drinking water – 2013 and 2014 updates
Key issues and trends	Despite claimed progress in relation to access to piped water and sanitation services, these remain common causes of service delivery protests in many parts of South Africa. South Africa is also plagued by persistently high levels of unemployment, even if measured only by the "strict" definition. New research has underlined the impact of social grants in such a milieu.

The Stats SA General Household Survey (GHS) 2012 showed that 29.6% of South Africans benefited from access to some form of social grant, up from 12.7% in 2002.[38] Expressed differently, 43.6% of households received at least one social grant in 2012. As expected, this figure exceeded 50% in the more deprived provinces (Limpopo, Eastern Cape, Free State), and was lowest in the more affluent provinces (Gauteng and Western Cape) (Figure 4). Although this level of social spending might be considered fiscally unsupportable in the longer term, the need for such grants is undeniable. The value of even modest cash payments was clearly demonstrated in a case-control study of adolescents in two randomly selected urban and two randomly selected rural districts in South Africa.[40] The study showed that household receipt of a state-provided child-focused cash transfer was associated with reduced incidence of transactional sex (odds ratio 0.49, 95% CI: 0.26–0.93) and age-disparate sex (OR 0.29, 95% CI: 0.13–0.67) in adolescent girls. However, no effects were detectable in relation to unprotected sex, multiple sexual partners, or sex while intoxicated or after taking drugs. The results in boys were less impressive.

Figure 4: Percentage of individuals and households benefiting from social grants per province, 2012



Source: Stats SA General Household Survey 2012.[38]

The implications of reporting only on the "strict" definition of unemployment have long been recognised in South Africa, but this choice has again been challenged.[41] Using data from the first two waves of the National Income Dynamics Study (NiDS), Posel et al. have shown that those not actively searching for employment (and therefore falling outside of the "strict" definition) form a "legitimate and integral part of the labour force". Including these, as in the "broad" definition, would increase the unemployment rate by approximately 10%. The Quarter 3, 2013 Quarterly Labour Force Survey showed that there were 4 609 000 unemployed, but also 2 240 000 "discouraged work-seekers who were therefore labelled as not unemployed but economically inactive.[42] The reported "strict" unemployment rate of 24.7% would thus be 36.7% under the "broad" definition. As Posel et al. state: "With the high costs of active job search and the low probability of finding employment, many of the unemployed do not search actively, regularly or intensively for work, but rather rely on social networks to provide information on when an employment opportunity becomes available – a rational strategy in the circumstances". These figures underline the comment in the Development Indicators 2012 that "unemployment remains the key economic challenge in South Africa".[43]

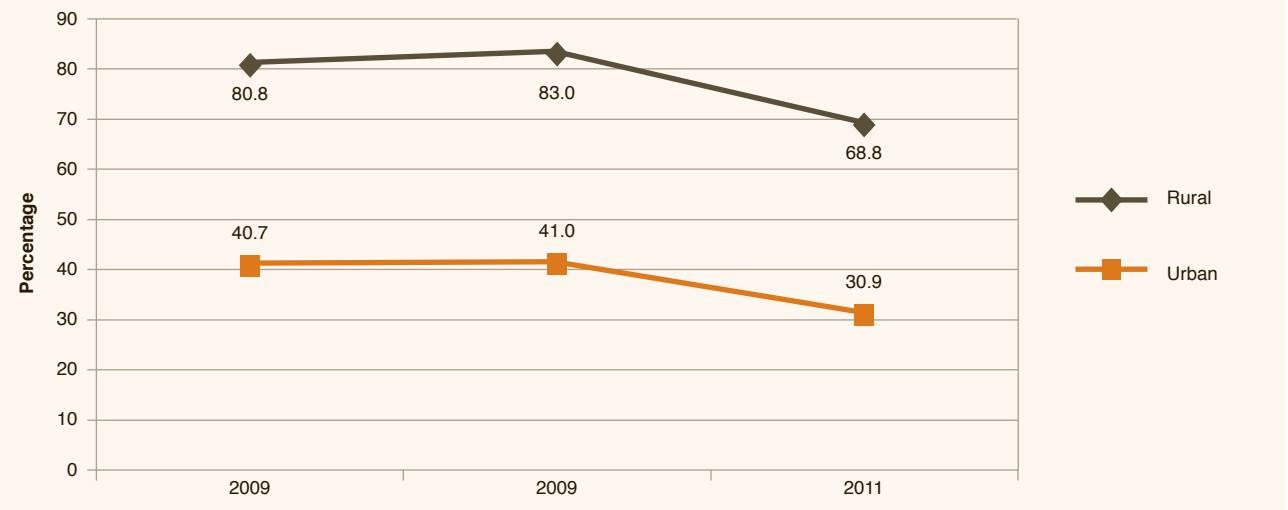
A number of derivative products have been issued by Stats SA, drawing on different sources of data. In 2012, a report on "South Africa's young children: their family and home environment" was published, based on data from the GHS 2012.[44] Although highly informative about the types of housing, access to water, sanitation, waste removal and types of energy used, issues relating to healthcare access were more difficult to unravel. As the GHS investigates where households would usually seek care first if any member were ill, trying to sub-set those data for children aged under five years is not particularly helpful.

In 2012, Stats SA also released a report entitled "Subjective poverty in South Africa", based on the data from the Living Conditions Survey 2008/2009.[45] In contrast to the objective money-metric approach that is characterised by "poverty lines", subjective poverty is the "individual's assessment of his or her own welfare, utility or happiness". Based on various objective and subjective measures, the report provided poverty headcounts for the provinces. Subjective measures showed a higher proportion of the country's population as living in poverty, but also differences between provinces. However, by most measures, the Eastern Cape remains the poorest province. Depending on the measures used, including multidimensional measures, urban informal areas may be considered poorer than tribal areas, or vice versa. Another Stats SA report drawing on the same data focused on "Men, Women and Children".[46] The health section focused on access to medical scheme cover and to health services. As would be expected, while poor and non-poor children had markedly different access to medical scheme cover, access to health care was not different.

The Wave 3 dataset from the National Income Dynamics Study (NiDS) was released by the Southern Africa Labour and Development Research Unit in 2014.[47] Based on data from those participants who were successfully interviewed in all three waves, Finn and Leibbrandt have shown that poverty exit rates have increased over time.[48] However, these authors also noted that a substantial proportion of the population was trapped in severe poverty, defined as having income of less than half of the poverty line. In March 2014, Stats SA released a report entitled "Poverty Trends in South Africa – An examination of absolute poverty between 2006 and 2011", drawing on data from the Income and Expenditure Survey (IES) 2005/2006 and 2010/2011, as well as the Living Conditions Survey (LCS) 2008/2009.[49] This report also included a useful summary of the process of developing the national poverty line. The national poverty line is based on the cost-of-basic-needs approach, and includes both food and non-food components. The food poverty line (FPL) is "the level of consumption below which individuals are unable to purchase sufficient food to provide them with an adequate diet". Two bounds to the national poverty line are described. The lower-bound poverty line (LBPL) "includes non-food items, but requires that individuals sacrifice food in order to obtain these". The upper-bound poverty line (UBPL) allows for individuals to purchase both adequate food and non-food items. The Rand value of each line is updated annually on the basis of the consumer price index. For March 2011, the FPL was set at R320 per capita per month, the LBPL at R443 and the UBPL at R620. It should be noted that poverty headcounts obscure differences in the depth of poverty. The poverty gap can be used as an indicator of this depth, as the average distance of the population from the poverty line in percentage terms. By this measure, a decline in the depth of poverty was shown between 2006 and 2011. Nonetheless, in 2011, 54.0% of Africans were living in poverty, with the highest levels recorded in Limpopo (63.8%), Eastern Cape (60.8%) and KwaZulu-Natal (56.6%) provinces. As expected, poverty headcounts were higher in rural areas (68.8%) than in urban areas (30.9%) as shown in Figure 5. The majority (58.3%) of poor people in South Africa were living in rural areas.

In 2013, the Southern African Social Policy Research Institute published an analysis of multiple deprivation at small area level across South Africa.[50] The analysis used the South African Index of Multiple Deprivation 2011 (a weighted aggregate of material deprivation, employment deprivation, education deprivation and living environment deprivation, derived from the Census 2011) and income poverty at ward level (Table 3). The authors clearly explain the difference between deprivation (people's unmet needs) and poverty (the lack of resources required to meet those needs). They also highlight that "spatial patterns of poverty and multiple deprivation are not random", and they reflect "the outcome of a number of dynamic social processes and factors which include migration, availability and cost of living space, community preferences, current and historical policies". It is worth recalling, as do these authors, the degree to which "the spatial legacy of apartheid means that poor South Africans are concentrated spatially and tend to reside either in formerly racially segregated "townships" around cities created or confirmed as a result of the Group Areas Acts 1950–1966, or in former homelands".

Figure 5: Poverty headcount by rural/urban settlement type



Source: Poverty Trends in South Africa – An examination of absolute poverty between 2006 and 2011.[49]

Table 3: Provincial rates of deprivation for the four domains of the SAIMD 2011

	Material deprivation %	Employment deprivation %	Education deprivation %	Living environment deprivation %	Overall rank order of population weighted average rank of the wards (1=most deprived)
Eastern Cape	52.0	47.3	28.5	59.6	1
Limpopo	40.2	46.4	24.3	71.9	2
North West	41.7	37.9	28.7	55.4	3
KwaZulu-Natal	43.0	42.3	23.4	55.3	4
Northern Cape	39.5	34.1	30.0	32.1	5
Mpumalanga	34.9	38.2	24.4	54.5	6
Free State	33.3	38.9	23.4	32.9	7
Gauteng	30.8	29.8	12.6	21.5	8
Western Cape	24.8	25.1	16.8	19.1	9
South Africa	37.1	36.0	20.9	43.8	

Source: South African Index of Multiple Deprivation 2011.[50]

With the greater emphasis being paid to non-communicable diseases, health planners and researchers are also getting to grips with multi-morbidity. Using data from the GHS reports from 2005 to 2008, Ataguba showed that multi-morbidity is more common among the poor, more so for disability than for illness.[51] Arokiasamy et al. have shown that measures of socio-economic status are negatively correlated with the number of chronic diseases in six countries (China, India, Russia, South Africa, Mexico and Ghana), based on Wave 1 data from the WHO Study on Global Ageing and Adult Health (SAGE).[52] South Africa was shown to have the second-highest prevalence of multi-morbidity (22.0%) after Russia (32.8%) in this dataset.

The United Nations Development Program (UNDP) Human Development Report 2013 was sub-titled "The Rise of the South".[53] Countries that were recognised as making rapid progress included Brazil, China, India, Indonesia, South Africa and Turkey, a combination that reaches across the BRICS and "Fragile 5" groupings. Nonetheless, it is sobering to note that the combined Gross Domestic Product (GDP) of Argentina, Brazil, China, India, Indonesia, Mexico, South Africa and Turkey now equals that of the United States. In 2012, South Africa was ranked 121st in terms of the Human Development Index, with a value of 0.629, sharing that position with Indonesia and Kiribati. On this Index, very high human development is scored at 0.905, high human development at 0.758, medium human development at 0.640 and low human development at 0.466. Although South Africa is still a highly unequal country, as measured for instance by the Gini coefficient, the UNDP has noted a drop in that measure, particularly linked to the redistributive effects of social grants.[54]

There have been no updated reports on the quality of potable water supply management (Blue Drop) or waste water treatment (Green Drop) since 2012. Although the UNDP report "Progress on sanitation and drinking-water" noted the considerable increase in access to clean water and sanitation in South Africa between 1995 and 2011, these figures are now outdated.[55] The 2014 report indicates that South Africa has met the MDG target for drinking water and is "on track" regarding sanitation.[56] Politically, access to water and sanitation enjoy a high profile, but action on the ground is hampered by the capacity constraints of local authorities. The South African Human Rights Commission's "Report on the Right to Access Sufficient Water and Decent Sanitation in South Africa: 2014" pointed out that the "areas which lack water and sanitation mirror apartheid spatial geography", and that the "lack of access to sanitation has an impact on other rights including rights to dignity, education, health, safety and the environment".[57] The Commission drew attention to the degree to which specific areas differed from the national averages.

Table 4: Socio-economic indicators by province

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Drinking Water System (Blue Drop) Performance Rating											
2010	79.4	48.5	85.5	65.9	55.0	65.4	46.9	66.0	92.5	67.2	a
2011	77.3	64.1	95.1	80.5	64.0	56.5	62.1	62.3	94.1	72.9	b
2012	82.1	73.6	98.1	92.1	79.4	60.9	68.2	78.7	94.2	87.6	c
Education level: percentage of population 20 years and older with no schooling											
2011 Census	10.5	7.1	3.6	10.7	17.3	14.0	11.3	11.8	2.7	8.6	d
2011 no schooling	7.4	5.7	2.6	7.8	12.9	10.3	11.3	10.0	1.7	6.5	e
2012 no schooling	6.4	4.8	1.9	7.8	11.6	10.6	8.5	8.8	1.5	5.7	f
Education level: percentage of population in specified age group with no schooling											
2012 no schooling 7-14 years	-	-	-	-	-	-	-	-	-	1.0	g
2012 no schooling 15-24 years	-	-	-	-	-	-	-	-	-	1.3	g
2012 no schooling 25-34 years	-	-	-	-	-	-	-	-	-	3.0	g
2012 no schooling 35-44 years	-	-	-	-	-	-	-	-	-	5.9	g
2012 no schooling 45-54 years	-	-	-	-	-	-	-	-	-	9.0	g
2012 no schooling 55-64 years	-	-	-	-	-	-	-	-	-	16.8	g
2012 no schooling 65+	-	-	-	-	-	-	-	-	-	38.2	g
2012 no schooling 7+	5.4	4.6	2.4	7.0	11.9	10.0	7.6	14.9	1.7	6.0	g
Percentage of households by type of housing											
2011 informal Census	7.7	15.7	18.9	8.3	5.2	10.9	13.1	21.2	18.2	13.6	d
2011 informal	6.5	11.0	20.4	7.3	4.5	7.0	7.0	18.5	15.1	12.1	e
2012 informal	8.8	14.4	20.9	9.6	4.2	9.3	7.9	22.8	15.4	14.1	f
Percentage of households using electricity for cooking											
2011 Census	62.1	84.5	83.9	68.6	49.9	69.3	78.1	75.3	86.9	73.9	d
2011 GHS	59.8	88.0	79.3	71.2	50.4	67.5	79.8	75.6	89.5	73.1	e
2012 GHS	64.9	85.9	82.2	73.1	49.8	70.1	81.7	76.8	88.1	75.2	f
Percentage of households with access to piped water											
2011 Census	77.8	97.8	98.2	85.9	86.0	87.4	97.4	91.6	99.1	91.2	d
2011 GHS	74.8	96.2	97.4	84.5	82.2	86.9	95.1	89.6	99.5	89.5	e
2012 GHS	79.0	96.7	97.3	87.3	80.1	87.5	95.6	91.1	98.9	90.8	f
Percentage of households with no toilet / bucket toilet											
2011 Census	15.0	8.6	2.9	8.0	7.8	7.2	12.0	6.8	6.7	7.2	d
2011 GHS	17.0	4.6	1.1	4.8	7.9	6.7	7.6	5.5	3.4	5.7	e
2012 GHS	13.4	6.0	1.8	5.7	6.3	6.4	6.1	5.8	3.2	5.3	f
Percentage of households with refuse removal											
2011 Census	43.5	72.7	89.9	53.1	21.8	43.7	66.3	50.2	91.1	63.6	e
Percentage of households with telephone (telephone in dwelling or cell phone)											
2011 GHS	84.0	88.7	93.9	93.5	92.0	93.4	80.7	88.7	89.4	90.9	e
2012 GHS	87.6	93.4	96.3	93.6	94.6	96.0	82.7	93.7	93.3	93.7	f
Poverty prevalence (%)											
2006 UBPL rural	-	-	-	-	-	-	-	-	-	80.8	h
2006 UBPL urban	-	-	-	-	-	-	-	-	-	40.7	h
2006 food poverty line	-	-	-	-	-	-	-	-	-	26.6	i
2006 lower-bound poverty line	-	-	-	-	-	-	-	-	-	42.2	i
2006 upper-bound poverty line	69.5	53.2	32.4	69.1	74.4	66.3	63.8	60.2	36.9	57.2	i
2009 LCS lower bound	51.0	42.0	18.1	46.1	62.1	47.6	42.0	42.6	17.8	38.9	j
2009 LCS upper bound	66.1	57.8	29.0	60.2	74.3	62.5	56.9	58.2	30.6	52.3	j
2009 UBPL rural	-	-	-	-	-	-	-	-	-	83.0	h
2009 UBPL urban	-	-	-	-	-	-	-	-	-	41.0	h
2009 food poverty line	-	-	-	-	-	-	-	-	-	32.4	k
2009 lower-bound poverty line	-	-	-	-	-	-	-	-	-	44.6	k
2009 upper-bound poverty line	70.6	61.9	33.0	65.0	78.9	67.1	63.0	61.4	35.4	56.8	k
2011 UBPL rural	-	-	-	-	-	-	-	-	-	68.8	h
2011 UBPL urban	-	-	-	-	-	-	-	-	-	30.9	h
2011 food poverty line	-	-	-	-	-	-	-	-	-	20.2	l
2011 lower-bound poverty line	-	-	-	-	-	-	-	-	-	32.3	m
2011 upper-bound poverty line	60.8	41.2	22.9	56.6	63.8	52.1	46.8	50.5	24.7	45.5	m
Unemployment rate (official definition)											
2011 Q1	26.9	27.9	26.9	20.3	19.3	30.8	31.3	25.0	22.2	25.0	n
2012 Q1	28.3	32.2	26.0	20.5	21.9	30.3	24.9	26.2	22.8	25.2	n
2012 Q3	28.8	32.0	24.8	21.3	22.2	31.1	30.0	25.0	25.4	25.5	n
2013 Q3	30.8	34.0	24.3	20.9	17.8	26.6	28.0	26.6	23.4	24.7	n

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a Blue Drop 2011.[58] Some values revised since original reports.
b Blue Drop 2011.[58]
c Blue Drop 2012.[59]
d Census 2011.[31]
e Stats SA GHS 2011.[60]
f Stats SA GHS 2012.[38]
g SANHANES-1.[61]
h Poverty Trends 2006-2011.[49] Upper-bound poverty line (UBPL).
i Poverty Trends 2006-2011.[49] Derived from the Income and Expenditure Survey (IES) 2005/2006.
j Development Indicators 2012.[43] Based on Statistics SA Living Conditions Survey 2007/08. The percentage of the population living below lower bound poverty line of R416/month or upper bound poverty line of R577/month in 2011 prices (food poverty line plus non-food items).
k Poverty Trends 2006-2011.[49] Derived from the Living Conditions Survey (LCS) 2008/2009.
l Poverty Trends 2006-2011.[49] Derived from the Income and Expenditure Survey (IES) 2010/2011. The food poverty line (FPL) is the level of consumption below which individuals are unable to purchase sufficient food to provide them with an adequate diet.
m Poverty Trends 2006-2011.[49] Derived from the Income and Expenditure Survey (IES) 2010/2011. The lower-bound poverty line (LBPL) includes non-food items, but requires that individuals sacrifice food in order to obtain these, while individuals at the upper-bound poverty line (UBPL) can purchase both adequate food and non-food items. The Rand value of each line is updated annually using CPI prices data.
n Stats SA Labour Force Survey.[42] Quarter 1, 2011 Report, Quarter 3, 2012 Report and Quarter 3, 2013 Report.

Table 5: Socio-economic indicators by ethnic group

	African	Coloured	Indian	White	Other	All	Ref
Poverty prevalence (%)							
2006 upper-bound poverty line	66.8	41.6	13.0	0.6	-	57.2	a
2009 upper-bound poverty line	66.9	37.8	11.6	1.5	-	56.8	b
2011 upper-bound poverty line	54.0	27.6	3.4	0.8	-	45.5	c

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a Poverty Trends 2006-2011.[49] Derived from the Income and Expenditure Survey (IES) 2005/2006.
b Poverty Trends 2006-2011.[49] Derived from the Living Conditions Survey (LCS) 2008/2009.
c Poverty Trends 2006-2011.[49] Derived from the Income and Expenditure Survey (IES) 2010/2011. Individuals at the upper-bound poverty line (UBPL) can purchase both adequate food and non-food items. The Rand value of each line is updated annually using CPI prices data.

Health status indicators

Mortality

Context	Updated cause of death statistics have continued to be reported by Stats SA. Updated estimates of the completeness of vital registration reporting were provided in the 2011 Mortality and causes of death report and in the Rapid Mortality Surveillance Report 2012.
New data sources	Nationally, new data have been reported in the: • Stats SA Mortality and causes of death in South Africa, 2010 and 2011: Findings from death notification • Rapid Mortality Surveillance Report 2012 Internationally, reports of interest include: • Various outputs from the Global Burden of Disease Study 2010
Key issues and trends	➢ There is increasing evidence, both nationally and from the Western Cape, that premature mortality associated with HIV has stabilised and started to decrease, most probably linked to the increasing access to antiretroviral treatment. ➢ Cause of death data can also help to identify areas where new policy is needed, or where existing policies need to be strengthened. Two examples are policies aimed at reducing alcohol use and tobacco use.

The Stats SA report P0309 ("Mortality and causes of death in South Africa: Findings from death notification") is watched very carefully.[62] The 2010 data were released in April 2013, some months later than expected. The 2011 data followed in March 2014, with the release date for the 2012 report scheduled for July 2014.[35] It is worth recalling the data sources used: reports of deaths that occurred in 2010 and were registered at the Department of Home Affairs (including late registrations). Where a medical practitioner is unavailable to certify death, a Death Report can be completed by a traditional leader (chief, *induna* or headman), providing a record not just of the occurrence of death, but also a description of the circumstances that led to and caused the death. Stats SA reported that it processed a total of 543 856 deaths that occurred in 2010, as well as 8 786 late registrations for deaths that occurred between 1997 and 2009. Importantly, almost half (48%) of reported deaths occurred in hospitals. Stats SA had previously estimated the level of completeness of death registration as about 93% between 2001 and 2007. However, as required data inputs from the Census 2011 (specifically, the distribution of net migrants in South Africa classified by age and sex) were not available, estimates of the completeness of death registration between 2007 and 2011 could not be made.

The 2011 Census results were available in time for the Stats SA report on 2011 mortality and causes of death.[35] Overall completeness of adult death registration was estimated to be 93% for 2001–2007 and modestly higher at 94% for 2007–2011. Estimates for completeness of child death registration are not yet available. The Stats SA reports do provide further corroboration of the observed reduction in mortality that had previously been reported. The median age at death has increased and is now about 49 years for males and 53 years for females. The reversal in trends is clearly shown in the age bands 25–34 in Figure 6, but also in the youngest age groups. It has been estimated that the life expectancies of HIV-positive adults in South Africa are close to normal, provided they start antiretroviral therapy before their CD4 count drops below 200 cells/μl.[63]

In 2014, the MRC Burden of Disease Unit and UCT Centre for Actuarial Research published the second Rapid Mortality Surveillance Report, updated to the end of 2012 and reflecting cause of death data to the end of 2010.[64] Importantly, the report was able to incorporate data from the Census 2011. The report also provided new estimates of the level of completeness of vital registration data for different age groups. The 2012 estimate for life expectancy at birth was reported to be 61.3 years, up from 57.1 years in 2009. The report also drew attention to the potential effect of an over-estimate of the number of young children in Census 2011.

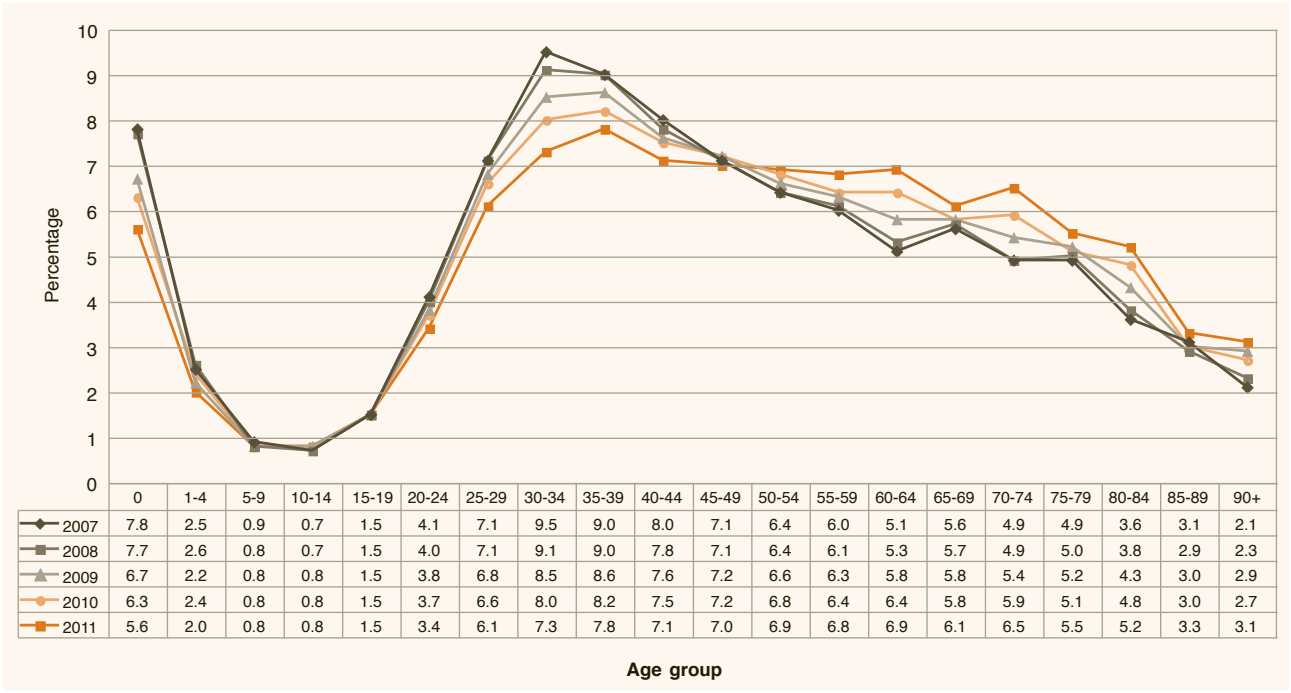
An indication of what is possible when automated cause of death coding is implemented has been provided by reports on the Western Cape experience.[65,66] The Western Cape was able to provide age-standardised mortality rates per district for the first time, though it was noted that HIV and tuberculosis were the leading causes of premature death across all districts.

Using the Stats SA community survey of 2007 and other secondary data, Sartorius et al. illustrated the non-random pattern of adult mortality using spatial disaggregation to district and local municipality level.[67] They identified the most prominent determinants of mortality as HIV antenatal seroprevalence, low socio-economic status and lack of formal marital union.

Analyses of the change in mortality patterns over time in South Africa have also been reported from the Global Burden of Disease Collaborative.[68,69] This source rated HIV/AIDS, diarrhoeal diseases, interpersonal violence, lower respiratory infections, tuberculosis and strokes as the leading causes of years of life lost (YLLs) due to premature death in South Africa in 2010. Importantly for local policy debates, it rated alcohol use as the leading risk factor in South Africa. Globally, the leading causes are ischaemic heart disease, lower respiratory infections, cerebrovascular disease, diarrhoea, HIV/AIDS and malaria.[70] An abstract published in Lancet provided mortality trends in South Africa from 1997 to 2009, from the Second National Burden of Disease Study South Africa.[71] The analysis presented showed that all-cause mortality had peaked in 2006 and thereafter started to decline. The downward trend in HIV/AIDS mortality, in particular, was attributed to the extensive antiretroviral treatment roll-out. The following breakdown of leading causes for mortality for 2009 was reported:

- ➢ HIV/AIDS – 194 322 of 622 300 deaths (31.2%)
- ➢ cerebrovascular disease – 38 666 (6.2%)
- ➢ tuberculosis – 33 375 (5.4%)
- ➢ lower respiratory infections – 32 568 (5.2%)
- ➢ ischaemic heart disease – 27 688 (4.4%).

Figure 6: Percentage distribution of deaths by age and year of death, 2007–2011



	0	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85-89	90+
2007	7.8	2.5	0.9	0.7	1.5	4.1	7.1	9.5	9.0	8.0	7.1	6.4	6.0	5.1	5.6	4.9	4.9	3.6	3.1	2.1
2008	7.7	2.6	0.8	0.7	1.5	4.0	7.1	9.1	9.0	7.8	7.1	6.4	6.1	5.3	5.7	4.9	5.0	3.8	2.9	2.3
2009	6.7	2.2	0.8	0.8	1.5	3.8	6.8	8.5	8.6	7.6	7.2	6.6	6.3	5.8	5.8	5.4	5.2	4.3	3.0	2.9
2010	6.3	2.4	0.8	0.8	1.5	3.7	6.6	8.0	8.2	7.5	7.2	6.8	6.4	6.4	5.8	5.9	5.1	4.8	3.0	2.7
2011	5.6	2.0	0.8	0.8	1.5	3.4	6.1	7.3	7.8	7.1	7.0	6.9	6.8	6.9	6.1	6.5	5.5	5.2	3.3	3.1

Source: Stats SA Causes of Death 2011.[35]

Note: Excluding deaths with unspecified age. Data for 2007-2010 updated to include late registrations processed in 2013.

Table 6: Mortality indicators by province

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Adult mortality (45q15 – probability of dying between 15-60 years of age)											
2009 ASSA2008	41.7	51.7	41.3	53.6	33.1	50.2	36.0	48.6	31.3	44.4	a
2009 ASSA2008 female	58.1	44.2	34.5	45.4	29.3	46.1	29.5	40.8	25.7	37.4	a
2009 ASSA2008 male	53.2	59.2	48.1	61.7	36.8	54.2	42.6	56.4	36.9	51.4	a
2009 RMS 2012 female	-	-	-	-	-	-	-	-	-	40.0	b
2009 RMS 2012 male	-	-	-	-	-	-	-	-	-	51.0	b
2009 RMS 2012 total	-	-	-	-	-	-	-	-	-	46.0	b
2010 ASSA2008	40.0	49.0	40.0	52.0	33.5	47.6	36.7	46.3	31.9	43.1	a
2010 ASSA2008 female	53.5	41.1	33.7	44.0	29.3	42.9	30.4	38.6	26.5	36.3	a
2010 ASSA2008 male	50.9	56.8	46.3	60.0	37.8	52.2	43.0	54.0	37.4	50.0	a
2010 GBD 2010 female	-	-	-	-	-	-	-	-	-	35.0	c
2010 GBD 2010 male	-	-	-	-	-	-	-	-	-	44.1	c
2010 IHME female	-	-	-	-	-	-	-	-	-	43.9	d
2010 IHME male	-	-	-	-	-	-	-	-	-	53.2	d
2010 RMS 2012 female	-	-	-	-	-	-	-	-	-	38.0	b
2010 RMS 2012 male	-	-	-	-	-	-	-	-	-	48.0	b
2010 RMS 2012 total	-	-	-	-	-	-	-	-	-	43.0	b
2011 ASSA2008	39.4	47.2	39.4	51.3	33.9	46.1	37.2	44.8	32.5	42.6	a
2011 ASSA2008 female	46.0	39.6	33.5	43.6	29.5	41.3	31.2	37.6	27.2	36.1	a
2011 ASSA2008 male	46.6	54.8	45.3	59.0	38.4	51.0	43.2	52.1	37.7	49.2	a
2011 RMS 2012 female	-	-	-	-	-	-	-	-	-	35.0	b
2011 RMS 2012 male	-	-	-	-	-	-	-	-	-	46.0	b
2011 RMS 2012 total	-	-	-	-	-	-	-	-	-	40.0	b
2012 ASSA2008	40.1	46.3	39.2	51.1	34.3	45.5	37.6	44.1	32.9	42.5	a
2012 ASSA2008 female	46.1	39.0	33.8	43.7	29.8	40.8	31.9	37.3	27.9	36.2	a
2012 ASSA2008 male	46.4	53.5	44.7	58.4	38.7	50.3	43.3	50.8	37.9	48.8	a
2012 RMS 2012 female	-	-	-	-	-	-	-	-	-	32.0	b
2012 RMS 2012 male	-	-	-	-	-	-	-	-	-	44.0	b
2012 RMS 2012 total	-	-	-	-	-	-	-	-	-	38.0	b

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Life expectancy at birth											
2009 ASSA2008	54.4	53.8	59.8	52.7	63.2	54.2	61.8	56.4	65.0	57.6	a
2009 ASSA2008 female	57.7	57.1	63.1	56.1	65.8	56.2	65.3	59.7	68.3	60.9	a
2009 ASSA2008 male	51.2	50.6	56.7	49.2	60.7	52.3	58.4	53.1	61.7	54.3	a
2009 RMS 2012 female	-	-	-	-	-	-	-	-	-	59.7	b
2009 RMS 2012 male	-	-	-	-	-	-	-	-	-	54.6	b
2009 RMS 2012 total	-	-	-	-	-	-	-	-	-	57.1	b
2009 mid-year total	-	-	-	-	-	-	-	-	-	56.8	e
2010 ASSA2008	55.2	55.1	60.3	53.4	63.0	55.6	61.6	57.2	64.7	58.2	a
2010 ASSA2008 female	58.7	58.7	63.4	56.9	65.8	57.9	64.9	60.6	68.0	61.5	a
2010 ASSA2008 male	51.8	51.6	57.2	49.9	60.3	53.3	58.3	53.8	61.5	54.9	a
2010 RMS 2012 female	-	-	-	-	-	-	-	-	-	61.2	b
2010 RMS 2012 male	-	-	-	-	-	-	-	-	-	56.0	b
2010 RMS 2012 total	-	-	-	-	-	-	-	-	-	58.5	b
2010 mid-year total	-	-	-	-	-	-	-	-	-	57.6	e
2011 2006-2011 mid-year female	55.5	49.8	60.8	55.2	60.8	56.6	57.9	54.3	66.1	-	e
2011 2006-2011 mid-year male	49.8	45.9	57.7	50.0	55.4	51.8	52.2	49.9	60.6	-	e
2011 ASSA2008	55.7	56.0	60.5	53.8	62.9	56.4	61.4	57.8	64.6	58.4	a
2011 ASSA2008 female	59.1	59.5	63.5	57.3	65.7	58.9	64.7	61.1	67.7	61.7	a
2011 ASSA2008 male	52.2	52.5	57.6	50.3	60.1	54.0	58.2	54.5	61.5	55.2	a
2011 RMS 2012 female	-	-	-	-	-	-	-	-	-	63.3	b
2011 RMS 2012 male	-	-	-	-	-	-	-	-	-	57.7	b
2011 RMS 2012 total	-	-	-	-	-	-	-	-	-	60.5	b
2011 mid-year total	-	-	-	-	-	-	-	-	-	58.1	e
2012 ASSA2008	55.9	56.4	60.6	53.9	62.8	56.8	61.4	58.1	64.5	58.5	a
2012 ASSA2008 female	59.3	59.9	63.5	57.3	65.7	59.3	64.5	61.3	67.5	61.7	a
2012 ASSA2008 male	52.4	53.0	57.8	50.6	60.0	54.3	58.3	55.0	61.5	55.4	a
2012 RMS 2012 female	-	-	-	-	-	-	-	-	-	64.0	b
2012 RMS 2012 male	-	-	-	-	-	-	-	-	-	58.5	b
2012 RMS 2012 total	-	-	-	-	-	-	-	-	-	61.3	b
2012 mid-year total	-	-	-	-	-	-	-	-	-	58.7	e

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a ASSA2008.[72]
b RMS 2012.[64]
c Global Burden of Disease 2010.[73]
d Rajaratnam et al., 2010.[74] Data from source converted from value per 1 000 to percentage.
e Stats SA Mid-year Estimates. 2013 mid-year estimates.[23]

Disability

Context	Interpreting measures of the prevalence of disability over time requires careful attention to the exact definitions used and the means by which responses are elicited in various surveys. The questions used in the Stats SA General Household Survey remain as introduced in 2009.
New data sources	Nationally, new data have been reported in the: • Stats SA General Household Survey (GHS) 2012 • District Health Information System (DHIS) (cataract surgery indicator) Internationally, reports of interest include: • UNICEF report "The State of the World's Children: Children with Disabilities" 2013
Key issues and trends	Accurately identifying disability in younger children remains a challenge. Once new methodologies are developed and standardised, they will need to be incorporated in national survey tools.

The questions in the Stats SA General Household Survey dealing with disability remain as they have since 2009, and require "each person in the household to rate their ability level for a range of activities such as seeing, hearing, walking a kilometre or climbing a flight of steps, remembering and concentrating, self-care, and communicating in his/her most commonly used language, including sign language". Those who report that they have some difficulty with two or more of the listed activities or have considerable difficulty, or are unable to perform any one activity, are then classified as disabled. However, responses are only elicited for those aged five years or older. Based on this classification, 5.1% of South Africans aged five years and older were classified as disabled in 2012, compared with the 7.4% recorded in the Census 2011.[38] However, both the GHS 2012 and Census 2011 showed the prevalence of disability to be highest in the Free State, North West and Northern Cape, and lowest in Gauteng and the Western Cape. While this may be explained by the relative youth of populations in provinces that have a net in-migration, it also appears to mirror socio-economic gradients. Based on data from the World Health Surveys 2002–2004, a clear gradient in the prevalence of disability among adults was shown by household wealth quintile.[75] In this analysis, while overall crude prevalence of disability in adults in South Africa was 20.0%, it varied from 33.5% in quintile 1 (poorest) to 7.4% in quintile 5 (wealthiest). It is worth recalling that Ataguba has shown a greater concentration of multi-morbidity among the poor in South Africa than among the rich, and also that this holds true to a greater extent for disabilities than for multi-morbidity in illness.[51]

Cataract surgery continues to receive attention as an accessible and effective intervention. Public-private partnerships have been mooted as one way to shorten the waiting lists for such surgery. Globally, attention has been paid to the prevalence of non-traumatic cataract among in Africa – estimated to affect 82 000 children, with 19 000 new cases a year – but no specific data on the situation in South Africa are available.[76] The degree to which child eye health has been neglected in Africa has also been highlighted.[77] In time, as data are generated from the School Health programme, it will be possible to track progress in South Africa more closely.

In 2013, the UNICEF annual report – The State of the World's Children – focused on children with disabilities.[78] The report drew attention to the difficulties of comparing data from different settings, using different definitions of disability: "Because children develop and learn to perform basic tasks at different speeds, it can be difficult to assess function and distinguish significant limitations from variations in normal development". It noted that "[m]any data collection instruments, including household surveys and censuses, are based on parental responses only, with caregivers normally expected to assess and report the disability status of children under their care". Parents and caregivers may lack the ability to gauge age-appropriate behaviours, and to distinguish disability from normal developmental differences. Together with the Washington Group on Disability Statistics, UNICEF is contributing to the development of new methodologies, suitable for children aged two to 17 years. The challenge of existing methods, such as the Ten Questions screening tool used in Multiple Indicator Cluster Surveys to elicit responses from primary caregivers of children aged two to nine years, is clearly demonstrated in the range of prevalence estimates generated. When this method was used in 2005–2006, the percentage of children who screened positive for disability ranged from 3% in Uzbekistan to 48% in the Central African Republic.

Table 7: Disability indicators by province

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Cataract surgery rate											
2010	784.4	899.5	213.5	319.5	717.5	604.1	259.0	468.8	1 094.0	547.6	a
2011	1 002.1	821.3	555.6	633.6	765.3	629.4	416.7	363.9	1 209.7	729.5	b
2012	962.5	471.2	412.8	685.4	737.4	662.1	448.9	426.4	-	553.2	c
Prevalence of disability (%)											
2010 GHS	7.9	10.1	3.3	6.6	8.2	5.0	9.8	8.5	5.0	6.3	d
2011 GHS	6.1	6.7	3.3	4.6	6.1	5.5	10.2	7.7	4.4	5.2	d
2012 GHS	6.0	7.6	3.5	5.0	5.0	5.4	7.1	7.2	4.6	5.1	d
2012 WHODAS score	2.6	3.1	2.0	3.1	3.2	3.9	3.0	2.4	1.4	2.5	e
Prevalence of hearing disability (%)											
2012 age 15+	10.8	14.3	7.0	13.6	10.5	10.3	4.0	7.2	9.0	9.5	f

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a DHIS.[30] Incomplete data. For 2010/11 financial year.

b DHIS.[30] Total surgeries: 36 862. For 2011/12 financial year.

c DHIS.[30] 2012/13 financial year.

d Stats SA GHS 2010-12.[36,38,60] The question asks each person in the household to rate their ability level for a range of activities. These include: seeing, hearing, walking a kilometre or climbing a flight of steps, remembering and concentrating, self-care and communicating in his/her most commonly used language, including sign language. During the analysis, individuals who said that they had some difficulty in two or more of the activities or a lot of difficulty/unable to do in any one activity were ranked as disabled. Since this question is very different from the question asked in previous surveys, no comparison over time is possible. This analysis only includes the percentage of persons aged five years and older with a disability. This is because children under five years are often mistakenly categorised as being unable to walk, remember, communicate or care for themselves when it is due to their level of development rather than any innate disabilities they might have.

e SANHANES-1.[61] The WHO Disability Assessment Scale (DAS) score provides an indication of the overall level of self-reported disability in the 30 days preceding the interview when the survey was conducted. It is expected that the level of disability will increase with age. In SANHANES-1, a very low level of disability was reported at all ages, including the middle and older age group, although the results show a trend of increasing disability with age.

f SANHANES-1.[61] Self-reported prevalence of wearing a hearing aid.

Infectious disease

Context	No reports have been issued by the National Department of Health's Notifiable Disease system for some years. The only sources of data now available are the reports issued by the National Institute for Communicable Diseases (NICD).
New data sources	Nationally, new data have been reported in the: • Surveillance data, surveillance bulletins and other reports issued by NICD • Antenatal HIV and Herpes Simplex Type-2 Prevalence Survey 2012
Key issues and trends	The Antenatal Sentinel HIV Prevalence Survey 2012 was released in May 2014. In this survey, screening for syphilis was been replaced by a focus on herpes simplex 2 infections. However, in this pilot phase, data were only gathered from four purposively selected provinces.

No new national data on the incidence of most notifiable conditions can be provided, as no data have been reported from the National Department of Health since the 2010 edition of the *South African Health Review*. As was noted in the 2012/13 *Review*, some data on these conditions have been reported by the National Institute for Communicable Diseases (NICD), based on positive identification by their laboratories or surveillance sites, or following their involvement in investigations of outbreaks. In November 2013, the NICD Communicable Disease Surveillance Bulletin included a table of the "provisional number of laboratory confirmed cases of diseases under surveillance reported to the NICD", for the periods 1 January 2012 to 30 September of both 2012 and 2013.[79] Overlapping data for the periods 1 January to 31 December of 2011 and 2012 had previously been published.[80] These data cannot, however, replace the comprehensive reporting that is expected of the National Department of Health's Notifiable Disease system. Compliance with the requirement for notification will inevitably decline unless the system is seen to be working and the results of notification are made public. The NICD report also included a number of conditions/organisms that fall outside of the notifiable disease list, but are responsible for large numbers of positive cases, such as *Cryptococcus* spp and invasive *Haemophilus influenzae* and *Streptococcus pneumoniae* infections.

As was described in the *South African Health Review* 2012/13, screening for syphilis was replaced with a focus on herpes simplex 2 infections from the Antenatal Sentinel HIV Prevalence Survey 2012.[81] Routine testing for syphilis will still be conducted as part of antenatal care, although data are also no longer collected by the DHIS. Globally, data from national syphilis seropositivity systems or antenatal surveys were reported in 2013, highlighting the need for continued attention to the quality of antenatal screening.[82]

Internationally, the development of new treatment options for hepatitis C virus (HCV) has refocused attention on this condition. A national HCV surveillance database has been developed at the NICD.[80] From January 2010 to December 2012, the NICD identified 1 002 positive patient specimens, of which 53% were from males. In total, 16 genotypes were identified, although genotype 5a was dominant (accounting for 36% of positive samples). There are limited data on the prevalence of HCV across Africa, although Egypt has the highest prevalence in the world (17.5%), predominantly of genotype 3.[83]

Frean and Mendelson have drawn attention to the high burden of helminth infections in South Africa, including schistosomiasis.[84] Efforts to ensure access to preventive chemotherapy campaigns for schistosomiasis in African children have continued.[85] However, this field was disappointed by the results of the massive Deworming and Enhanced Vitamin A (DEVTA) cluster-randomised trial in India, which failed to show an impact on mortality from six-monthly oral vitamin A and albendazole administration.[86]

The NICD reported that seven laboratory-confirmed cases and an additional five clinical cases of human rabies had been recorded in South Africa in 2013.[87]

Of particular relevance to the choice of indicators, and their use to track progress towards targets, was the carefully considered analysis of the leprosy elimination campaign published in the British Medical Journal in 2014.[88] In India and Brazil, official concern about meeting elimination targets led to changes in practice which had the effect of hiding both existing and new cases. Not only was this poor public health practice, but it also hampered access to treatment. This publication contained a salutary lesson in a short sentence: "South Africa attained elimination rates in 1926 but new cases still present today." The authors summarised the lessons as follows: "Elimination of any disease is a powerful target and sets high expectations … The lessons of leprosy show that monitoring of targets must be transparent. Workers strive to reach targets and find unexpected ways of doing so, particularly if incentives or pressure is exerted on them … Targets need to be evidence based. Like a battle strategy, they need to be reviewed regularly and amended when inappropriate." Those lessons should be borne in mind whenever targets are set and indicators chosen, and when progress is celebrated.

Table 8: Selected infectious disease indicators by province

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Reported cases of cholera											
2010 NICD lab confirmed cases	-	-	1	-	-	-	-	-	-	1	a
2011 NICD lab confirmed cases	-	-	-	-	1	-	-	-	-	1	b
2012 NICD lab confirmed cases	-	-	-	-	-	-	-	-	-	0	c
2013 NICD lab confirmed cases	-	-	-	-	1	-	-	-	-	1	d
Reported cases of measles											
2010 NICD lab confirmed cases	1 309	674	1 617	3 837	290	1 844	374	758	1 796	12 499	a
2011 NICD lab confirmed cases	4	2	36	23	1	2	8	8	8	92	b
2012 NICD lab confirmed cases	0	2	8	6	1	0	0	2	1	20	c
2013 NICD lab confirmed cases	2	0	3	1	0	0	0	1	1	8	d
Reported cases of rabies											
2010 NICD lab confirmed cases	2	0	1	3	3	1	1	0	0	11	a
2011 NICD lab confirmed cases	2	0	0	1	3	0	0	0	0	6	b
2012 NICD lab confirmed cases	1	1	0	4	3	1	0	0	0	10	e
2013 NICD lab confirmed cases	0	2	0	1	3	1	0	0	0	7	d
Syphilis prevalence rate (%) (antenatal)											
2010 ANC survey	2.1	1.2	2.8	0.3	0.5	2.1	3.6	1.3	1.2	1.5	f
2011 ANC survey	1.8	1.9	2.0	0.4	0.7	4.1	3.8	1.7	1.6	1.6	g

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a NICD surveillance. Communicable Diseases Surveillance Bulletin Mar 2011.[89] Data for Jan-Dec 2010.

b NICD surveillance. Communicable Diseases Surveillance Bulletin Apr 2012.[90] Data for Jan-Dec 2011.

c NICD surveillance. Communicable Diseases Surveillance Bulletin Apr 2013.[80] Data for Jan-Dec 2012.

d NICD surveillance. Communicable Diseases Surveillance Bulletin Apr 2014.[91] Data for Jan-Dec 2013.

e NICD surveillance. Communicable Diseases Surveillance Bulletin Apr 2013.[80] Data for Jan-Dec 2012. Updated GP and KZN from Nov 2013 bulletin.

f Antenatal Survey 2010.[92]

g Antenatal Survey 2011.[93]

Malaria

Context	South Africa has committed to the elimination of malaria by 2018.
New data sources	Nationally, new data have been reported in the: • NDoH malaria surveillance • Stats SA Mortality and causes of death in South Africa, 2010: Findings from death notification Internationally, reports of interest include: • WHO World Malaria Report 2013 • Roll Back Malaria: Progress and Impact Series Country Reports: Focus on South Africa 2013
Key issues and trends	Increasingly, the burden of malaria in South Africa is related to cross-border travel. Cases are therefore being reported from all provinces, not only those that include areas where malaria is still endemic. A new malaria risk map has been produced, with significant changes to the assessment of risk in KwaZulu-Natal.

The foreword to an extensive series of articles on malaria in the October 2013 issue of the South African Medical Journal (SAMJ) noted that South Africa was one of 34 malaria-endemic countries targeting elimination of the disease.[94] The accompanying review of the epidemiology of malaria in South Africa described the system for malaria surveillance, focused on the three endemic provinces (KwaZulu-Natal, Limpopo and Mpumalanga), thus:

> Active and passive case reports are fed into provincial desktop malaria information systems (MIS) and then integrated nationally using a web-based platform. Cases diagnosed in clinics or hospitals are entered in registers and reported to district offices weekly. Details of cases diagnosed by [rapid diagnostic tests] RDT or microscopy by programme field staff are entered into the provincial MIS. This allows the automated or customised generation of aggregate daily, weekly, monthly, annual or seasonal reports at facility, locality, municipality (sub-district), district or provincial level. These data facilitate detailed planning and review at provincial level, and monitoring at national level. Ongoing system maintenance, data flow and quality control are effected at provincial level with national support … The MIS is currently used in the three malaria-endemic provinces in SA. Data are uploaded weekly by the information officer to a central server housed at the South African Medical Research Council in Durban. Data are further verified by the staff in the database section before a web-based data (Malaria Data Management System (MDMS) warehouse is updated with the latest datasets.[95]

In addition, data are collected on the process of indoor residual spraying: "Indoor residual spraying (IRS) activity is recorded on field data cards, summarised by field managers and then entered into the electronic data-management system. Captured data include number of structures sprayed, type and quantity of insecticide used, and locality of spraying. The electronic system generates routine spraying coverage rates, insecticide use, spray personnel activity and application rates."

The challenges posed by the shifting case load on the data collection system are immense. In 2012, there were more cases reported in Gauteng (1 136) than in KwaZulu-Natal (355). More deaths occurred in Gauteng (23) than in any of the endemic provinces (KwaZulu-Natal 2, Limpopo 13, Mpumalanga 10). As reported in the SAMJ, between January and December 2011, 64% of all reported malaria cases were imported. In Gauteng, KwaZulu-Natal and Mpumalanga, 85% of cases were assessed as originating in Mozambique. In Limpopo, 30% of the imported cases were from Mozambique and 53% were from Zimbabwe. Integrating the data collection efforts of all provinces will be necessary if elimination efforts are to be tracked with confidence. As Moonasar et al. have argued, "enhanced surveillance will still have at its core a reliable passive case detection system, but it will have to be complemented with extensive active surveillance".[96] Trends in the number of deaths recorded by surveillance and vital registration suggest that the gap between these two data sources is narrowing (Figure 7). The journal also included a new malaria risk map for South Africa, which has major implications for the advice provided on chemoprophylaxis.[97]

A teasing example of the shifts in malaria epidemiology was provided by a report in the NICD Communicable Disease Communiqué in February 2013 of two clusters (seven cases in total) of odyssean malaria in Gauteng. In neither cluster could the source of the infected mosquitoes be identified.[98]

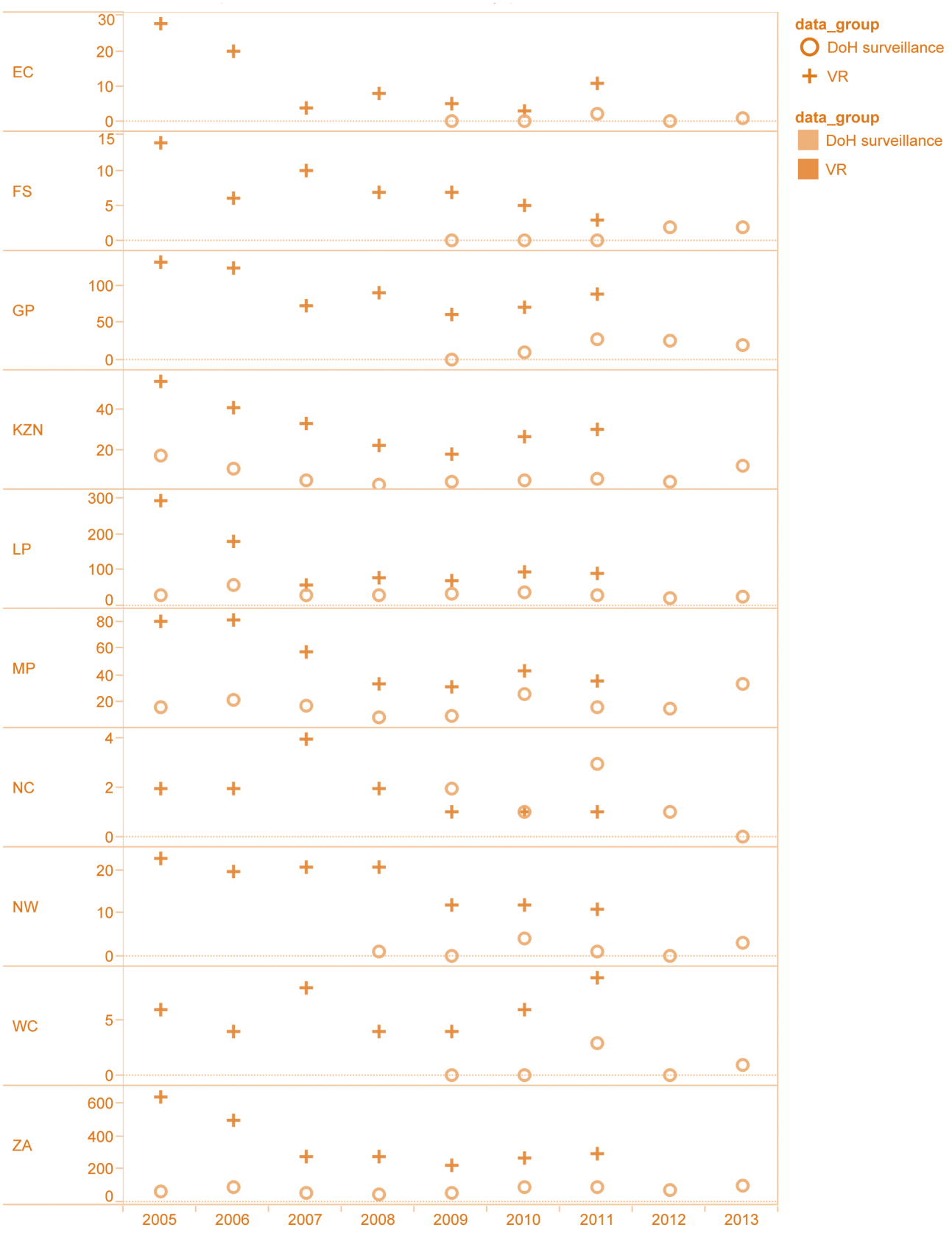
The World Malaria Report 2013 again listed South Africa as among the eight countries out of 43 in the African region that are on track to achieve reductions in reported malaria case incidence or malaria admission rates of 75% or more (the others being Botswana, Cabo Verde, Eritrea, Namibia, Rwanda, Sao Tome and Principe, Swaziland and the island of Zanzibar).[99] The report also noted South Africa's membership of the Elimination Eight (E8) regional initiative, although it noted that four of these (Botswana, Namibia, South Africa and Swaziland) aimed to eliminate malaria by 2015 (not 2018 as reported by Blumberg and Moonasar). Globally, the WHO estimated that only 14% of malaria cases were detected by routine health information systems. Case detection rates were lowest in countries with the greatest number of cases, as were proportions of deaths recorded. Maintaining the quality of surveillance systems will also be difficult as caseloads drop and attention is potentially diverted to other priorities.

In October 2013, the WHO and the Roll Back Malaria initiative also provided a progress report on South Africa's efforts.[100] This report provided some interesting additional data on the fight against malaria: in 2012, about 1.8 million structures were sprayed as part of the vector control programme; in 2011, 61% of malaria cases were confirmed by microscopy and 39% by rapid diagnostic tests (RDTs). However, this comment bears noting: "Currently the malaria control programme in South Africa does not routinely collect RDT and ACT [artemesinin-combination therapy] utilization data as this function lies with pharmaceutical units and obtaining the data is difficult. Anecdotally, malaria managers are confident there are seldom stock-outs of RDTs and ACTs, and that all confirmed

malaria cases are treated with ACTs for uncomplicated malaria and with quinine for complicated malaria, especially in the endemic provinces. However, for South Africa to track its delivery and usage of diagnostic tests and ACTs, it needs to ensure that this data is routinely collected."

Across Africa, a massive geocoding exercise has also shown the degree to which the populations at risk of malaria have been reduced since 2000.[101] Increasingly, the highest risk is concentrated in a few African countries. Just 10 African countries (Guinea, Togo, Mali, Mozambique, Burkina Faso, Ghana, Côte d'Ivoire, Uganda, Nigeria, and the Democratic Republic of Congo) contained 87.1% of the population living in areas of hyperendemic or holoendemic transmission in 2010. The proximity of one of these – Mozambique – is therefore of fundamental importance to local malaria elimination efforts.

Figure 7: Number of deaths due to malaria recorded by DoH malaria surveillance and vital registration



Source: DoH Malaria Statistics (surveillance) and Vital Registration from Stats SA Causes of death (online database, multiple years) using ICD-10 codes B50-B54 as underlying cause of death.

Table 9: Malaria indicators by province

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Case fatality rate: malaria											
2008	-	0.0	-	0.5	0.7	0.5	-	0.7	-	0.6	a
2009	-	0.0	0.0	0.9	1.1	0.4	-	3.1	-	0.8	b
2010	0.0	0.0	1.1	1.3	0.9	1.1	8.3	2.1	0.0	1.1	b
2011	1.2	0.0	1.3	1.0	0.8	0.4	4.5	1.1	3.0	0.9	b
2012	0.0	4.0	1.8	0.8	1.0	0.5	3.0	0.0	0.0	1.0	b
2013	3.2	2.7	1.1	2.0	1.1	0.8	0.0	3.4	1.4	1.1	b
Reported cases of malaria											
2008	0	52	0	582	4 392	1 655	0	135	0	6 816	a
2009	-	23	163	428	3 155	1 900	-	64	-	5 733	b
2010	9	34	960	380	4 215	2 195	12	186	75	8 066	b
2011	156	81	2 080	598	3 451	3 259	66	85	97	9 873	b
2012	2	49	1 430	486	1 998	2 745	33	26	54	6 823	b
2013	31	72	1 761	575	2 412	3 797	18	87	67	8 820	b
Reported cases of malaria (per 100 000)											
2008	0.0	1.8	0.0	5.6	84.5	46.3	0.0	3.9	0.0	14.0	c
2009	-	0.8	1.3	4.2	59.9	48.5	-	1.9	-	11.4	d
2010	0.1	1.2	8.0	3.7	79.1	55.2	1.0	5.3	1.3	15.8	d
2011	2.3	2.9	17.0	5.8	64.0	81.0	5.7	2.4	1.6	19.1	d
2012	0.0	1.7	11.4	4.6	36.6	67.3	2.8	0.7	0.9	13.0	d
2013	0.4	2.6	13.8	5.4	43.7	91.9	1.5	2.4	1.1	16.6	d
Reported deaths from malaria											
2008 DoH surveillance	-	-	-	3	31	8	-	1	-	43	a
2008 VR	8	7	92	22	79	33	2	21	4	279	e
2009 DoH surveillance	-	0	0	4	35	9	2	-	-	50	b
2009 VR	5	7	61	18	70	31	1	12	4	222	f
2010 DoH surveillance	0	0	11	5	40	26	1	4	0	87	b
2010 VR	3	5	71	27	94	43	1	12	6	271	g
2011 DoH surveillance	2	0	29	6	31	16	3	1	3	91	b
2011 VR	11	3	90	30	91	36	1	11	9	291	h
2012 DoH surveillance	0	2	27	4	21	15	1	0	0	70	b
2013 DoH surveillance	1	2	21	12	27	33	0	3	1	100	b

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a DoH Malaria Statistics. Data file received 2012-08-28. Data for Jan-Dec.

b DoH Malaria Statistics. Data file received 2014-04-03. Data for Jan-Dec.

c DoH Malaria Statistics. Data file received 2012-08-28. Data for Jan-Dec. Calculated using Stats SA mid-year population estimates for the relevant year.

d DoH Malaria Statistics. Data file received 2014-04-03. Data for Jan-Dec. Calculated using Stats SA mid-year population estimates for the relevant year.

e Stats SA Causes of death 2008.[102] Calculated from Stats SA Causes of Death online database using ICD-10 codes B50-B54 as underlying cause of death. Includes deaths occurring outside of SA.

f Stats SA Causes of death 2009.[103] Calculated from Stats SA Causes of Death online database using ICD-10 codes B50-B54 as underlying cause of death. Includes 13 deaths occurring outside of SA.

g Stats SA Causes of death 2010.[103] Calculated from Stats SA Causes of Death online database using ICD-10 codes B50-B54 as underlying cause of death. Includes 9 deaths not recorded by province.

h Stats SA Causes of death 2011.[35] Calculated from Stats SA Causes of Death online database using ICD-10 codes B50-B54 as underlying cause of death. Includes 9 deaths not recorded by province.

Tuberculosis

Context	South Africa is one of the countries most affected by tuberculosis, with significant numbers of drug-resistant cases. While there is a policy commitment to an integrated approach to the management of HIV and TB, the reality is still one of fragmentation and lost opportunities.
New data sources	Nationally, new data have been reported in the: • NDoH Electronic Tuberculosis Register (ETR.Net) and MDR TB statistics • Stats SA Mortality and causes of death in South Africa, 2010 and 2011: Findings from death notification • South African National Health and Nutrition Examination Survey (SANHANES-1) • National Institute for Communicable Disease (NICD) reports Internationally, reports of interest include: • WHO Global Tuberculosis Report 2013 • WHO Roadmap for Childhood Tuberculosis: Towards Zero Deaths 2013 • MSF Crisis Alert on global drug-resistant TB • World Bank report on TB in mineworkers
Key issues and trends	Although South Africa dominates the world's use of new diagnostic technology in the form of the Xpert MTB/RIF assay, and has generated considerable research findings that should inform practice, it continues to fail to meet global targets for TB treatment success. South Africa remains one of the highest-burden countries, with a stable but unacceptable treatment success rate, and with a considerable burden of drug-resistant TB. In the case of XDR-TB, outcomes remain poor and the infrastructure for caring for such patients safely and effectively is still deficient.

Apart from the routine data that are reported by means of the NDoH Electronic Tuberculosis Register (ETR.Net), important insights into the state of tuberculosis services, at least in the public sector, are apparent from the reports issued by the National Institute for Communicable Disease (NICD). In January 2013, the NICD outlined several important initiatives, including a "process of cleaning, collating and analysing historical TB data from 2004 to 2011", the integration of TB data into the Group for Enteric, Respiratory and Meningeal Disease Surveillance in South Africa (GERMS-SA) (which would allow for enhanced surveillance of rifampicin-resistant TB), and the integration of TB into the Severe Acute Respiratory Infections (SARI) surveillance network (allowing for the estimation of the proportion of patients with laboratory-confirmed TB among patients admitted with severe respiratory infection at selected surveillance sites).[104] The same edition also provided a progress report on the South African National Tuberculosis Drug Resistance Survey (DRS). In the period from 18 June to 31 December 2012, a total of 20 109 patients were enrolled in the survey. By June 2013, more than 80 000 patients had been enrolled.[105] However, only the following results were reported: "Preliminary analysis shows a smear-positivity rate of around 8% and a culture-positivity rate of around 13% among people suspected to have TB, with variation across provinces."

In April 2014, a Joint Review of HIV, TB and PMTCT Programmes in South Africa was published by the National Department of Health, together with a range of development partners and international organisations.[106] In addition to drawing on existing data sources, the Review also involved interviews with over 160 individuals representing 29 different institutions and field visits to about 100 health facilities in 21 districts. Of relevance to TB control, the Review noted an increase in case detection, an increase in the number of sites initiating multidrug-resistant TB (MDR-TB) treatment, but also low HIV and TB treatment coverage among children and adolescents. Although the report claimed "successful, functional integration of HIV, TB and prevention of mother-to-child transmission of HIV (PMTCT) services, particularly at primary care level", it did note that "closer integration of the programmes are less well defined at the level of the National and Provincial Departments of Health".

At the launch of the decentralised MDR-TB policy framework, the NDoH Director of the TB and HIV cluster showed that the number of notified MDR-TB cases almost doubled from 2010 (7 386 cases) to 2012 (14 161 cases).[107] The increase in KZN over the same period was even more dramatic, from 2 032 to 6 630 MDR-TB cases. In 2012, a total of 1 545 laboratory-confirmed extensively drug-resistant TB (XDR TB) cases were identified, 754 of these in KZN. However, only 701 XDR-TB cases were started on treatment. Decentralisation and de-institutionalisation of MDR-TB care has the potential to reduce the time between diagnosis and accessing treatment, thus improving the poor cure rates currently achieved.

Initial data have also been reported from the South African National Health and Nutrition Examination Survey (SANHANES-1) cohort. In addition to data on the social and psychological determinants of TB (such as participants' views on the seriousness of the illness, its relationship with HIV and whether it could be cured), the SANHANES-1 cohort provided a figure for the self-reported life-time prevalence of TB in respondents 15 years and older (5.9%). Importantly, respondents showed poor knowledge of the common presenting signs and symptoms of TB, which would affect their health-seeking behaviour.[108]

Internationally, research has provided pointers to techniques that could improve the quality of TB care. For instance, a systematic review and meta-analysis of studies of pre-treatment loss to follow-up in low- and lower-middle income countries and high-burden countries showed how not counting such individuals would lead to an underestimation of case detection rates and mortality, while overestimating cure rates.[109] An article in a Lancet series on tuberculosis emphasised the extent of TB co-morbidity with a range of communicable and non-communicable diseases, and thus how integration was an imperative in all settings.[110] Based on an

analysis of surveillance data, it was predicted that only six out of 30 countries expected to identify more than 1 000 multi-drug-resistant (MDR) TB cases in 2011 would be able to achieve universal access to MDR-TB care by 2015.[111] South Africa was among that number, along with Belarus, Brazil, Kazakhstan, Peru and Ukraine.

Local research continues to inform practice in relation to TB, sometimes with surprising results. In January 2014, the formal results of the Thibela study were published, which disappointingly showed that mass screening and treatment for latent TB with isoniazid had no significant effect on TB control in a mining setting.[112] Efforts to integrate TB care and elements of HIV treatment and prevention have also received attention,[113-117] as have efforts to improve the tracing of patients and thus reduce defaulter rates.[118] There has also been increasing focus on the challenges of identifying and managing MDR-TB and XDR-TB, including the application of new diagnostic tests such as Xpert MTB/RIF.[119-123]

The WHO Global Tuberculosis Report 2013 once again emphasised the incredibly high incidence of tuberculosis, which exceeds 1 000 per 100 000 population in only South Africa and Swaziland, compared with less than 10 per 100 000 in parts of the Americas, several countries in western Europe, Japan, Australia and New Zealand.[124] The countries with the largest numbers of incident cases were India (2.0 million – 2.4 million cases), China (0.9 million – 1.1 million), South Africa (0.4 million – 0.6 million), Indonesia (0.4 million – 0.5 million) and Pakistan (0.3 million – 0.5 million). Of even greater concern, the WHO estimated that 2.9 million cases were either not diagnosed or diagnosed but not reported. Of these, 75% were estimated to be in just 12 countries, of which South Africa was assessed as reflecting the most after India. The other 10 countries identified were Bangladesh, Pakistan, Indonesia, China, Democratic Republic of the Congo, Mozambique, Nigeria, Ethiopia, the Philippines and Myanmar. There was a 42% increase in the number of detected MDR-TB cases in 2012 compared with 2011, with the largest increases noted in India, South Africa and Ukraine. MDR-TB coverage gaps were estimated to have widened in China, Pakistan and South Africa. In terms of mortality, India and South Africa accounted for about one third of global TB deaths in 2012, although it was acknowledged that there was "considerable uncertainty about the level of and trends in mortality in some countries, notably Mozambique, Nigeria, South Africa and Zimbabwe". Worryingly, South Africa is still the country that reports the most XDR-TB cases, of which 1 596 were reported in 2012. The poor treatment outcomes in such patients also drew international attention in 2013.[125]

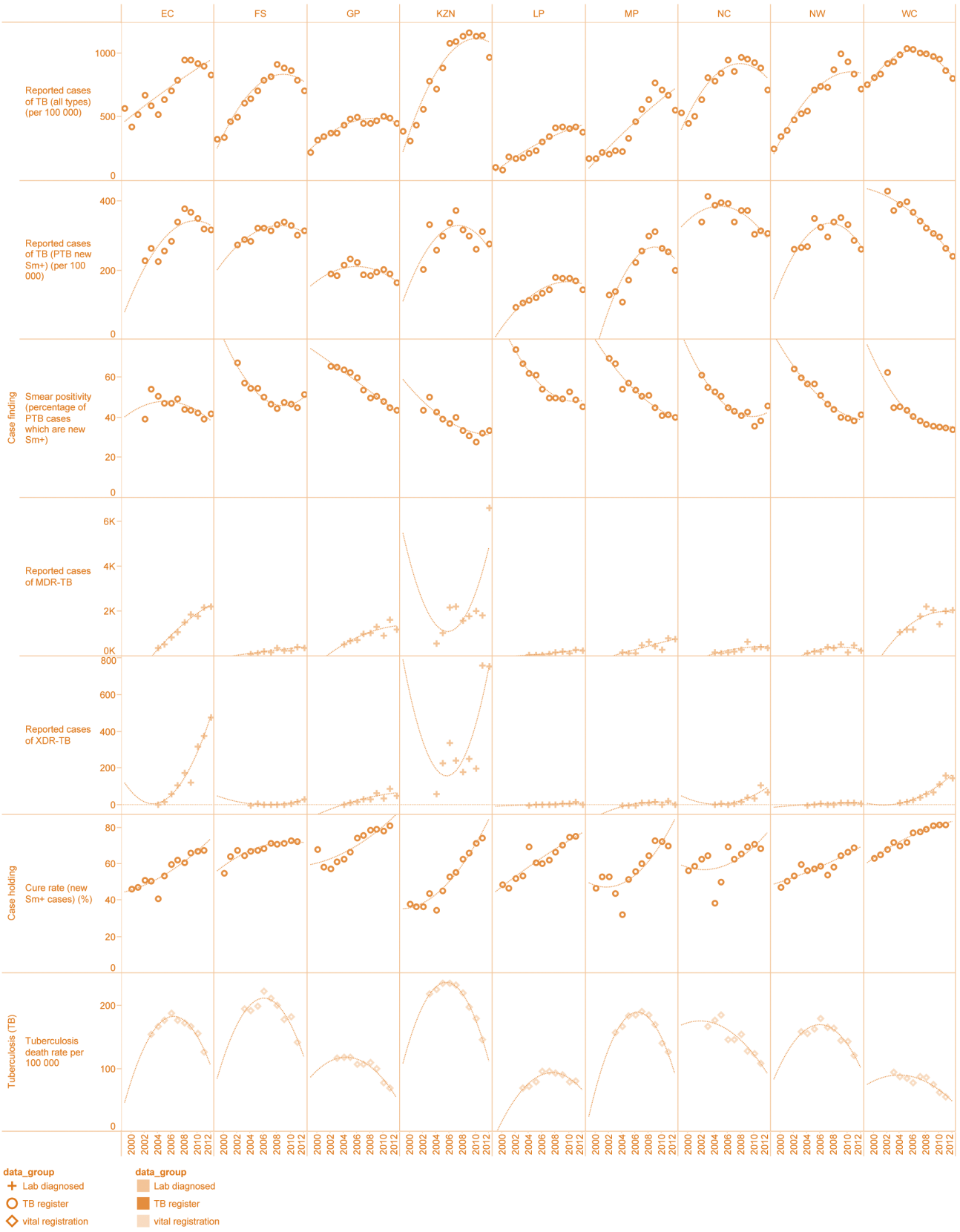
A March 2014 report focused on the particular challenge of TB in mineworkers.[126] The incidence of TB among mineworkers in South Africa (2 500 to 3 000 cases for every 100 000) is the highest among any working population in the world. This also has major implications for the countries from which such mineworkers are recruited. The report pointed out that there are currently about 500 000 mineworkers and 1.5 to 2 million ex-mineworkers in South Africa, Lesotho, Mozambique and Swaziland.

TB in children has long been a neglected aspect of this epidemic, in all settings. The WHO Roadmap for Childhood Tuberculosis was sub-titled "Towards Zero Deaths".[127] One of the key elements identified was to collect and report better data, including on preventive measures. If tuberculosis in children is poorly recognised and treated, the estimates of drug-resistant TB in children would be expected to be even more uncertain. A global estimate of 999 792 (95% CI: 937 877–1 055 414) cases of TB in children in 2010, of whom 31 948 (95% CI: 25 594–38 663) had multi-drug-resistant disease, was published in 2014.[128]

Although new anti-tuberculosis medicines (delamanid and bedaquiline) have been developed in recent years, after a gap of some decades, the effort needed to identify the best regimens, for drug-sensitive and drug-resistant forms and for the treatment of those co-infected with HIV, remains a major challenge.[129,130]

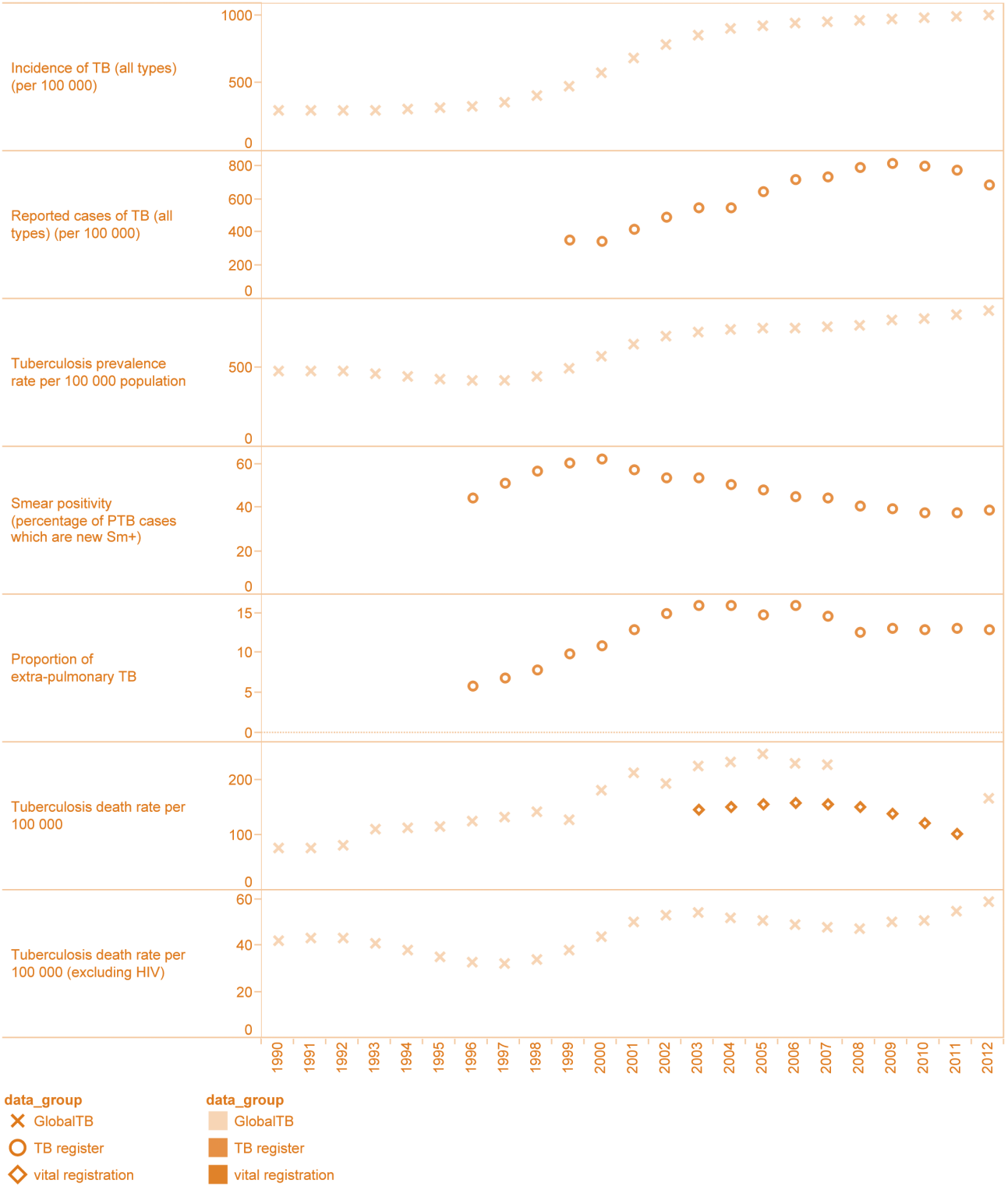
Figures 8 and 9 depict TB indicator trends by province for the period 2000–2012, drawing on various sources, followed by the national trends for the same period, by source.

Figure 8: Overview of TB indicator trends by province, 2000–2012



Source: DoH TB, Stats SA Causes of death 2003–2011, MDR Overview 2014.[107]

Figure 9: Overview of TB indicator trends for South Africa by data source, 1990–2012



Source: DoH TB, Global TB database, Stats SA Causes of death 2003–2011.

Table 10: TB programme management and other indicators

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Case detection rate (all forms)											
2008 GlobalTB	-	-	-	-	-	-	-	-	-	71	a
2009 GlobalTB	-	-	-	-	-	-	-	-	-	73	a
2010 GlobalTB	-	-	-	-	-	-	-	-	-	70	a
2011 GlobalTB	-	-	-	-	-	-	-	-	-	67	a
2012 GlobalTB	-	-	-	-	-	-	-	-	-	62	b
HIV prevalence in TB incident cases											
2008 GlobalTB	-	-	-	-	-	-	-	-	-	67.0	a
2009 GlobalTB	-	-	-	-	-	-	-	-	-	65.0	a
2010 GlobalTB	-	-	-	-	-	-	-	-	-	65.0	a
2011 GlobalTB	-	-	-	-	-	-	-	-	-	64.0	a
2012 GlobalTB	-	-	-	-	-	-	-	-	-	65.0	b
Incidence of TB (all types) (per 100 000)											
2008 GlobalTB	-	-	-	-	-	-	-	-	-	960	a
2009 GlobalTB	-	-	-	-	-	-	-	-	-	971	a
2010 GlobalTB	-	-	-	-	-	-	-	-	-	981	a
2011 GlobalTB	-	-	-	-	-	-	-	-	-	993	a
2012 GlobalTB	-	-	-	-	-	-	-	-	-	1 003	b
Treatment success rate (%)											
2008 GlobalTB	-	-	-	-	-	-	-	-	-	76	a
2009 GlobalTB	-	-	-	-	-	-	-	-	-	73	a
2010 GlobalTB	-	-	-	-	-	-	-	-	-	79	a
2011 GlobalTB	-	-	-	-	-	-	-	-	-	79	c
Tuberculosis death rate per 100 000											
2008 vital registration	173	200	110	220	93	185	155	164	86	153	d
2009 vital registration	167	178	101	197	90	170	128	144	75	140	e
2010 vital registration	156	183	77	180	79	141	123	143	63	123	f
2011 vital registration	127	142	69	147	80	127	109	121	56	105	g
2012 GlobalTB	-	-	-	-	-	-	-	-	-	168	b
Tuberculosis death rate per 100 000 (excluding HIV)											
2008 GlobalTB	-	-	-	-	-	-	-	-	-	47	a
2009 GlobalTB	-	-	-	-	-	-	-	-	-	50	a
2010 GlobalTB	-	-	-	-	-	-	-	-	-	51	a
2011 GlobalTB	-	-	-	-	-	-	-	-	-	55	a
2012 GlobalTB	-	-	-	-	-	-	-	-	-	59	b
Tuberculosis prevalence rate per 100 000 population											
2008 GlobalTB	-	-	-	-	-	-	-	-	-	761	a
2009 GlobalTB	-	-	-	-	-	-	-	-	-	795	a
2010 GlobalTB	-	-	-	-	-	-	-	-	-	803	a
2011 GlobalTB	-	-	-	-	-	-	-	-	-	831	a
2012 GlobalTB	-	-	-	-	-	-	-	-	-	857	b

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a Global TB database. Downloaded 2013-12-24.

b Global TB Control 2013.[124]

c Global TB Control 2013.[124] For the cohort: New smear-positive and/or culture-positive

d Stats SA Causes of death 2008.[102] Calculated from 74 863 deaths due to TB (ICD10 A15-A19, U51 (MDR) and U52 (XDR TB)) and Stats SA mid-year population estimates for the relevant year. No adjustment has been made for under-reporting or ill-defined causes of death notification. The rate for South Africa includes deaths that are not allocated to a specific province and will therefore be higher than the average provincial value. Based on the recorded province of death.

e Stats SA Causes of death 2009.[103] Calculated from 67 668 deaths due to TB (ICD10 A15-A19), plus 1 184 due to ICD10 U51 (MDR) and 151 due to ICD10 U52 (XDR TB) and Stats SA mid-year population estimates for the relevant year. No adjustment has been made for under-reporting or ill-defined causes of death notification. The rate for South Africa includes deaths that are not allocated to a specific province and will therefore be higher than the average provincial value. Based on the recorded province of death.

f Stats SA Causes of death 2010.[102] Calculated from 61 800 deaths due to TB (ICD10 A15-A19), plus 856 due to ICD10 U51 (MDR) and 171 due to ICD10 U52 (XDR TB) and Stats SA mid-year population estimates for the relevant year. No adjustment has been made for under-reporting or ill-defined causes. The rate for South Africa includes deaths that are not allocated to a specific province and will therefore be higher than the average provincial value. Based on the recorded province of death.

g Stats SA Causes of death 2011.[35] Calculated from 53 203 deaths due to TB (ICD10 A15-A19), plus 747 due to ICD10 U51 (MDR) and 162 due to ICD10 U52 (XDR TB) and Stats SA mid-year population estimates for the relevant year. No adjustment has been made for under-reporting or ill-defined causes. The rate for South Africa includes deaths that are not allocated to a specific province and will therefore be higher than the average provincial value. Based on the recorded province of death.

Table 11: TB case-finding indicators by province

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Bacteriological coverage rate (%)											
2006 TB register	82	89	92	79	78	72	86	77	95	-	a
2008 TB register	81	83	87	80	75	73	87	76	95	82	a
2009 TB register	80	83	81	74	77	69	86	70	95	79	a
2010 TB register	81	83	85	80	75	64	79	70	94	80	a
2011 TB register	70	75	74	73	84	67	75	64	81	73	a
2012 TB register	72	73	73	74	81	69	76	67	78	74	a
Proportion of extra-pulmonary TB											
2004 TB register	14	19	23	17	15	13	6	14	12	16	a
2005 TB register	15	17	23	14	16	10	8	13	12	15	a
2006 TB register	15	19	26	16	18	10	8	14	12	16	a
2007 TB register	12	18	23	15	18	10	8	13	11	15	a
2008 TB register	9	16	16	15	13	9	5	11	10	13	a
2009 TB register	10	17	17	15	15	9	8	11	10	13	a
2010 TB register	9	17	16	15	16	9	8	10	10	13	a
2011 TB register	9	14	15	16	17	9	7	10	12	13	a
2012 TB register	8	14	16	15	17	9	6	11	11	13	a
Reported cases of MDR-TB											
2004 Lab diagnosed	379	116	537	583	59	162	168	130	1 085	3 219	b
2005 Lab diagnosed	545	151	676	1 024	40	134	155	203	1 192	4 120	b
2006 Lab diagnosed	836	198	732	2 200	77	139	188	225	1 179	5 774	b
2007 Lab diagnosed	1 092	179	986	2 208	91	506	199	397	1 771	7 429	b
2008 Lab diagnosed	1 501	381	1 028	1 573	185	657	290	363	2 220	8 198	b
2009 Lab diagnosed	1 858	253	1 307	1 773	204	446	631	520	2 078	9 070	b
2010 Lab diagnosed	1 782	267	934	2 032	126	312	353	158	1 422	7 386	b
2011 Lab diagnosed	2 178	412	1 643	1 825	290	824	427	473	2 013	10 085	b
2012 Lab diagnosed	2 205	390	1 198	6 630	266	760	373	267	2 072	14 161	b
Reported cases of TB (PTB new Sm+) (per 100 000)											
2004 TB register	225.4	283.7	214.3	258.3	113.4	108.7	387.7	269.4	391.8	235.5	a
2005 TB register	255.5	322.0	233.8	299.8	121.6	172.4	395.4	350.9	399.2	267.5	a
2006 TB register	285.2	322.5	223.9	337.6	133.6	222.3	394.2	325.5	369.3	277.8	a
2007 TB register	339.7	314.5	187.9	372.7	143.1	256.3	340.1	298.2	343.4	283.4	a
2008 TB register	377.5	332.7	184.1	316.7	179.6	299.0	373.7	340.1	321.9	283.8	a
2009 TB register	369.0	340.9	195.1	300.0	176.1	312.6	374.4	354.0	305.9	281.6	a
2010 TB register	349.7	329.9	202.3	262.2	178.1	263.4	304.6	332.2	296.0	264.3	a
2011 TB register	319.1	302.7	189.4	312.7	169.2	254.3	315.3	286.9	264.6	259.4	a
2012 TB register	318.3	314.1	163.8	276.7	143.2	201.3	308.4	262.0	242.1	235.7	a
Reported cases of TB (PTB new Sm+)											
2004 TB register	15 978	8 370	18 965	24 970	6 248	3 527	3 487	10 257	17 907	109 709	a
2005 TB register	17 984	9 508	21 086	28 938	6 854	5 554	3 567	13 419	18 550	125 460	a
2006 TB register	20 135	9 553	20 609	32 855	7 574	7 216	3 582	12 539	17 555	131 618	a
2007 TB register	23 459	9 327	18 208	37 323	7 734	9 065	3 749	10 120	16 619	135 604	a
2008 TB register	25 304	9 329	19 882	33 071	9 551	10 631	4 088	10 713	16 234	138 803	a
2009 TB register	24 827	9 597	21 447	31 652	9 470	11 210	4 113	11 249	15 709	139 274	a
2010 TB register	23 584	9 318	22 641	27 913	9 689	9 528	3 363	10 633	15 462	132 131	a
2011 TB register	21 236	8 869	21 170	33 217	8 903	9 313	3 651	9 770	14 697	130 826	a
2012 TB register	21 234	9 240	18 591	29 620	7 567	7 428	3 585	8 977	13 659	119 901	a
Reported cases of TB (PTB)											
2004 TB register	31 631	15 323	29 663	58 216	10 084	6 508	6 614	18 083	39 597	215 719	a
2005 TB register	38 319	17 423	33 866	73 735	11 236	9 712	7 053	23 689	42 571	257 604	a
2006 TB register	42 582	19 058	34 290	88 271	14 118	13 496	7 951	24 519	43 155	287 440	a
2007 TB register	47 795	19 941	33 986	93 204	15 569	17 858	8 721	21 695	43 133	301 902	a
2008 TB register	57 517	21 013	40 134	98 876	19 146	20 777	9 978	24 259	44 545	336 245	a
2009 TB register	57 017	20 273	42 424	102 464	19 230	25 032	9 646	28 042	44 175	348 303	a
2010 TB register	55 744	19 917	47 060	100 421	18 365	23 217	9 435	26 706	43 805	344 670	a
2011 TB register	54 299	19 825	46 945	102 608	18 253	22 546	9 475	25 636	42 340	341 927	a
2012 TB register	51 013	17 993	42 705	87 842	16 722	18 436	7 839	21 627	40 086	304 263	a

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Reported cases of TB (all types)											
2004 TB register	36 771	18 943	38 559	69 912	11 832	7 447	7 047	20 986	45 165	256 662	a
2005 TB register	44 909	20 915	43 990	85 507	13 366	10 746	7 633	27 208	48 193	302 467	a
2006 TB register	49 766	23 374	46 093	104 705	17 301	15 035	8 631	28 421	48 989	342 315	a
2007 TB register	54 343	24 267	43 946	109 556	18 910	19 857	9 461	24 867	48 672	353 879	a
2008 TB register	63 533	25 621	48 659	118 062	22 189	22 604	10 567	27 378	50 169	388 782	a
2009 TB register	63 807	24 940	51 660	122 642	22 836	27 511	10 503	31 682	50 118	405 699	a
2010 TB register	62 029	24 395	56 501	120 421	22 138	25 683	10 252	29 789	49 840	401 048	a
2011 TB register	59 883	23 092	55 416	121 328	22 121	24 679	10 218	28 556	47 921	393 214	a
2012 TB register	55 492	20 840	50 867	103 937	20 195	20 359	8 373	24 396	45 135	349 594	a
Reported cases of TB (all types) (per 100 000)											
2004 TB register	518.7	642.0	435.8	723.3	214.7	229.5	783.6	551.2	988.1	550.9	a
2005 TB register	637.9	708.3	487.8	885.9	237.2	333.6	846.0	711.5	1 037.2	645.0	a
2006 TB register	705.0	789.2	500.7	1 075.8	305.2	463.3	949.9	737.9	1 030.7	722.4	a
2007 TB register	786.9	818.3	453.6	1 094.0	350.0	561.5	858.4	732.6	1 005.7	739.6	a
2008 TB register	947.8	913.6	450.6	1 130.6	417.2	635.7	966.1	869.1	994.6	794.9	a
2009 TB register	948.2	885.9	469.9	1 162.6	424.6	767.1	956.0	997.0	976.0	820.2	a
2010 TB register	919.8	863.7	504.8	1 131.2	407.0	709.9	928.7	930.6	954.1	802.2	a
2011 TB register	899.8	788.0	495.8	1 142.2	420.4	674.0	882.4	838.5	862.8	779.8	a
2012 TB register	831.7	708.5	448.3	971.0	382.3	551.8	712.1	720.2	800.0	687.3	a
Reported cases of XDR-TB											
2004 Lab diagnosed	3	1	5	59	-	-	4	1	12	85	b
2005 Lab diagnosed	18	6	14	227	2	-	10	5	16	298	b
2006 Lab diagnosed	61	3	19	336	5	-	3	9	28	464	b
2007 Lab diagnosed	108	4	33	241	2	12	7	4	42	453	b
2008 Lab diagnosed	175	3	30	181	2	14	19	4	60	488	b
2009 Lab diagnosed	123	3	65	254	6	18	40	13	72	594	b
2010 Lab diagnosed	320	7	37	201	6	5	39	14	112	741	b
2011 Lab diagnosed	377	18	91	758	18	24	111	14	163	1 574	b
2012 Lab diagnosed	477	31	50	754	3	3	72	10	145	1 545	b
Retreatment ratio											
2004 TB register	30	22	15	18	13	11	26	17	30	22	a
2005 TB register	32	23	17	20	14	10	28	18	32	23	a
2006 TB register	31	23	17	21	15	13	30	19	33	24	a
2007 TB register	28	22	16	19	14	13	28	21	34	22	a
2008 TB register	27	19	13	14	12	11	25	20	30	19	a
2009 TB register	24	17	9	13	10	11	20	18	27	17	a
2010 TB register	25	18	12	16	11	12	21	17	31	19	a
2011 TB register	25	16	12	16	12	12	23	17	31	19	a
2012 TB register	23	8	9	13	12	13	18	15	32	17	a
Smear positivity (percentage of PTB cases which are new Sm+)											
2004 TB register	51	55	64	43	62	54	53	57	45	51	a
2005 TB register	47	55	62	39	61	57	51	57	44	49	a
2006 TB register	47	50	60	37	54	54	45	51	41	46	a
2007 TB register	49	47	54	40	50	51	43	47	39	45	a
2008 TB register	44	44	50	33	50	51	41	44	36	41	a
2009 TB register	44	47	51	31	49	45	43	40	36	40	a
2010 TB register	42	47	48	28	53	41	36	40	35	38	a
2011 TB register	39	45	45	32	49	41	39	38	35	38	a
2012 TB register	42	51	44	34	45	40	46	42	34	39	a

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a DoH TB. Indicators for recent years based on analysis of patient-level records in ETR.Net as received from NDoH in May 2013.

b MDR Overview 2014.[107]

Table 12: TB case-holding indicators by province

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Case fatality rate (MDR-TB) (%)											
2010	27.7	17.2	20.8	13.2	11.9	20.1	9.2	13.3	13.2	-	a
Cure rate (new Sm+ cases) (%)											
2004 TB register	40.8	67.2	62.6	34.8	69.5	32.0	38.3	56.6	70.1	50.8	b
2005 TB register	53.7	67.5	66.7	45.2	60.8	51.8	50.1	57.6	71.9	57.6	b
2006 TB register	59.6	68.7	74.4	52.9	60.4	56.1	69.7	59.0	77.3	62.9	b
2007 TB register	62.0	71.3	75.6	55.4	62.2	60.4	62.8	54.1	77.7	64.0	b
2008 TB register	60.9	70.9	78.7	62.9	66.7	64.5	65.6	58.3	79.4	67.5	b
2009 TB register	66.0	71.4	79.0	66.3	70.3	73.0	69.7	64.6	80.9	71.1	b
2010 TB register	67.1	73.0	78.2	71.3	74.7	72.6	70.9	66.6	81.7	73.1	b
2011 TB register	67.7	72.4	81.1	74.1	75.3	69.9	68.3	68.9	81.4	74.2	b
Defaulter (interruption) rate (new Sm+ cases) (%)											
2004 TB register	10.8	5.9	8.2	13.1	3.6	11.0	14.5	7.9	11.9	10.3	b
2005 TB register	9.0	5.9	6.9	14.7	7.4	10.8	13.1	9.5	11.1	10.4	b
2006 TB register	7.5	5.0	5.9	12.3	8.2	11.3	6.8	9.8	9.7	9.1	b
2007 TB register	7.4	4.9	6.3	10.1	7.4	8.9	10.1	10.9	9.2	8.5	b
2008 TB register	7.5	4.7	5.9	8.3	7.9	8.2	5.8	9.3	8.2	7.5	b
2009 TB register	7.8	4.6	6.3	7.3	7.7	7.1	5.8	8.7	7.1	7.1	b
2010 TB register	7.8	4.8	5.5	7.2	6.0	7.5	6.4	8.8	6.8	6.8	b
2011 TB register	7.7	4.7	5.1	5.8	4.7	5.9	7.4	7.7	6.9	6.1	b
Defaulter rate (MDR-TB) (%)											
2010	16.2	16.0	22.4	9.2	31.4	7.4	11.6	33.7	27.1	-	a
Failed treatment rate (MDR-TB) (%)											
2010	13.1	5.5	3.7	1.1	4.2	2.0	5.2	11.0	8.6	-	a
MDR-TB started on treatment											
2007	932	158	497	788	71	148	145	156	439	3 334	a
2008	772	233	414	1 039	104	272	148	159	890	4 031	a
2009	847	148	512	927	88	198	253	175	995	4 143	a
2010	927	167	607	1 788	119	298	230	143	1 034	5 313	a
2011	1 207	214	572	1 733	152	313	264	188	1 000	5 643	a
2012	1 062	201	417	2 571	135	591	243	268	1 006	6 494	a
Smear conversion rate (new Sm+ cases) (%)											
2004 TB register	37.3	58.5	57.8	38.7	43.2	34.2	31.8	48.4	58.0	46.6	b
2005 TB register	41.8	61.1	62.2	40.4	62.0	35.6	40.5	47.7	60.7	50.5	b
2006 TB register	49.9	67.2	69.2	48.4	54.3	44.4	48.3	48.1	66.9	55.8	b
2007 TB register	58.9	71.8	75.1	52.0	56.4	57.8	50.3	49.2	71.1	60.4	b
2008 TB register	58.1	73.2	77.0	57.3	58.5	59.0	55.5	48.7	70.6	62.5	b
2009 TB register	61.2	72.9	78.6	61.1	63.0	69.5	66.8	53.3	74.9	66.5	b
2010 TB register	60.6	73.5	80.1	66.6	65.1	60.3	70.8	55.5	75.5	68.1	b
2011 TB register	68.5	74.4	83.1	76.1	70.7	74.2	72.0	62.1	76.4	74.4	b
2012 TB register	53.3	72.9	67.5	63.9	63.5	65.5	59.9	56.7	59.7	62.3	c
Successful completion rate (MDR-TB) (%)											
2010	27.8	54.6	28.0	62.1	44.1	26.1	63.6	35.9	21.5	-	a
Successful completion rate (new Sm+) (%)											
2004 TB register	63.4	76.7	67.8	55.1	77.2	49.6	65.8	69.2	78.9	65.5	b
2005 TB register	72.9	76.9	71.7	64.2	70.0	65.7	71.4	70.0	79.7	70.8	b
2006 TB register	75.3	76.5	77.9	69.3	69.4	66.0	80.9	69.1	82.0	73.8	b
2007 TB register	74.8	77.4	78.4	70.7	71.8	67.6	76.1	65.5	82.2	73.9	b
2008 TB register	77.1	76.8	80.8	74.0	74.1	70.3	79.2	69.4	83.5	76.4	b
2009 TB register	76.9	76.4	80.0	73.8	74.5	77.4	80.4	73.4	83.3	77.1	b
2010 TB register	76.9	77.8	82.3	77.6	77.0	76.4	80.9	74.8	85.0	78.9	b
2011 TB register	78.1	77.7	81.9	80.0	77.5	79.5	77.5	75.8	84.6	79.8	b
XDR-TB started on treatment											
2007	171	7	45	170	2	0	11	4	64	474	a
2008	135	7	40	163	0	3	8	1	34	391	a
2009	135	6	25	177	3	5	13	9	58	431	a
2010	224	5	30	235	3	6	37	14	61	615	a
2011	208	16	33	211	11	5	51	6	68	609	a
2012	204	9	26	267	3	8	26	14	144	701	a

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a MDR Overview 2014.[107]

b DoH TB. Indicators for recent years based on analysis of patient-level records in ETR.Net as received from NDoH in May 2013.

c DoH TB. Based on analysis of patient-level records in ETR.Net as received from NDoH in May 2013. In general, there is a much higher percentage of "results not available" in 2012 than previous years, resulting in low smear-conversion rates.

HIV and AIDS

Context	Although there is always mention of South Africa's antiretroviral treatment programme being the world's largest, there are also plans to double the number on treatment.
New data sources	Nationally, new data have been reported in the: • South African National HIV Prevalence, Incidence and Behaviour Survey 2012 • National Antenatal Sentinel HIV & Herpes Simplex Type-2 Prevalence Survey in South Africa 2012 • TIER.Net data as reported in DHIS • Health Indicators Update: Antiretroviral Indicators 2013 • National Health Laboratory Service data on PCR tests • THEMBISA integrated demographic and epidemiological model of the South African HIV/AIDS epidemic Internationally, reports of interest include: • UNAIDS Report on the Global AIDS Epidemic 2013 • UNAIDS Getting to zero: HIV in eastern and southern Africa 2013 • UNAIDS Global AIDS Response Progress Reporting 2013: Construction of Core Indicators for monitoring the 2011 UN Political Declaration on HIV/AIDS
Key issues and trends	The report of the 2012 National Antenatal Sentinel Survey was finally released in May 2014. The survey showed no change in the national antenatal prevalence compared with 2011. However, the pilot surveys on HSV-2 in four provinces showed dramatically high prevalences, ranging from 46.3% in the Western Cape to 60.2% in KwaZulu-Natal. In addition, the report of the 4th South African National HIV Prevalence, Incidence and Behaviour Survey conducted in 2012 was released in April 2014. The survey showed that 12.2% of the population (6.4 million people) were living with HIV in 2012. A decrease in condom use at last sex act was reported, to 36.2% in 2012 from a peak of 45.1% in 2008.

As mentioned, a Joint Review of HIV, TB and PMTCT Programmes in South Africa was published by the National Department of Health, together with a range of development partners and international organisations, in April 2014.[106] The report noted that progress had been made in rolling out HIV and TB information systems (ETR.Net, EDR.Web, TIER.Net), but that "there is a lack of interoperability of different TB, HIV and MDR TB electronic data systems". It noted the persistence of a "multiplicity of registers at health facilities and inadequate data capturing by nurses and lay counsellors" as well as a "lack of a common reporting system for non-public sector ART programmes".

The goals set for the National Strategic Plan (NSP) for HIV and AIDS, STIs and TB 2012–2016 remain as had been previously outlined:

- Reduce new HIV infections by at least 50% using combination prevention approaches;
- Initiate at least 80% of eligible patients on antiretroviral treatment, with 70% alive and on treatment five years after initiation;
- Reduce the number of new TB infections as well as deaths from TB by 50%;
- Ensure an enabling and accessible legal framework that protects and promotes human rights in order to support implementation of the NSP; and
- Reduce self-reported stigma related to HIV and TB by at least 50%.[131]

TIER.Net was adopted by the National Health Council in December 2010, based on a paper-based system (tier 1), a non-networked electronic register (tier 2) and a networked electronic register (tier 3). The aim was initially to have an electronic register working in at least one facility per district by March 2012. The Minister of Health is on record as saying that the number on treatment will increase from 2.4 million to 4.6 million in 2016.[132] It is difficult to track progress against this target, as the expected flow of accessible data from the TIER.Net system has not yet occurred at scale. A limited number of elements are exported to the DHIS, which is also not publicly accessible, aside from those data included in the District Health Barometer (DHB 2012/13).[133] The National Department of Health Indicators Update: Antiretroviral Indicators 2013 has provided a useful summary of the available data on the antiretroviral treatment programme.[134] The report stated that, as at November 2013, 1 582 health facilities were implementing phases 0–5 of the TIER.Net process (i.e. conducting installation and training, back-capturing, live capturing, conducting data cleaning activities), 967 facilities had implemented phase 6 (i.e. were capturing ART data live and were are able to produce monthly and quarterly reports), 991 facilities were still using paper-based reporting, and 299 were eligible for TIER.Net implementation (i.e. had more than 500 patients remaining on ART), but had not yet started implementation. However, the proportions of facilities reaching phase 6 varied considerably between provinces, with the Northern Cape and North West making slow progress. The proportion of those expected to report in quarter 2 of 2013, of those known to be at phase 6, also varied considerably, with only 42/84 Mpumalanga facilities and 3/14 North West facilities reporting. At the end of September 2013, there were 2 274 422 adults and 144 742 children retained on ART. Of particular note was the low retention in care, with only 60% of adults initiated eight or more years ago remaining on ART. However, the longitudinal data were based on a cohort of only 453 323 adults and 45 107 children, captured between April 2004 and June 2013.

In November 2013, the TAC/SECTION27 NSP Review reported that tier 1 paper-based records were still being used in the majority of facilities, tier 2 in about 1 600 facilities and tier 3 at only 30 facilities.[135] Important insights into the challenges facing the public

sector ART programme and the data collection and reporting process were also reported in the TAC/SECTION27 NSP Review in December 2013.[136] In that publication, Venter and Rees argued strongly for greater use to be made of the data captured by the National Laboratory Health Service (NHLS) on CD4 and viral load tests. They suggested, for example, that:

> mapping the data onto district maps and charting the number of CD4s tests done would provide useful information: new patients who have received a CD4 count would probably have been recently tested, and this therefore will give us a rough idea of the amount of testing being done. The levels of immunosuppression recorded, that is the average CD4 count at initiation, allow us to determine how effective the testing processes are, and whether linkage to care is being done. Any district with an initiation CD4 threshold level of over 200, for example, is probably doing sufficient testing, and is effectively linking their patients to care. But clinics reporting low CD4 counts, could either be assumed to not be testing enough people or not linking them to care. Viral load data from the NHLS could be used in a similar way. The testing of viral loads is only undertaken when a patient is on ART and, according to the new guidelines, this is done annually after the first 6 months. Mapping how many viral loads have been measured in an area can provide us with a rough idea of the number of people on ART, the level of adherence (people taking their medication will be "undetectable", so the overall proportion will be a quality measure), and the level of retention in an HIV programme. This again should correlate roughly with the number of patients on treatment. When triangulating these data with health registries and pharmaceutical deliveries, this data could help at a provincial, district and sub-district level, with issues such as M&E improvements, and identifying misreporting and procurement corruption.

Critically, the claimed numbers from the ART programme still to a large extent reflect the total ever started on treatment, and not the proportion retained in care, let alone a count of those effectively treated. Some rather dated figures can also be seen in the 2012 South African progress report on the 2001 UNGASS Declaration of Commitment.[137] A treatment coverage of 58.3% of adults and children was recorded for 2010, and 75.2% for 2011. However, on the indicator "Percentage of adults and children with HIV known to be on treatment 12 months after initiation of therapy", the report recorded "no data" for either 2010 or 2011. The proportion of those eligible for treatment who achieve virological suppression may be a suitable indicator for the future.[138] Drawing on data from a large sample of patients who started ART in various settings (including South Africa), Yiannoutsos et al. showed that mortality was high in the first six months after initiation, especially in patients who started at a low CD4 count.[139]

The ART guidelines applicable in the public sector (and hence binding on medical schemes as prescribed minimum benefits) were updated in April 2013.[140] However, in June 2013, the World Health Organization issued new consolidated HIV guidelines, again opening a gap between what was provided locally and what was considered best practice.[141] As an example, the NDoH 2013 guidelines stipulated the following eligibility criteria for ART in adults and adolescents:

- CD4 count <350 cells/mm^3 irrespective of WHO clinical stage
- OR, irrespective of CD4 count
  - All types of TB (in patients with TB drug-resistant or sensitive, including extra-pulmonary TB)
  - WHO stage 3 or 4

The WHO 2013 guidelines recommended a CD4 count eligibility cut-off of <500 cells/mm3. The UNAIDS Report on the Global AIDS Epidemic 2013 made the global implications clear: as of December 2012, an estimated 9.7 million people in low- and middle-income countries were receiving ART, representing 61% (57–66%) of all persons eligible for ART according to the 2010 WHO guidelines, but only 34% (32–37%) of those eligible in terms of the 2013 WHO guidelines.[142] The Treatment 2015 target is to enrol 15 million people on treatment.[143]

Despite the progress made in treating patients, HIV/AIDS remains the fifth leading cause of disability-adjusted life years (DALYs) lost, according to the Global Burden of Disease study 2010.[144] Significantly, although the majority of these DALYs were in high-burden countries, 20% occurred in countries where HIV/AIDS was not among the top 10 leading causes of death. Although the UNAIDS Global Report celebrated the fact that over 100 000 HIV-TB co-infected patients in South Africa received ART in 2012, it estimated coverage at only 31% of such patients. South Africa was also reported to have the largest isoniazid preventive therapy programme in 2012, reaching 370 000 patients. More promisingly, the UNAIDS report "Getting to zero: HIV in eastern and southern Africa", issued in 2013, stated that rates of new HIV infections among adults declined by 49% in South Africa between 2001 and 2011.[145] In January 2013, UNAIDS also published guidance on the "Construction of Core Indicators for monitoring the 2011 UN Political Declaration on HIV/AIDS".[146]

The results of the 2012 National Antenatal Sentinel Survey were only released in May 2014. The survey was conducted in 1 497 public sector facilities and recruited 34 260 antenatal presenters, which was close to the target of 36 000. The overall HIV prevalence among first-time antenatal presenters in 2012 was 29.5% (95% CI: 28.8 – 30.2%), which was almost exactly the same as that recorded in 2011 (29.5%; 95% CI: 28.7 – 30.2%).[81] Results were also presented by marital status, parity, level of education, age of partner, geotype and awareness of HIV status (Figure 10). The sentinel survey also included determination of herpes simplex type 2 (HSV-2) prevalence in four selected provinces. These were purposively selected to include two provinces in which HIV prevalence rates were very high but syphilis prevalence rates were low (KwaZulu-Natal and Gauteng), and two provinces in which HIV prevalence was lowest, but syphilis prevalence rates were high (Northern Cape and Western Cape). The results of this pilot survey were dramatic. The overall prevalence of HSV-2 infection, based on samples from 18 732 women, was 55.8% (95% CI: 55.1 – 56.5%). The provincial prevalence estimates varied in a fairly narrow range, from 46.3% in the Western Cape and 47.1% in the Northern Cape, to 58.4% in Gauteng and 60.2% in KwaZulu-Natal. Although the number of women in older age groups was small, the HSV-2 prevalence of 91.7% among 45–49-year-old antenatal women was startling. Even in the 15–19 age group, HSV-2 prevalence was 28.4%.

Although some high-level results from the 4th South African National HIV, Behaviour and Health Survey 2012, conducted by the Human

Sciences Research Council (HSRC), were presented at the June 2013 South African AIDS Conference, the full report was not released until April 2014. Figures reported at the June 2013 Conference were a national prevalence of 12.3% (based on the 67.5% of the 37 021 participants who agreed to be tested). In the age group 15 to 49 years, the highest prevalence was recorded in KwaZulu-Natal (27.6%), and the lowest in the Western Cape (9.2%).[b] Prevalence in the Western Cape among this age group had thus almost doubled between 2008 (5.2%) and 2012. The 2012 survey used a similar design (multi-stage stratified cluster sampling) to that implemented in previous surveys.[147] A total of 42 950 individuals were eligible to be interviewed and 38 431 (89.5%) agreed to be interviewed. Of these, 28 997 (67.5%) agreed to provide a blood specimen for HIV testing. Refusal rates were highest in infants under two years, and also in White interviewees. Prevalence figures for Whites were considered to be unreliable because of this low response rate. Unlike in previous surveys, prevalence data were reported at sub-provincial levels. Caution should, however, be exercised when using such data, as the confidence intervals are wide.

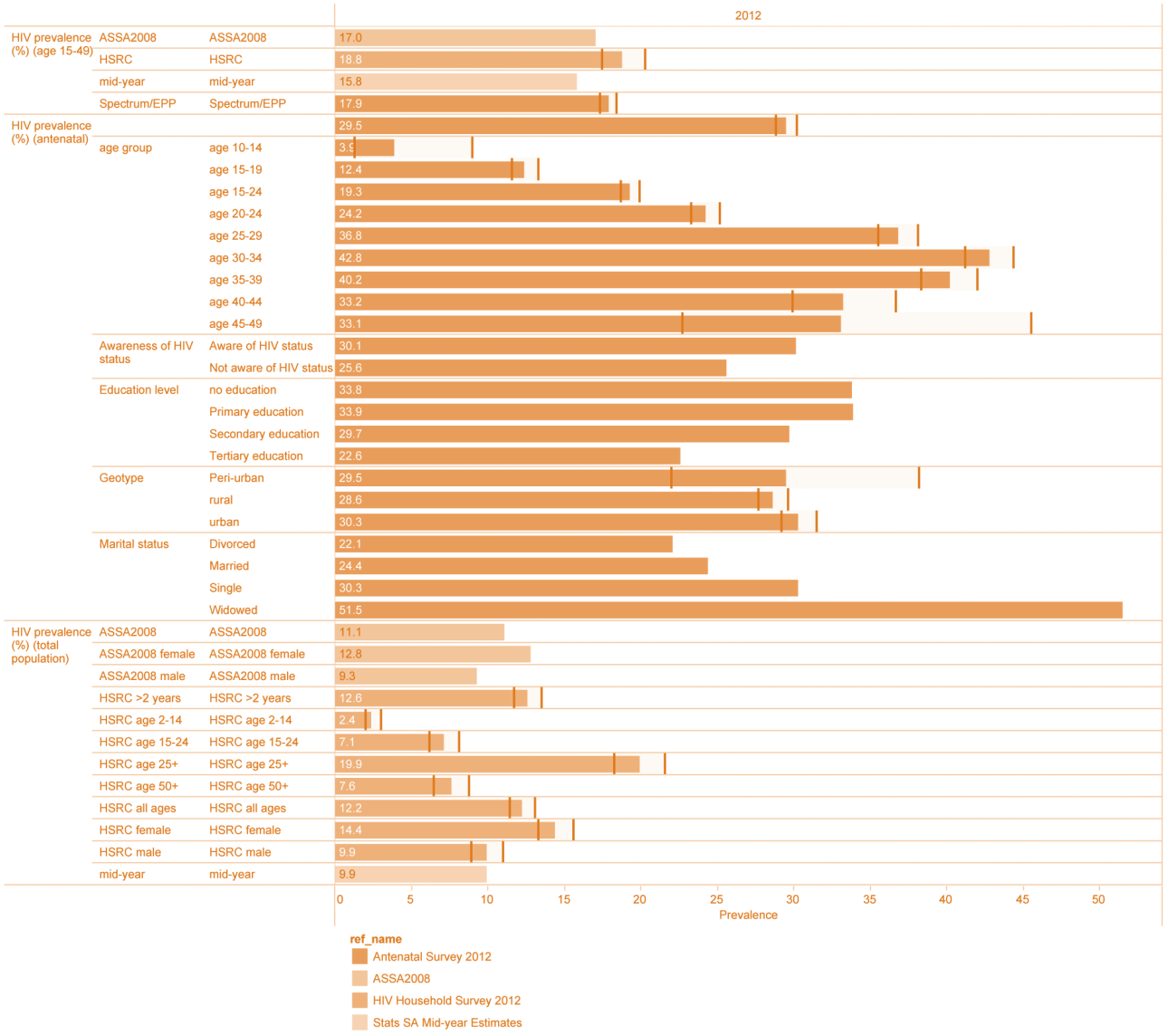
The survey also included data on ART access, showing that 2 002 000 (31.2%) of the estimated 6 422 000 persons living with HIV were exposed to ART by mid-2012 (Figure 11). As expected, this proportion was far higher in females (34.7%) than males (25.7%). Access to ART was higher in children aged 0–14 years (45.1%), but far lower in youth aged 15–24 years (14.3%). It is important to note the differences in eligibility criteria for ART, particularly in young children, where a test-and-treat approach is already embraced. The finding that prompted the most comment was that condom use at last sex act by both males and females across all age groups decreased to 36.2%, from a peak of 45.1% in 2008. The implications were put in stark terms: "It is conceivable that the beneficial impact of increased antiretroviral treatment coverage on HIV incidence (through viral load reduction in HIV-positive individuals) has been more than offset by the disturbing trends of increased HIV-risk behaviour." This finding is controversial and at odds with the trends reported by the Third National HIV Communication Survey conducted in 2012.[148] The authors of the HSRC report called for a particular focus on inhabitants of informal settlements, given the high prevalence and incidence in such settings. Incidence was estimated to be more than twice as high in urban informal settlements (2.5%) than in urban formal areas (1.1%). However, an encouraging finding was that incidence in young females aged 15–24 years had declined by 60%, from 5.3% in 2002–2005 to 2.1% in the period 2008–2012. Nonetheless, the authors expressed concern that the NSP 2012–2016 target of a reduction of new infections by at least 50% was not achievable.

Johnson published a technical description of the THEMBISA demographic model in February 2014.[149] The model, fitted to HIV prevalence, death data and HIV testing history, simulates the change in population profile and spread of HIV over time. The results suggest that HIV incidence in South Africa has declined substantially since 2000, although the report notes that the results differ significantly from the two most widely used models (Spectrum/EPP and ASSA 2008). The author notes that further work is required to refine the model and apply it at the provincial level.

As in previous years, there have been many research publications either reporting on studies conducted in South Africa or including South African data, in the field of HIV. To highlight just two, Calvert and Ronsmans used data from 23 studies (including 17 in sub-Saharan Africa) to show the excess risk of death in pregnancy attributable to HIV, under different HIV prevalence conditions.[150] Where antenatal prevalence exceeds 15%, as many as 50% of all deaths in pregnancy may be attributed to HIV. With these data in mind, the findings of a rapid ART initiation in pregnancy pilot programme in Cape Town are important.[151] Of 134 ART-eligible women, 97.0% started ART, 90.8% on the day that eligibility was ascertained. Only one seroconversion was noted in the 107 cases for which PCR outcomes were available.

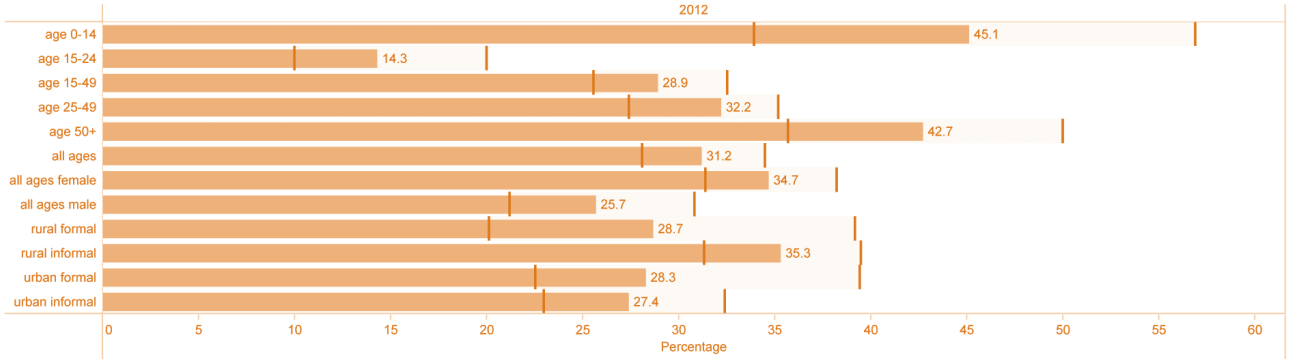
b Available from: http://www.hsrc.ac.za/en/media-briefs/hiv-aids-stis-and-tb/plenary-session-3-20-june-2013-hiv-aids-in-south-africa-at-last-the-glass-is-half-full

Figure 10: HIV prevalence indicators by source and various stratifiers, 2012



Source: Antenatal Survey 2012,[81] ASSA 2008,[72] HIV Household Survey 2012,[147] Stats SA mid-year estimates.[23]

Figure 11: Antiretroviral treatment exposure, 2012



Source: HIV Household Survey 2012.[147]

Table 13: HIV prevalence and incidence indicators by province

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
AIDS sick (number of people with AIDS-defining conditions)											
2010 ASSA2008	57 821	36 085	122 551	143 549	28 508	44 720	6 044	44 222	21 119	495 374	a
2011 ASSA2008	60 525	35 390	126 240	149 621	32 285	44 827	6 868	44 230	24 533	519 214	a
2012 ASSA2008	64 849	36 010	132 375	158 413	36 035	46 712	7 617	45 384	27 595	553 253	a
2013 ASSA2008	69 948	37 490	139 348	168 173	39 672	49 513	8 293	47 342	30 323	591 116	a
2014 ASSA2008	75 325	39 323	146 240	177 961	43 143	52 712	8 896	49 611	32 721	629 183	a
2015 ASSA2008	80 652	41 238	152 552	187 299	46 526	55 965	9 432	51 915	34 743	665 502	a
Antenatal client HIV 1st test positive rate (%)											
2010 DHIS	19.4	23.9	24.9	27.2	17.0	30.6	11.8	23.6	12.5	22.6	b
2011 DHIS	17.4	21.7	22.5	24.5	15.8	28.9	10.1	21.4	10.6	20.6	b
2012 DHIS	16.7	19.5	20.4	23.2	13.3	26.7	9.8	18.7	8.3	18.6	b
HIV incidence (%) – ASSA2008											
2012 total population	0.8	0.7	0.5	1.0	0.5	0.9	0.4	0.8	0.3	0.7	a
HIV incidence (%) – HSRC SABSSM survey											
2012 age 15-24	-	-	-	-	-	-	-	-	-	1.5	c
2012 age 15-49	-	-	-	-	-	-	-	-	-	1.7	c
2012 age 2+	-	-	-	-	-	-	-	-	-	1.1	c
2012 age 2-14	-	-	-	-	-	-	-	-	-	0.3	c
2012 age 25+	-	-	-	-	-	-	-	-	-	1.4	c
2012 female age 15-24	-	-	-	-	-	-	-	-	-	2.5	c
2012 female age 15-49	-	-	-	-	-	-	-	-	-	2.3	c
2012 female age 2+	-	-	-	-	-	-	-	-	-	1.5	c
2012 female age 25+	-	-	-	-	-	-	-	-	-	1.6	c
2012 male age 15-24	-	-	-	-	-	-	-	-	-	0.5	c
2012 male age 15-49	-	-	-	-	-	-	-	-	-	1.2	c
2012 male age 2+	-	-	-	-	-	-	-	-	-	0.7	c
2012 male age 25+	-	-	-	-	-	-	-	-	-	1.3	c
HIV incidence (%) – THEMBISA											
1990 THEMBISA age 15-49	-	-	-	-	-	-	-	-	-	0.3	d
1990 THEMBISA female age 15-49	-	-	-	-	-	-	-	-	-	0.4	d
1990 THEMBISA male age 15-49	-	-	-	-	-	-	-	-	-	0.2	d
2000 THEMBISA age 15-49	-	-	-	-	-	-	-	-	-	2.2	d
2000 THEMBISA female age 15-49	-	-	-	-	-	-	-	-	-	2.7	d
2000 THEMBISA male age 15-49	-	-	-	-	-	-	-	-	-	1.8	d
2005 THEMBISA age 15-49	-	-	-	-	-	-	-	-	-	2.0	d
2005 THEMBISA female age 15-49	-	-	-	-	-	-	-	-	-	2.4	d
2005 THEMBISA male age 15-49	-	-	-	-	-	-	-	-	-	1.6	d
2010 THEMBISA age 15-49	-	-	-	-	-	-	-	-	-	1.6	d
2010 THEMBISA female age 15-49	-	-	-	-	-	-	-	-	-	2.0	d
2010 THEMBISA male age 15-49	-	-	-	-	-	-	-	-	-	1.2	d
2011 THEMBISA age 15-49	-	-	-	-	-	-	-	-	-	1.5	d
2011 THEMBISA female age 15-49	-	-	-	-	-	-	-	-	-	1.9	d
2011 THEMBISA male age 15-49	-	-	-	-	-	-	-	-	-	1.1	d
HIV prevalence (%) (age 15-49)											
2010 ASSA2008	16.8	18.6	17.0	23.1	11.1	19.6	10.3	18.9	7.9	17.0	a
2010 Spectrum/EPP	-	-	-	-	-	-	-	-	-	17.9	e
2010 mid-year	-	-	-	-	-	-	-	-	-	15.6	f
2011 ASSA2008	16.9	18.5	16.9	23.0	11.2	19.6	10.4	18.8	8.0	17.0	a
2011 Spectrum/EPP	-	-	-	-	-	-	-	-	-	17.3	e
2011 mid-year	-	-	-	-	-	-	-	-	-	15.7	f
2012 ASSA2008	17.0	18.5	16.8	22.9	11.3	19.5	10.4	18.8	8.0	17.0	a
2012 HSRC	19.9	20.4	17.8	27.9	13.9	21.8	11.9	20.3	7.8	18.8	c
2012 Spectrum/EPP										17.9	g
2012 mid-year	-	-	-	-	-	-	-	-	-	15.8	f
2013 ASSA2008	17.1	18.4	16.7	22.8	11.4	19.5	10.4	18.7	8.0	17.0	a
2013 mid-year	-	-	-	-	-	-	-	-	-	15.9	f
2014 ASSA2008	17.2	18.4	16.6	22.8	11.4	19.5	10.4	18.6	8.0	17.0	a
2015 ASSA2008	17.3	18.4	16.4	22.8	11.5	19.5	10.4	18.6	8.0	17.0	a

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
HIV prevalence (%) (antenatal)											
2010	29.9	30.6	30.4	39.5	21.9	35.1	18.4	29.6	18.5	30.2	h
2010 age 10-14	-	-	-	-	-	-	-	-	-	9.1	h
2010 age 15-19	-	-	-	-	-	-	-	-	-	14.0	h
2010 age 15-24	-	-	-	-	-	-	-	-	-	21.8	h
2010 age 20-24	-	-	-	-	-	-	-	-	-	26.7	h
2011	29.3	32.5	28.7	37.4	22.1	36.7	17.0	30.2	18.2	29.5	i
2011 age 10-14	0.0	10.0	11.1	12.5	7.1	12.5	0.0	20.0	6.7	-	i
2011 age 15-19	11.2	17.0	12.0	16.8	7.4	14.0	8.1	13.4	7.4	12.7	i
2011 age 15-24	20.7	23.0	18.7	25.5	13.6	25.0	12.8	21.3	11.7	20.5	i
2011 age 25-29	35.7	38.1	33.5	50.0	27.4	48.9	21.6	34.8	23.0	36.3	i
2011 age 30-34	45.7	48.3	42.2	53.1	33.5	53.8	22.3	40.7	24.9	42.2	i
2011 age 35-39	36.0	45.6	38.4	53.1	33.7	52.6	16.5	39.6	23.5	39.5	i
2011 age 40-44	37.9	37.8	26.8	43.2	22.9	34.0	20.0	42.6	16.7	31.7	i
2011 age 45-49	27.3	0.0	33.3	52.9	15.8	24.0	25.0	40.0	0.0	30.4	i
2012	29.1	32.0	29.9	37.4	22.3	35.6	17.8	29.7	16.9	29.5	j
2012 Aware of HIV status	-	-	-	-	-	-	-	-	-	30.1	j
2012 Not aware of HIV status	-	-	-	-	-	-	-	-	-	25.6	j
2012 Single	-	-	-	-	-	-	-	-	-	30.3	j
2012 Married	-	-	-	-	-	-	-	-	-	24.4	j
2012 Widowed	-	-	-	-	-	-	-	-	-	51.5	j
2012 Divorced	-	-	-	-	-	-	-	-	-	22.1	j
2012 No education	-	-	-	-	-	-	-	-	-	33.8	j
2012 Primary education	-	-	-	-	-	-	-	-	-	33.9	j
2012 Secondary education	-	-	-	-	-	-	-	-	-	29.7	j
2012 Tertiary education	-	-	-	-	-	-	-	-	-	22.6	j
2012 Peri-urban	-	-	-	-	-	-	-	-	-	29.5	j
2012 Rural	-	-	-	-	-	-	-	-	-	28.6	j
2012 Urban	-	-	-	-	-	-	-	-	-	30.3	j
2012 age 10-14	13.6	0.0	0.0	0.0	8.3	0.0	0.0	20.0	0.0	3.9	j
2012 age 15-19	11.0	14.3	12.7	16.6	7.3	14.4	6.5	11.6	5.4	12.4	j
2012 age 15-24	19.4	21.2	19.6	25.8	12.3	23.7	11.5	18.1	9.6	19.3	j
2012 age 25-29	38.9	40.4	33.7	48.1	29.9	48.4	22.2	39.5	21.3	36.8	j
2012 age 30-34	43.7	45.1	41.4	59.0	34.0	49.7	26.5	42.2	26.9	42.8	j
2012 age 35-39	39.5	47.9	43.3	51.1	30.8	48.0	19.4	41.3	21.6	40.2	j
2012 age 40-44	30.3	33.3	37.6	48.5	26.1	40.0	26.1	33.3	11.7	33.2	j
2012 age 45-49	44.4	0.0	20.0	37.5	42.9	20.0	0.0	40.0	16.7	33.1	j
HIV prevalence (%) (total population)											
2010 ASSA2008	10.3	12.0	11.3	14.8	6.8	12.4	6.6	12.4	5.0	10.9	a
2010 ASSA2008 female	12.2	13.4	12.4	16.6	9.0	15.2	8.0	13.5	6.2	12.4	a
2010 ASSA2008 male	8.2	10.5	10.1	12.9	4.3	9.5	5.2	11.3	3.8	9.2	a
2010 mid-year	-	-	-	-	-	-	-	-	-	9.6	f
2011 ASSA2008	10.6	12.0	11.2	14.9	7.0	12.5	6.7	12.4	5.1	11.0	a
2011 ASSA2008 female	12.6	13.5	12.5	16.8	9.3	15.4	8.1	13.6	6.3	12.6	a
2011 ASSA2008 male	8.3	10.4	10.0	12.8	4.4	9.5	5.2	11.2	3.8	9.2	a
2011 mid-year	-	-	-	-	-	-	-	-	-	9.8	f
2012 ASSA2008	10.8	12.1	11.2	15.1	7.1	12.7	6.8	12.5	5.2	11.1	a
2012 ASSA2008 female	12.9	13.7	12.5	17.0	9.5	15.6	8.3	13.8	6.4	12.8	a
2012 ASSA2008 male	8.4	10.4	9.9	12.9	4.5	9.6	5.3	11.2	3.9	9.3	a
2012 HSRC >2 years	12.2	14.7	12.8	17.4	9.4	14.5	7.8	13.9	5.1	12.6	c
2012 HSRC age 15-24	6.2	4.5	5.8	12.0	3.1	10.0	4.1	8.2	4.4	7.1	c
2012 HSRC age 2-14	1.3	1.7	2.1	4.4	2.8	1.7	1.2	2.2	0.7	2.4	c
2012 HSRC age 25+	22.0	23.7	18.8	30.1	16.3	23.6	12.5	21.1	6.8	19.9	c
2012 HSRC age 50+	8.5	13.9	6.9	9.8	7.3	10.1	6.1	9.2	1.8	7.6	c
2012 HSRC all ages	-	-	-	-	-	-	-	-	-	12.2	c
2012 HSRC female	-	-	-	-	-	-	-	-	-	14.4	c
2012 HSRC male	-	-	-	-	-	-	-	-	-	9.9	c
2012 mid-year	-	-	-	-	-	-	-	-	-	9.9	f
2013 ASSA2008	11.0	12.1	11.2	15.2	7.3	12.8	6.9	12.5	5.2	11.2	a
2013 ASSA2008 female	13.1	13.8	12.6	17.3	9.6	15.7	8.4	13.9	6.5	13.0	a
2013 ASSA2008 male	8.6	10.4	9.8	12.9	4.6	9.6	5.3	11.1	3.9	9.3	a

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
2013 mid-year	-	-	-	-	-	-	-	-	-	10.0	f
2014 ASSA2008	11.2	12.2	11.1	15.3	7.4	12.9	6.9	12.5	5.2	11.3	a
2014 ASSA2008 female	13.4	13.9	12.6	17.5	9.8	15.9	8.5	14.0	6.5	13.1	a
2014 ASSA2008 male	8.7	10.4	9.7	12.9	4.7	9.7	5.3	11.1	3.9	9.3	a
2015 ASSA2008	11.4	12.3	11.1	15.4	7.5	13.0	7.0	12.6	5.2	11.3	a
2015 ASSA2008 female	13.6	14.0	12.5	17.6	9.9	16.1	8.5	14.1	6.5	13.2	a
2015 ASSA2008 male	8.9	10.4	9.6	13.0	4.8	9.7	5.3	11.0	3.9	9.3	a
People living with HIV											
2010 ASSA2008	695 707	348 832	1 207 378	1 550 955	394 221	472 882	74 963	427 023	266 180	5 467 182	a
2010 Spectrum/EPP	-	-	-	-	-	-	-	-	-	5 500 000	d
2011 ASSA2008	715 736	351 746	1 215 856	1 576 025	409 161	482 288	76 966	431 576	273 114	5 577 812	a
2011 Spectrum/EPP	-	-	-	-	-	-	-	-	-	5 600 000	e
2012 Spectrum/EPP	-	-	-	-	-	-	-	-	-	6 100 000	g
2012 ASSA2008	736 404	355 466	1 222 605	1 602 236	423 400	492 287	78 711	436 670	278 889	5 685 424	a
2013 ASSA2008	756 979	359 406	1 227 020	1 628 536	436 918	502 186	80 225	441 816	283 550	5 786 603	a
2014 ASSA2008	777 096	363 254	1 229 076	1 654 551	449 748	511 625	81 550	446 737	287 163	5 880 382	a
2015 ASSA2008	796 634	366 895	1 229 068	1 680 200	461 927	520 480	82 723	451 339	289 915	5 967 061	a

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a ASSA2008.[72]
b DHIS.[30] Data for financial year from April of the year to March of the following year (not calendar year).
c HIV Household Survey 2012.[147]
d THEMBISA 1.0.[149]
e Antenatal Survey 2011.[93] Modelled from antenatal HIV survey using the Epidemic Projection Package.
f Stats SA Mid-year Estimates. 2013 mid-year estimates. Modelled using the Epidemic Projection Package.
g Antenatal Survey 2012.[81] Modelled from antenatal HIV survey using the Epidemic Projection Package.
h Antenatal Survey 2010.[92]
i Antenatal Survey 2011.[93] National value for prevalence in the 10–14 age group was not provided in source.
j Antenatal Survey 2012.[81]

Table 14: Other HIV and AIDS indicators by province

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
AIDS orphans (maternal orphans <18 years)											
2010 ASSA2008	163 805	83 937	243 216	383 803	89 427	125 987	10 794	103 449	41 541	1 202 727	a
2011 ASSA2008	171 190	87 341	257 667	397 715	93 590	131 613	11 758	107 775	45 005	1 264 771	a
2012 ASSA2008	176 955	89 353	268 550	407 190	98 219	135 452	12 729	110 540	48 708	1 313 260	a
2013 ASSA2008	181 485	90 299	276 490	413 145	102 965	138 031	13 673	112 088	52 397	1 351 144	a
2014 ASSA2008	184 941	90 480	281 811	416 079	107 574	139 608	14 563	112 733	55 869	1 379 917	a
2015 ASSA2008	187 391	90 079	284 602	416 265	111 858	140 340	15 365	112 672	58 905	1 400 267	a
Antiretroviral coverage (%)											
2010 total	-	-	-	-	-	-	-	-	-	55.0	b
2011 adults	-	-	-	-	-	-	-	-	-	52.0	c
2012 adults	-	-	-	-	-	-	-	-	-	81.0	d
2012 children 0-14 (GR 2013)	-	-	-	-	-	-	-	-	-	63.0	d
2012 children 0-14	-	-	-	-	-	-	-	-	-	67.0	e
2012 pregnant women	-	-	-	-	-	-	-	-	-	83.0	e
2012 women (for PMTCT)	-	-	-	-	-	-	-	-	-	87.0	e
Antiretroviral coverage (%) – THEMBISA model											
2001 THEMBISA total	-	-	-	-	-	-	-	-	-	0.4	f
2002 THEMBISA total	-	-	-	-	-	-	-	-	-	0.9	f
2003 THEMBISA total	-	-	-	-	-	-	-	-	-	1.3	f
2004 THEMBISA total	-	-	-	-	-	-	-	-	-	2.1	f
2005 THEMBISA total	-	-	-	-	-	-	-	-	-	4.4	f
2006 THEMBISA total	-	-	-	-	-	-	-	-	-	8.6	f
2007 THEMBISA total	-	-	-	-	-	-	-	-	-	13.0	f
2008 THEMBISA total	-	-	-	-	-	-	-	-	-	18.7	f
2009 THEMBISA total	-	-	-	-	-	-	-	-	-	27.0	f
2010 THEMBISA total	-	-	-	-	-	-	-	-	-	35.7	f
2011 THEMBISA total	-	-	-	-	-	-	-	-	-	46.0	f
2012 THEMBISA total	-	-	-	-	-	-	-	-	-	57.0	f
2012 THEMBISA children	-	-	-	-	-	-	-	-	-	44.7	f
2012 THEMBISA female 15+	-	-	-	-	-	-	-	-	-	62.7	f
2012 THEMBISA male 15+	-	-	-	-	-	-	-	-	-	51.5	f

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Antiretroviral treatment exposure (%)											
2012 age 0-14	-	-	-	-	-	-	-	-	-	45.1	g
2012 age 15-24	-	-	-	-	-	-	-	-	-	14.3	g
2012 age 15-49	-	-	-	-	-	-	-	-	-	28.9	g
2012 age 25-49	-	-	-	-	-	-	-	-	-	32.2	g
2012 age 50+	-	-	-	-	-	-	-	-	-	42.7	g
2012 all ages	-	-	-	-	-	-	-	-	-	31.2	g
2012 all ages female	-	-	-	-	-	-	-	-	-	34.7	g
2012 all ages male	-	-	-	-	-	-	-	-	-	25.7	g
2012 rural formal	-	-	-	-	-	-	-	-	-	28.7	g
2012 rural informal	-	-	-	-	-	-	-	-	-	35.3	g
2012 urban formal	-	-	-	-	-	-	-	-	-	28.3	g
2012 urban informal	-	-	-	-	-	-	-	-	-	27.4	g
Baby PCR test around 6 weeks uptake rate (%)											
2010 DHIS	69.5	97.6	95.6	91.7	74.5	64.0	80.2	97.0	93.9	86.0	h
2011 DHIS	81.4	103.4	93.6	107.6	84.4	88.9	95.8	103.4	37.0	92.8	h
2012 DHIS	84.2	101.2	97.3	114.6	91.5	102.2	94.0	103.0	55.0	98.7	h
Baby PCR test positive around 6 weeks rate (%)											
2010 DHIS	6.7	6.2	6.4	6.8	21.1	7.9	6.6	6.1	2.7	7.6	i
2011 DHIS	3.9	3.0	4.1	4.0	4.2	4.6	5.3	3.9	2.1	4.0	i
2012 DHIS	3.0	2.3	2.4	2.2	2.4	3.0	2.7	2.8	1.7	2.5	i
Early infant diagnosis coverage											
2010 NHLS in DHB	44.9	50.3	72.0	55.2	47.4	51.0	55.3	48.8	65.3	56.2	j
2011 NHLS in DHB	60.0	63.4	80.9	72.5	52.4	54.9	65.1	57.0	71.6	66.9	j
2012 NHLS in DHB	61.8	67.2	86.7	78.6	63.8	74.9	71.1	61.1	75.2	73.9	j
Mother-to-child transmission rate of HIV <2 months of age											
2010 NHLS in DHB	4.2	4.1	3.4	4.0	4.6	4.0	3.4	3.7	3.1	3.8	k
2010 PMTCT survey	4.7	5.9	2.5	2.9	3.6	5.7	1.4	4.4	3.9	3.5	l
2011 NHLS in DHB	2.9	2.5	2.5	2.7	3.4	3.2	3.0	2.7	2.0	2.7	k
2011 PMTCT survey	3.8	3.8	2.1	2.1	3.1	3.3	6.1	2.6	2.0	2.7	m
2012 NHLS in DHB	2.6	2.5	2.2	2.2	2.9	2.7	2.9	2.5	1.8	2.4	k
Number of patients receiving ART											
2010 Children (<15)	-	-	-	-	-	-	-	-	-	113 000	n
2010 Men	-	-	-	-	-	-	-	-	-	396 000	n
2010 NGO programmes	-	-	-	-	-	-	-	-	-	60 000	n
2010 Private sector	-	-	-	-	-	-	-	-	-	154 000	n
2010 Public sector	-	-	-	-	-	-	-	-	-	1 073 000	n
2010 Women	-	-	-	-	-	-	-	-	-	777 000	n
2011 Children (<15)	-	-	-	-	-	-	-	-	-	152 000	n
2011 Men	-	-	-	-	-	-	-	-	-	551 000	n
2011 NGO programmes	-	-	-	-	-	-	-	-	-	78 000	n
2011 Private sector	-	-	-	-	-	-	-	-	-	190 000	n
2011 Public sector	-	-	-	-	-	-	-	-	-	1 525 000	n
2011 Women	-	-	-	-	-	-	-	-	-	1 090 000	n
2013 Adults (Mar)	222 107	124 221	505 644	672 544	149 102	199 538	23 377	138 289	126 348	2 161 170	o
2013 Children (Mar)	15 765	7 846	28 564	53 794	10 329	12 501	3 001	9 093	7 449	148 342	o
2013 Total (Mar)	237 872	132 067	534 208	726 338	159 431	212 039	26 378	147 382	133 797	2 309 512	o
2013 Adults (Aug)	-	-	-	-	-	-	-	-	-	2 322 659	p
2013 Children (Aug)	-	-	-	-	-	-	-	-	-	148 894	p
2013 Total (Aug)	-	-	-	-	-	-	-	-	-	2 471 553	p
Percentage of deaths due to AIDS											
2010 ASSA2008	26.5	35.0	36.8	38.0	22.5	38.8	18.0	38.7	13.7	31.7	a
2010 mid-year	-	-	-	-	-	-	-	-	-	34.6	q
2011 ASSA2008	26.1	33.0	35.9	37.6	23.7	37.1	19.2	37.2	14.9	31.3	a
2011 mid-year	-	-	-	-	-	-	-	-	-	34.6	q
2012 ASSA2008	26.3	32.1	35.6	37.7	24.7	36.5	20.1	36.5	15.9	31.5	a
2012 mid-year	-	-	-	-	-	-	-	-	-	33.5	q
2013 ASSA2008	27.0	31.8	35.5	38.1	25.6	36.6	20.9	36.2	16.7	31.9	a
2013 mid-year	-	-	-	-	-	-	-	-	-	31.9	p
2014 ASSA2008	27.7	31.8	35.5	38.6	26.4	37.0	21.5	36.3	17.2	32.4	a
2015 ASSA2008	28.5	32.0	35.4	39.0	27.2	37.4	21.9	36.4	17.6	32.8	a

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Proportion of ANC clients tested for HIV											
2010 DHIS	95.9	97.9	98.8	98.3	113.3	108.1	71.2	111.2	91.8	99.9	i
2011 DHIS	94.3	97.4	85.1	114.2	101.6	110.9	74.7	106.2	91.3	98.0	i
2012 DHIS	98.6	98.2	89.1	106.8	101.7	103.8	96.1	97.3	96.4	98.2	i

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a ASSA2008.[72]
b Universal Access 2011.[152] Range: 52-58%. Based on 1 389 865 people receiving antiretroviral therapy.
c Johnson, 2012.[153] Based on CD4 threshold of 350.
d UNAIDS Global Report 2013.[142] Generated using Spectrum.
e Global Plan 2013 Progress.[154] The estimates were calculated using Spectrum version 4.6. Each value is calculated with some uncertainty because of the data and assumptions used in the models. The Spectrum files were developed by country teams and compiled by UNAIDS in 2013.
f THEMBISA 1.0.[149]
g HIV Household Survey 2012.[147]
h DHIS.[30] 2010/11, 2011/12 and 2012/13 financial years. Due to problems with recording the denominator of live births to HIV-positive women and also uncertainty about whether the numerator may also include tests in older infants, this indicator substantially overestimates coverage of early infant diagnosis for HIV.
i DHIS.[30] 2010/11, 2011/12 and 2012/13 financial years.
j DHB 2012/13.[133] Data for financial years. Numerator: NHLS PCR tests under 2 months of age. Denominator: Live births from Stats SA x antenatal HIV prevalence from antenatal surveys to estimate HIV-exposed infants.
k DHB 2012/13.[133] Data for financial years.
l PMTCT Survey 2010.[155]
m PMTCT Survey 2011 prelim.[156]
n Johnson, 2012.[153] Totals reflect ART enrolment over the 12 months up to the middle of the year. Includes public and private sector estimates unless otherwise indicated.
o DHIS.[30] As at March 2013. Based on DHIS data elements "Adult remain on ART total" and "Child remain on ART total" derived from aggregated Tier.Net data.
p ART Indicators 2013.[134] As at August 2013.
q Stats SA Mid-year Estimates. 2013 mid-year estimates.[23]

Table 15: HIV and AIDS indicators by ethnic group

	African	Coloured	Indian	White	Other	All	Ref
Antiretroviral treatment exposure (%)							
2012 all ages	30.9	-	-	-	-	31.2	a
HIV incidence (%)							
2005 total population adjusted	1.8	-	-	-	0.2	1.4	b
2012 HSRC age 2+	1.3	-	-	-	-	1.1	a
HIV prevalence (%) (age 15-49)							
2002 HSRC	18.4	6.6	1.8	6.2	-	15.6	c
2012 HSRC	22.7	4.6	1.0	0.6	-	18.8	a
HIV prevalence (%) (total population)							
2002 HSRC >2 years	12.9	6.1	1.6	6.2	-	11.4	d
2003 age 15-24	11.8	3.8	0.9	2.0	-	10.2	e
2005 HSRC >2 years	13.3	1.9	1.6	0.6	-	10.8	f
2008 HEAIDS students	5.6	0.8	0.3	0.3	-	3.4	g
2008 HSRC >2 years	13.6	1.7	0.3	0.3	-	10.9	h
2012 HSRC age 15-24	8.4	1.1	0.8	0.3	-	7.1	a
2012 HSRC age 50+	11.0	2.1	0.6	0.0	-	7.6	a
2012 HSRC all ages	15.0	3.1	0.8	0.3	-	12.2	a
HIV prevalence (%) (antenatal)							
2010	32.5	7.0	7.1	3.0	-	30.2	i
2011	31.4	7.6	8.8	1.1	-	29.5	i
2012	31.7	7.5	4.6	2.2	-	29.5	i

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a HIV Household Survey 2012.[147]
b Rehle et al. 2007.[157] Population 2 years and older. Based on the HSRC HIV Household Survey 2005. Adjustment formulas were recently reviewed and correct for both false long-term infections (sensitivity) and false recent infections (specificity) determined by the assay.
c HIV Household Survey 2002. Male: 12.8% Female: 17.7% The results for Whites and Indians have wide confidence intervals, largely due to a low response rate.
d HIV Household Survey 2002.[158]
e HIV Youth 2003.[159]
f HIV Household Survey 2005.[160] Prevalence estimates for the general population aged 2 years and older.
g HEAIDS 2008-9.[161]
h HIV Household Survey 2008.[162]
i Antenatal Survey 2012.[81]

Reproductive health

Contraception, sexual behaviour, sexually transmitted infections and termination of pregnancy

Context	The new national Contraceptive and Fertility Planning Policy and Service Delivery Guidelines were published in December 2012, but there are questions about whether implementation at scale has yet started. Although some of the new contraceptive technologies included, such as subdermal implants and intrauterine devices, are now being procured, training of staff and roll-out to all facilities offering family planning services is a major challenge.
New data sources	Nationally, new data have been reported in the: • South African National HIV Prevalence, Incidence and Behaviour Survey 2012 • District Health Information System (DHIS) Internationally, data of interest have been reported in the: • WHO Baseline report on global sexually transmitted infection surveillance 2012
Key issues and trends	As has been noted in previous years, data on terminations of pregnancy are inadequate to allow for any effective monitoring of access to this essential service.

The National Department of Health's Contraceptive and Fertility Planning Policy and Service Delivery Guidelines were published in December 2012, and appeared on the Department's website in February 2013.[163] Even then, there were questions about their applicability, especially as the selection of new technologies (in particular the subdermal implants) had not yet been completed and training of frontline health personnel had not yet commenced. Routine data on implants are not yet collected by DHIS and are thus not included in the indicator measuring couple year protection rate. Overall, the policy places greater emphasis on access to a wider range of long-acting options, including copper intrauterine devices, progesterone implants, levonorgestrel intrauterine systems and combined oestrogen-progesterone injectables. There is also an emphasis on expansion to non-clinical settings for the provision of contraceptives, using ward-based primary healthcare teams and community health workers. This is in line with global efforts to ensure equitable access to a broad mix of methods.[164] Globally, it has been estimated that 146 million women aged 15 to 49 years had an unmet need for contraceptives in 2010.[165] Focusing only on developing countries, a separate analysis showed that the number of women with an unmet need for contraception had decreased between 2003 and 2012, from 29% to 26%.[166]

Teenage pregnancy remains an emotive issue in South Africa. A cross-sectional population-based household survey was conducted in 2011 in four provinces in 3 123 participants aged 18 to 24 years as part of the evaluation of loveLife.[167] Among female respondents, 19.2% reported having had an adolescent pregnancy, 16.2% reported an unwanted pregnancy and 6.7% had terminated a pregnancy. A review, based predominantly on secondary data, reported that most teenage mothers reported limited contraceptive use prior to falling pregnant. However, after falling pregnant almost all began using injectable contraceptives. While positive in one sense, this also points to the limited range of options that are intended to be addressed by the new policy.

The introduction of human papillomavirus vaccine in the public sector commenced in 2014. A pilot scheme conducted in 31 primary schools in KwaZulu-Natal, using school health teams, showed high levels of acceptance of this vaccine.[168]

The new Contraceptive and Fertility Planning Policy is intended to deal not only with pregnancy prevention but also with planning for conception, particularly in the light of high HIV prevalence. It is thus important that questions of infertility also be addressed. Using data from 277 demographic and reproductive health surveys, it was estimated that as many as 45 million couples were affected by infertility in 2010.[169,170] The study reported an estimated prevalence of primary infertility of 2.2% in 2010 among South African women who sought to have a child.

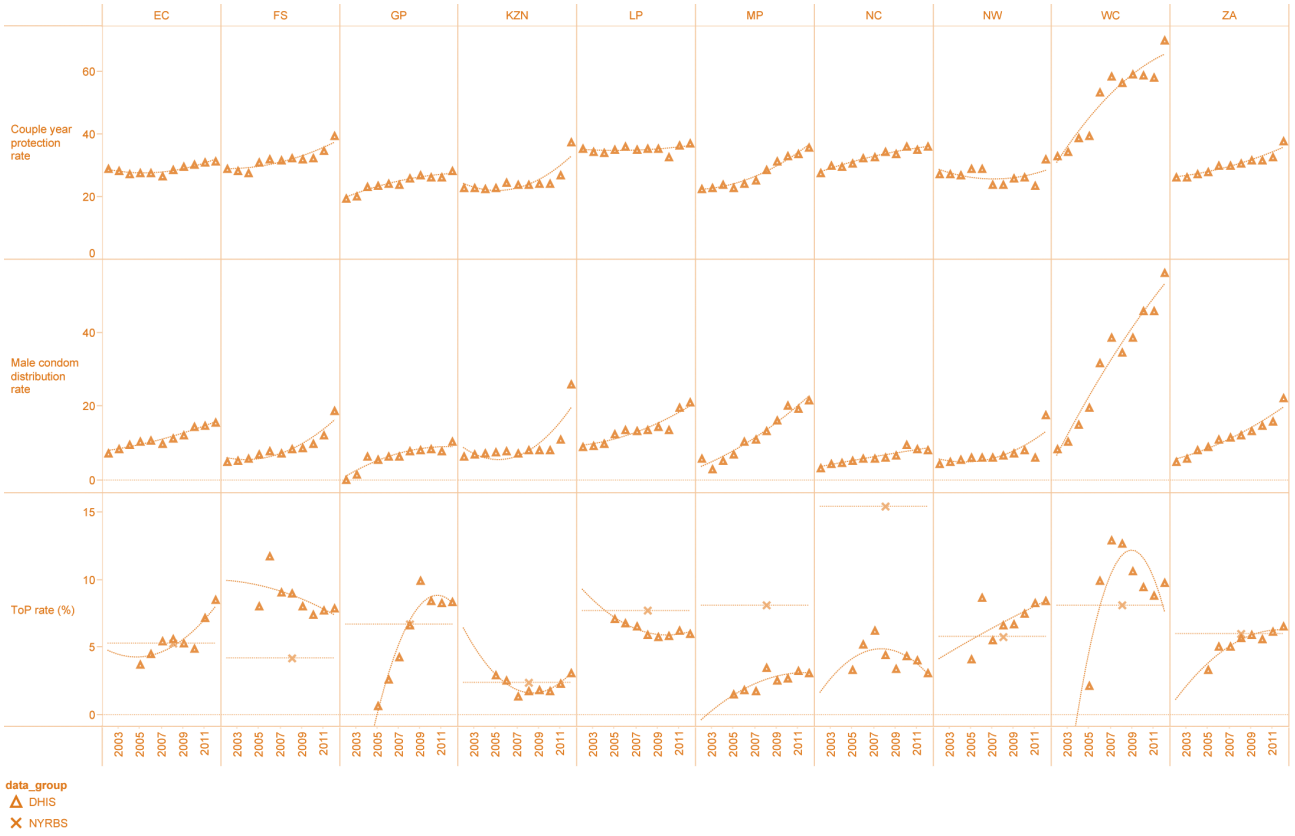
The WHO Baseline report on global sexually transmitted infection surveillance 2012 was intended to "explore what data are currently available globally online for analysis, in order to inform renewed efforts to strengthen STI surveillance".[171] A particular focus was on the data required to certify a country as having eliminated mother-to-child transmission of syphilis. Although data on the proportion of antenatal attendees tested for syphilis were shown for South Africa for 2009–2011, no data were provided on the proportion treated, nor were any estimates for the congenital syphilis rate (cases per 100 000 live births) reported. The WHO report also drew attention to the failure to treat gonorrhoea successfully with cefixime, which was first reported in Japan in 2002, and has now been reported from another six countries (Austria, Canada, France, Norway, South Africa and the United Kingdom). South Africa has already abandoned the quinolones and had to resort to third-generation cephalosporins for the treatment of *Neisseria gonorrhoeae*. Treatment failures with ceftriaxone have also been reported from Australia, Japan, Slovenia and Sweden. The WHO report stated the consequences in bald and bleak terms: "It can be assumed, however, that the treatment failures in these 10 countries represent only the tip of a silent epidemic of antimicrobial resistance."

Data on the extent of termination of pregnancy services, including those delivered in the private sector on behalf of the public sector, remain difficult to access. Limited routine data on the provision of termination of pregnancy is collected by DHIS, but disaggregation by gestational and maternal age are no longer collected, and there have been no recent reports by the NDoH on the percentage of Choice on Termination of Pregnancy (CToP) facilities functioning, and so access to this service cannot be tracked with any confidence.

Based on in-depth interviews with service providers in the Western Cape, Harries et al. showed that there was still considerable confusion about how and when conscientious objection could be exercised.[172] The authors characterised current practice as "ad hoc, unregulated and at times incorrect".

Provincial and national trends in selected reproductive health indicators are shown in Figure 12, drawing on both routine and survey data.

Figure 12: Provincial and national trends in selected reproductive health indicators



Source: DHIS,[30] National Youth Risk Behaviour Survey.[173]

Table 16: Contraception and sexual behaviour indicators by province

	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)											
2008 NYRBS	14.3	11.0	12.5	13.7	11.1	11.9	15.6	10.2	13.2	12.6	a
2008 NYRBS female	-	-	-	-	-	-	-	-	-	4.3	a
2008 NYRBS male	-	-	-	-	-	-	-	-	-	21.2	a
2008 age 15-24	7.8	9.6	7.8	4.9	11.2	15.0	7.3	8.5	9.3	8.5	b
2008 female age 15-24	-	-	-	-	-	-	-	-	-	5.9	b
2008 male age 15-24	-	-	-	-	-	-	-	-	-	11.3	b
2009 female age 16-24	-	-	-	-	-	-	-	-	-	5.0	c
2009 male age 16-24	-	-	-	-	-	-	-	-	-	14.0	c
2012 age 15-24	16.8	10.3	9.5	7.6	11.8	7.7	10.1	9.8	14.2	10.7	d
2012 female age 15-24	-	-	-	-	-	-	-	-	-	5.0	d
2012 male age 15-24	-	-	-	-	-	-	-	-	-	16.7	d
Condom use at last sex (%)											
2008 HEAIDS academic staff	24	18	19	25	19	-	-	19	15	20	e
2008 HEAIDS admin staff	32	23	29	32	29	-	-	29	22	28	e
2008 HEAIDS service staff	46	38	39	38	39	-	-	39	28	39	e
2008 HEAIDS students	60	53	63	60	63	-	-	63	56	60	e
2008 HSRC age 15+	48	47	42	47	53	52	30	48	35	45	f
2008 HSRC female age 15-24	-	-	-	-	-	-	-	-	-	67	f
2008 HSRC female age 25-49	-	-	-	-	-	-	-	-	-	41	f
2008 HSRC male age 15-24	-	-	-	-	-	-	-	-	-	85	f
2008 HSRC male age 25-49	-	-	-	-	-	-	-	-	-	44	f
2008 NYRBS	27	35	35	27	26	32	32	37	39	31	g
2008 NYRBS female	-	-	-	-	-	-	-	-	-	33	g
2008 NYRBS male	-	-	-	-	-	-	-	-	-	29	g
2009 age 16-55	34	36	45	40	40	46	23	46	27	40	c
2012 overall	-	-	-	-	-	-	-	-	-	60	h
2012 with a casual partner	-	-	-	-	-	-	-	-	-	76	h
2012 with a main/regular partner	-	-	-	-	-	-	-	-	-	65	h
2012 with spouse	-	-	-	-	-	-	-	-	-	28	h
2012 HSRC age 15+	38	41	36	40	39	39	27	41	24	36	d
2012 HSRC female age 15-24	-	-	-	-	-	-	-	-	-	50	d
2012 HSRC female age 25-49	-	-	-	-	-	-	-	-	-	33	d
2012 HSRC male age 15-24	-	-	-	-	-	-	-	-	-	68	d
2012 HSRC male age 25-49	-	-	-	-	-	-	-	-	-	36	d
Contraceptive prevalence rate (any method) (%)											
2010 Alkema et al.	-	-	-	-	-	-	-	-	-	63.7	i
Couple year protection rate											
2008 DHIS	28.8	32.3	26.1	23.8	35.4	28.8	34.4	23.9	56.5	30.9	j
2009 DHIS	29.7	32.0	27.1	24.2	35.4	31.6	33.6	26.0	59.4	31.9	j
2010 DHIS	30.4	32.4	26.3	24.2	32.7	33.0	36.0	26.3	58.8	31.6	j
2011 DHIS	31.2	34.7	26.2	27.1	36.5	33.7	35.1	23.6	58.3	32.7	j
2012 DHIS	31.3	39.6	28.3	37.5	37.3	35.9	36.2	32.2	70.2	37.8	j
Ever had sex (%)											
2008 HEAIDS students	80	66	67	66	67	-	-	67	68	69	k
2008 HEAIDS students female	-	-	-	-	-	-	-	-	-	70	k
2008 HEAIDS students male	-	-	-	-	-	-	-	-	-	73	k
2008 NYRBS	41	37	37	38	36	36	33	39	37	38	l
2008 NYRBS female	-	-	-	-	-	-	-	-	-	30	l
2008 NYRBS male	-	-	-	-	-	-	-	-	-	45	l
2009 female age 16	-	-	-	-	-	-	-	-	-	31	c
2009 male age 16	-	-	-	-	-	-	-	-	-	17	c
2011 Gr 8-10	-	-	-	-	-	-	-	-	32	-	m
2011 Gr 8-10 female	-	-	-	-	-	-	-	-	26	-	m
2011 Gr 8-10 male	-	-	-	-	-	-	-	-	39	-	m
2011 Grade 8	-	-	-	-	-	-	-	-	19	-	m
2011 Grade 9	-	-	-	-	-	-	-	-	31	-	m
2011 Grade 10	-	-	-	-	-	-	-	-	45	-	m

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
HIV knowledge: correct knowledge about prevention and rejection of major misconceptions											
2008 age 15+	36.0	41.3	32.8	29.5	14.0	18.2	32.1	18.5	34.1	29.0	b
2012 age 15+	25.6	34.7	31.7	24.4	19.3	21.9	28.0	20.8	29.5	26.8	d
2012 female age 15+	-	-	-	-	-	-	-	-	-	27.3	d
2012 male age 15+	-	-	-	-	-	-	-	-	-	26.2	d
Male circumcision (% of men who are circumcised)											
2008 HSRC age 15+	-	-	-	-	-	-	-	-	-	40.6	n
2009 NCS 2009	73.0	34.0	46.0	18.0	77.0	36.0	17.0	33.0	42.0	42.0	o
2012 HSRC age 15+	74.0	36.0	48.2	23.2	72.6	49.9	20.3	36.7	41.0	46.4	p
2012 NCS 2012	-	-	-	-	-	-	-	-	-	48.1	q
Male condom distribution rate											
2008 DHIS	11.2	8.3	7.8	8.2	13.6	13.4	6.0	6.7	34.5	12.2	j
2009 DHIS	12.1	8.6	8.2	8.2	14.6	16.3	6.7	7.2	38.6	13.3	j
2010 DHIS	14.5	9.9	8.3	8.2	13.6	20.2	9.5	8.3	45.8	14.8	j
2011 DHIS	14.8	12.2	7.9	11.1	19.7	19.4	8.3	6.0	45.7	15.8	j
2012 DHIS	15.7	18.9	10.3	25.9	21.0	21.6	8.0	17.7	56.1	22.1	j
Male condoms distributed (thousands)											
2012	-	-	-	-	-	-	-	-	-	501 452	r
Teenage pregnancy											
2008 NYRBS ever pregnant	30.9	20.3	19.4	25.8	28.6	24.5	24.2	17.9	15.3	24.4	s
2008 NYRBS mothers	24.0	17.8	16.0	26.0	30.1	23.2	22.6	11.8	9.1	21.9	s
2008 NiDS mothers	-	-	-	-	-	-	-	-	-	14.8	t
2011 ever pregnant	-	-	-	-	-	-	-	-	-	19.2	u
Unmet need for family planning (%)											
2010 Alkema et al.	-	-	-	-	-	-	-	-	-	12.7	i

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a NYRBS 2008.[173] Learners in grades 8-11. Definition slightly different as "Had sex BEFORE the age of 14".
b HIV Household Survey 2008.[162]
c NCS 2009.[174] Downloaded 2011-05-26.
d HIV Household Survey 2012.[147]
e HEAIDS 2008-9.[161] Data for GP, NW and LP are combined. Of all who had sex in the past year.
f HIV Household Survey 2012.[147] Reporting data from HIV Household Survey 2008 (values quite different from those published in the 2008 survey report).
g NYRBS 2008.[173] Learners in grades 8-11. Definition different: "Always use a condom during sex" (of those who ever had sex).
h NCS 2012.[175]
i Alkema et al. 2013.[165] Modelled estimates.
j DHIS.[30] Data for financial year from April of the year to March of the following year (not calendar year).
k HEAIDS 2008-9.[161] Data for GP, NW and LP are combined.
l NYRBS 2008.[173] Learners in grades 8-11.
m WC Substance use survey 2011.[176]
n HIV Household Survey 2012.[147] Reporting HIV Household Survey 2008 results. Self-reported circumcision.
o NCS 2009.[174] Downloaded 2011-05-26. Survey sampled men aged 16-55.
p HIV Household Survey 2012.[147] Self-reported circumcision.
q NCS 2012.[175] Survey sampled men aged 16-55. Among the 5 471 890 men who said they were not circumcised: Almost a million said they definitely intended to get circumcised in the next 12 months. Of those that say they will definitely get circumcised, 80.5% (803 690) intend to have a medical circumcision.
r DoH Annual Report 2012/13.[3] 2012/13 financial year.
s NYRBS 2008.[173] Learners in grades 8-11. Of those who have ever had sex.
t NiDS Demography Wave 1.[177] Proportion of women who have ever given birth.
u McHunu et al. 2013.[167] LoveLife impact study. Female youth (aged 8-24) who had ever had an adolescent pregnancy (i.e. fell pregnant at age 12-19 years).

Table 17: STI indicators by province

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
STI partner treatment rate (%)											
2010 DHIS	23.3	22.4	21.5	20.8	22.8	25.5	22.2	26.8	29.5	22.6	a
2011 DHIS	24.3	22.6	22.4	20.7	22.1	33.4	23.8	24.7	31.2	23.3	a
2012 DHIS	21.6	24.0	25.6	17.8	19.1	34.9	24.5	23.1	-	21.8	a
STI treated new episode incidence											
2010 DHIS	4.4	3.1	3.4	6.5	3.8	3.6	2.3	3.0	1.7	3.9	a
2011 DHIS	4.4	2.9	3.4	6.6	3.5	3.5	2.4	2.5	1.6	3.9	a
2012 DHIS	4.3	2.6	3.1	6.5	3.2	3.2	2.3	2.2	-	3.5	a

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a DHIS.[30] Data extracted June 2012. Data for financial year from April of the year to March of the following year (not calendar year).

Table 18: Termination of pregnancy indicators by province

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
ToP facilities functioning (%)											
2010 CHCs	-	-	-	-	-	-	-	-	-	46.0	a
2011	-	-	-	-	-	-	-	-	-	57.0	b
ToP rate (%)											
2010 DHIS	4.9	7.4	8.5	1.8	5.9	2.7	4.4	7.5	9.4	5.6	c
2011 DHIS	7.2	7.8	8.3	2.3	6.3	3.3	4.1	8.3	8.8	6.1	c
2012 DHIS	8.5	7.9	8.4	3.1	6.0	3.1	3.1	8.5	9.8	6.6	c
ToPs (Terminations of Pregnancy)											
2010 DHIS	8 980	5 595	20 955	5 040	8 342	2 680	1 241	6 444	12 271	71 548	d
2011 DHIS	12 397	5 648	21 318	6 560	8 555	3 340	1 144	6 890	11 928	77 780	d
2012 DHIS	14 357	5 588	21 794	8 675	8 226	3 158	865	6 812	13 445	82 920	d

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a DoH Annual Report 2010/11.[178] Target 40%.

b DoH Annual Report 2011/12.[179] 2011/12 financial year. Additional facilities were designated to provide CToP services during the reporting period.

c DHIS.[30] ToPs as % of all expected pregnancies in catchment population. Data for financial year from April of the year to March of the following year (not calendar year).

d DHIS.[30] Data for financial year from April of the year to March of the following year (not calendar year).

Table 19: Reproductive health indicators by ethnic group

	African	Coloured	Indian	White	Other	All	Ref
Age of first sex under 15 years (% having first had sex at age 14 or younger)							
2008 NYRBS	12.8	13.1	5.2	8.4	16.1	12.6	a
2012 age 15-24	11.1	9.3	4.9	7.5	-	10.7	b
Condom use at last sex (%)							
2008 NYRBS	30	31	51	44	13	31	c
2012 HSRC age 15+	42	18	14	15	-	36	b
HIV knowledge: correct knowledge about prevention and rejection of major misconceptions							
2012 age 15+	23.6	30.3	41.4	43.3	-	26.8	b
Male circumcision (% of men who are circumcised)							
2012 HSRC age 15+	52.4	26.4	33.5	23.3	-	46.4	d
Teenage pregnancy							
2008 NYRBS ever pregnant	24.4	28.7	12.1	8.2	54.8	24.4	e
2008 NYRBS mothers	22.3	23.7	6.1	5.3	12.9	21.9	e
2008 NiDS mothers	15.1	21.6	0.0	3.7	-	14.8	f
ToP rate (%)							
2008 NYRBS	5.1	14.6	6.3	8.1	13.6	6.0	e

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a NYRBS 2008.[173] Learners in grades 8-11. Definition slightly different as "Had sex BEFORE the age of 14".

b HIV Household Survey 2012.

c NYRBS 2008.[173] Learners in grades 8-11. Definition different: "Always use a condom during sex" (of those who ever had sex).

d HIV Household Survey 2012. Self-reported circumcision.

e NYRBS 2008.[173] Learners in grades 8-11. Of those who have ever had sex.

f NiDS Demography Wave 1.[177] Proportion of women who have ever given birth.

Maternal health

Context	South Africa has committed to the African Union's Campaign for Accelerated Reduction of Maternal and Child Mortality (CARMMA). At the national level, this is evident in the Strategic Plan for Maternal, Newborn, Child and Women's Health (MNCWH) and Nutrition in South Africa 2012 – 2016. Maternal health issues feature prominently in the Annual Performance Plan of the NDoH.
New data sources	Nationally, new data have been reported in the: • Tenth Interim Report of the National Committee for Confidential Enquiries into Maternal Deaths in South Africa 2011 and 2012 • Rapid Mortality Surveillance Report 2012 • District Health Information System (DHIS) • District Health Barometer Focus on Maternal Mortality 2012/13 • Saving Mothers: Caesarean Section Monograph 2013 Internationally, reports of interest include: • Save the Children. State of the World's Mothers 2013 • WHO Every Woman, Every Child: Strengthening Equity and Dignity through Health: the second report of the independent Expert Review Group (iERG) on Information and Accountability for Women's and Children's Health 2013
Key issues and trends	Overall, there is evidence of increasing completeness and accuracy of data on maternal mortality. Some positive evidence of improvement is also available, at least in terms of the institutional maternal mortality ratio.

The Tenth Interim Report was issued by the National Committee for Confidential Enquiries into Maternal Deaths in South Africa (NCCEMD), reporting on deaths that occurred in 2011 and 2012 in health facilities (Map 1).[180] In that period, a total of 1 560 maternal deaths were assessed, yielding an institutional maternal mortality ratio (iMMR) of 159.1/100 000 live births. Although the iMMR decreased from the 2008–2010 period (when it was 176.2/1 000 000 live births), the proportion of deaths attributable to non-pregnancy-related infections, obstetric haemorrhage and hypertension remained the same (at 66.3% of all avoidable deaths). The Committee identified the Free State Province as having made the most progress in reducing maternal deaths, with evidence of this trend continuing in 2013. Although it did not have access to district-level NCCEMD data for 2011 or 2012, the District Health Barometer 2012/13 supplement on maternal mortality provides an intriguing glimpse into the differences between NCCEMD and DHIS figures.[181] Overall, though, there is evidence of increasing completeness and accuracy of the data.

The Caesarean section rate has long been a bone of contention, with stark differences evident between the public and private sectors, but also between different levels of care. In 2013, the NCCEMD issued a monograph on the subject. One chapter reported on an audit of Caesarean sections performed in Central and Eastern Tshwane between 1 July 2008 and 30 June 2009.[182] The authors recommended that the necessary data to allow for the classification of all Caesarean section cases according to the Robson Ten Group Classification system be recorded in all labour ward registers.

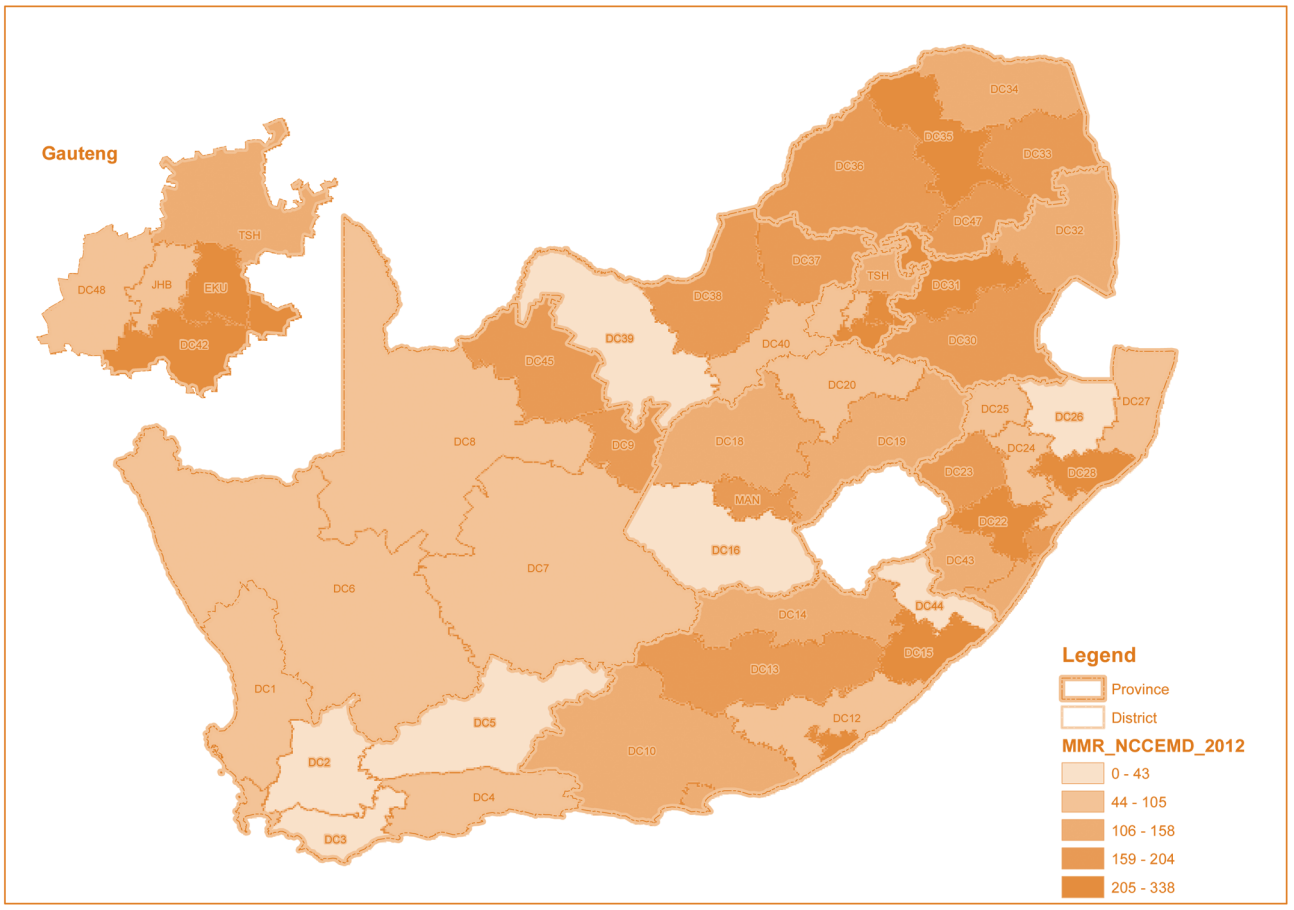
Maternal mortality is the common denominator in a wide range of locally produced research, much of it focused on the influence of HIV and access to ART. In a sub-analysis of the data from the 3rd South African National HIV, Behaviour and Health Survey, Wabiri et al. showed that inequalities in access to maternal health services were small across socio-economic groups.[183] However, while women in the poorest quartile had near universal access to antenatal care, fewer than 40% attended before 20 weeks' gestation. In the Free State, the provision of effective inter-facility transport for women with pregnancy complications was credited with contributing to the reduction in maternal mortality that was demonstrated.[184] Data from the Africa Centre Demographic Surveillance Area were used to show that mortality in the children of mothers on ART was not different from children of HIV-negative mothers.[185] At the African level, it has been estimated that 24% of deaths in pregnant or post-partum women are attributable to HIV.[186] In countries with high HIV prevalence, older mothers seem to be at particular risk.[187]

While maternal mortality is clearly targeted, for example in the Millennium Development Goals, this focus does obscure the far larger problem of maternal morbidity. However, there is a lack of clear definition in this area, which is receiving attention from the WHO.[188,189] Looking beyond 2015, there will need to be improved processes for the development of suitable global indicators for maternal, neonatal and child health.[190] The same can be said for systems of accountability at various levels. The second report of the independent Expert Review Group (iERG) on Information and Accountability for Women's and Children's Health recommended that "Ministers of Health, together with partners, must demonstrably prioritise and evaluate country-led, inclusive, transparent, and participatory national oversight mechanisms to advance women's and children's health."[191]

In 2013, Save the Children published a report entitled "Surviving the First Day", focused on the Health of the World's Mothers.[192] The report rated South Africa as 77th out of 176 on the Mothers' Index, a composite measure of maternal health (lifetime risk of maternal death), children's well-being (under-5 mortality rate), educational status (expected number of years of formal schooling), economic status (gross national income per capita) and political status (participation of women in national government).

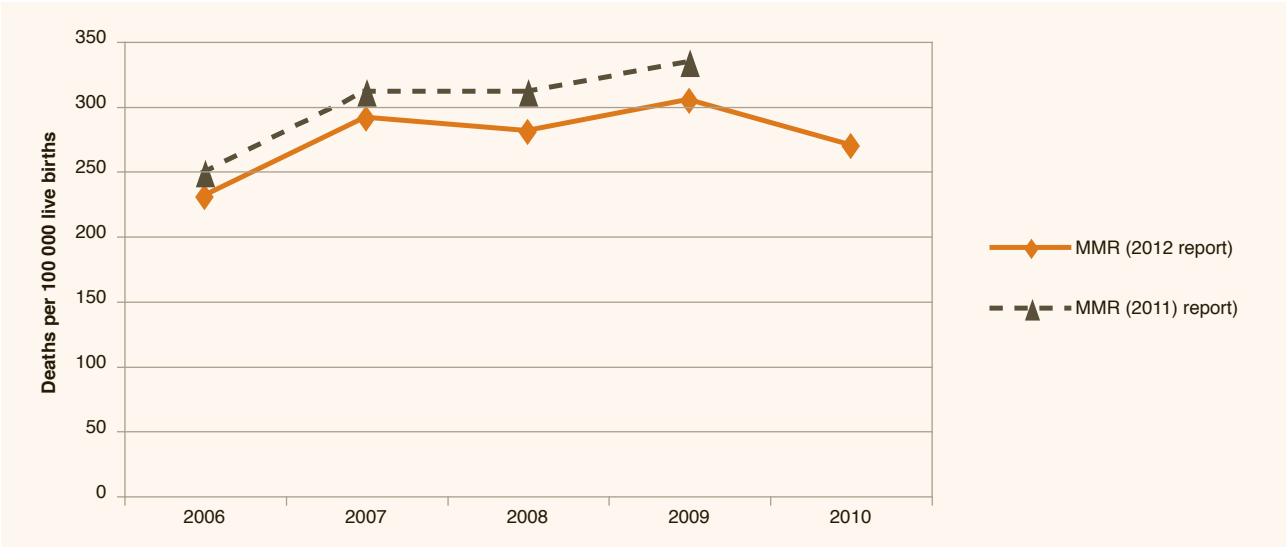
The MRC Rapid Mortality Surveillance Report 2012 provided estimates of the maternal mortality ratio, based on adjusted data from cause of death statistics up to 2010.[64] As the estimates of the number of births have also changed, new estimates of the MMR are that it rose from 280 per 100 000 live births in 2008 to 304

Map 1: Institutional maternal mortality ratio (NCCEMD data), by district, 2012



Source: Created from data in the Tenth Interim Report by the NCCEMD.[180]

Figure 13: Comparison of estimated maternal mortality ratios, 2011 and 2012 RMS reports



Source: Rapid Mortality Surveillance 2012.[64]

in 2009, and then dropped to 269 in 2010 (Figure 13). The report also plots MMR estimates from a wide range of sources, illustrating the magnitude of uncertainty that continues to plague this indicator.

Data from the Multicountry Survey on Maternal and Newborn Health (WHOMCS) have emphasised that "no quick fix exists to reduce maternal mortality".[193] Based on data from 359 hospitals from 29 countries located in five WHO regions, it was shown that "high coverage of essential interventions did not imply reduced maternal mortality". It was felt that "universal coverage of life-saving interventions needs to be matched with comprehensive emergency care and overall improvements in the quality of maternal health care".

Two other major reports have been published in 2014. Using the database established for the Global Burden of Diseases, Injuries, and Risk Factors Study 2013 (GBD 2013), data from 1980 to 2013 were used to show trends in "maternal mortality, the key causes contributing to maternal death, and the timing of maternal deaths".[194] This study also provided a meta-analysis of the available data on the contribution of HIV to maternal mortality, which showed a pooled relative risk of 6.4. For each of the countries for which data were available, this report provided estimates of the maternal mortality ratio in 1990, 2003 and 2013, the number of maternal deaths in each of those years, and the annualised rate of change in the maternal mortality ratio for the periods 1990 to 2003, 2003 to 2013, and 1990 to 2013. Over the last of those periods, the report estimated that South Africa's MMR had increased by 1.0% (-1.6 to 3.8). There are substantial differences between the MMR trends estimated by Kassebaum et al.[194] and former Institute for Health Metrics and Evaluation authors, Hogan et al. in 2010[195] and Lozano et al. in 2011.[196] A WHO systematic review of available literature from 2003 to 2012 yielded 23 eligible studies.[197] Data from these publications were combined with data from vital registration to show that "haemorrhage, hypertensive disorders, and sepsis were responsible for more than half of maternal deaths worldwide" in this period. However, a quarter were attributed to indirect causes, notably HIV. Significantly, the report showed that 83.8% of all maternal deaths in this period occurred in sub-Saharan Africa and southern Asia.

Table 20: Maternal health indicators by province

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
ANC coverage (%)											
2010 DHIS	94.6	85.6	112.9	99.1	106.3	98.9	131.3	95.9	89.9	100.7	a
2011 DHIS	99.4	87.1	121.1	90.1	111.8	99.9	127.8	102.0	80.8	101.2	a
2012 DHIS	90.0	87.4	116.2	91.9	106.6	100.1	101.9	109.7	78.4	98.5	a
ANC visits per client											
2010 DHIS	3.0	4.2	3.6	4.0	3.4	3.5	3.5	3.9	4.5	3.7	a
2011 DHIS	3.1	4.3	3.7	4.6	3.6	3.5	3.7	3.5	4.6	3.8	a
2012 DHIS	3.4	4.4	4.0	4.8	3.7	3.5	4.5	3.5	1.0	3.7	a
Births assisted by trained health personnel (%)											
2008 doctor	-	-	-	-	-	-	-	-	-	27.6	b
2008 nurse/midwife	-	-	-	-	-	-	-	-	-	66.7	b
2008 doctor or nurse/midwife	-	-	-	-	-	-	-	-	-	94.3	b
Caesarean section rate (%)											
2010 DHIS	24.3	20.8	23.0	26.9	14.6	15.8	17.6	16.1	22.9	21.6	a
2011 DHIS	25.0	22.5	24.3	28.6	14.9	16.4	19.5	16.7	24.5	22.7	a
2012 DHIS	25.4	24.8	24.6	29.2	15.4	16.7	19.5	16.7	25.6	23.2	a
Delivery rate in facility (%)											
2008 HSRC	-	-	-	-	-	-	-	-	-	94.9	c
2008 DHIS	69.2	78.1	106.1	80.6	97.1	95.5	90.1	79.1	96.9	87.7	a
2009 DHIS	71.4	77.5	104.1	79.3	99.2	91.4	85.0	80.1	94.3	87.3	a
2010 DHIS	75.8	78.2	98.5	80.6	104.6	86.8	90.1	78.3	89.9	87.4	a
2011 DHIS	83.4	79.8	96.3	84.2	114.2	90.5	85.6	84.6	83.9	90.1	a
2012 DHIS	83.7	84.2	98.2	84.5	113.9	92.7	92.6	90.4	81.3	91.3	a
Maternal mortality ratio (MMR)											
2008 RMS 2012	-	-	-	-	-	-	-	-	-	280	d
2009 RMS 2012	-	-	-	-	-	-	-	-	-	304	d
2010 RMS 2012	-	-	-	-	-	-	-	-	-	269	d
2010 WHO (2012 estimates)	-	-	-	-	-	-	-	-	-	300	e
2011 IHME (2011 estimates)	-	-	-	-	-	-	-	-	-	91	f
2013 IHME (2014 estimates)	-	-	-	-	-	-	-	-	-	174	g

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Maternal mortality ratio in facility / institutional (iMMR)											
2008 NCCEMD	180.4	267.0	136.0	183.8	176.6	179.8	274.4	161.7	61.8	164.8	h
2009 NCCEMD	215.2	350.9	160.2	194.2	160.4	159.4	251.8	279.5	113.1	188.9	h
2010 DHIS	147.9	237.2	93.8	196.9	142.1	161.1	90.7	204.6	-	138.5	i
2010 NCCEMD	197.0	263.5	159.2	208.7	166.7	218.6	267.4	256.1	88.0	186.2	h
2011 DHIS	114.9	199.1	123.3	192.2	184.6	135.0	147.7	189.7	28.6	144.9	i
2011 NCCEMD	158.3	240.1	121.5	186.7	195.5	190.1	191.1	153.8	64.8	159.1	h
2012 DHIS	109.5	132.7	116.5	165.5	177.9	175.8	144.6	166.6	8.7	132.9	i
2012 NCCEMD	146.4	124.5	142.5	160.3	185.8	173.8	149.3	127.8	78.6	146.7	h
Number of maternal deaths											
2010 NCCEMD	232	120	293	385	198	150	52	134	82	1 646	j
2010 WHO (2012 estimates)	-	-	-	-	-	-	-	-	-	3 200	e
2011 DHIS	137	94	250	366	236	101	30	107	26	1 347	i
2011 IHME (2011 estimates)	-	-	-	-	-	-	-	-	-	961	f
2011 NCCEMD	210	124	257	360	248	146	40	95	60	1 540	h
2012 DHIS	128	64	242	317	226	135	32	97	8	1 249	i
2012 NCCEMD	183	65	308	310	236	136	33	80	75	1 426	h
2013 IHME (2014 estimates)	-	-	-	-	-	-	-	-	-	1 925	g
PMDF (proportion maternal among deaths of females of reproductive age)											
2010 WHO (2012 estimates)	-	-	-	-	-	-	-	-	-	2.3	e

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a DHIS.[30] Data for financial year from April of the year to March of the following year (not calendar year).

b HIV Children 2008.[198] 4.7% of births attended by traditional birth attendant and 1% did not know about attendant at delivery.

c HIV Children 2008.[198] Majority born in hospitals (76.7%) and some in clinics (18.2%). Approximately 5% of children were born at home.

d RMS 2012.[64] The MMR is calculated (according to the method proposed by HDACC) from adjusted vital statistics by proportional redistribution of the ill-defined natural causes (ICD codes R00–R99) among the specified natural causes. Thereafter, the number is adjusted to allow for the fact that about 7% of deaths are not registered.

e Maternal Mortality 1990-2010.[199]

f Lozano et al., 2011.[196]

g Kassebaum et al., 2014.[194]

h Saving Mothers 2012.[180]

i DHIS.[30] Institutional (facility) MMR based only on maternal deaths in facilities. Data for financial year from April of the year to March of the following year (not calendar year).

j Saving Mothers 2008–10.[200]

Child health

Context	Together with maternal health, child health is a focus of a number of the Millennium Development Goals.
New data sources	Nationally, new data have been reported in the: • South African Child Gauge 2013 • South African National Health and Nutrition Examination Survey (SANHANES-1) • District Health Information System (DHIS) • Rapid Mortality Surveillance Report 2012 Internationally, reports of interest include: • UN-IGME Levels and Trends in Child Mortality Report 2013 • UNICEF. The State of the World's Children 2014 • UNICEF/WHO Ending Preventable Deaths from Pneumonia and Diarrhoea by 2025 • World Vision. The Killer Gap: A Global Index of Health Inequality for Children 2013 • UNICEF/WHO. Immunization Summary. A statistical reference containing data through 2012.
Key issues and trends	Globally, attention is being paid to the avoidable mortality from pneumonia and diarrhoeal disease. In both cases, cost-effective interventions have been identified, but are not universally applied.

Each year, the key publication in child health in South Africa is the annual South African Child Gauge, published by the Children's Institute, University of Cape Town. This year's edition has drawn attention to five areas of concern:

- maternal health and nutrition – highlighting the need for early antenatal care, screening for mental health, alcohol and substance abuse problems, and nutritional support to prevent problems associated with low birth weight and micronutrient deficiencies;
- child health and nutritional support – through the re-engineering of primary health care;
- caregiver support – such as programmes to improve caregivers' parenting skills and knowledge of early childhood development;
- access to early learning programmes – particularly for those living in poor and rural communities; and
- quality education in the foundation phase – including strengthening school health, nutrition and aftercare programmes.[201]

A large survey, which interviewed 6 002 children aged 10 to 17 years in 2009–2011, investigated the links between poverty, orphanhood and parental illness (including HIV) and child health, development and HIV risks.[202] Children at highest risk were affected by both family HIV and poverty. Figure 14 illustrates the variation across provinces, and the measurement differences across survey in the proportion of children who are paternal, maternal or double orphans.

Two conditions that have been the subject of global attention since the very earliest days of primary health care are childhood diarrhoea and pneumonia. Even in the better-resourced Western Cape Province, primary care advice in relation to oral rehydration and breastfeeding has been shown to be sub-optimal.[203] The Global Enteric Multicenter Study, conducted in four sites in Africa and three in Asia, has underlined the need for accelerated implementation of existing, available interventions.[204] While one of these (rotavirus vaccine) has been rolled out in South Africa, the other (zinc administration) has proved difficult to implement locally because of the lack of appropriate, registered medicinal products. A Lancet series has also targeted childhood pneumonia and diarrhoea. These two conditions remain the leading infectious causes of death in children under five years, and accounted for 2 million deaths between them in 2011.[205] Cost-effective interventions have been clearly identified, but are not always applied at scale and in the settings of greatest need.[206,207] Nonetheless, ending preventable deaths from pneumonia and diarrhoea has been identified as an achievable goal by 2025, and has been outlined as a Global Action Plan.[208,209] One of the challenges of this global plan is to develop efficient means of monitoring access to appropriate antibiotic treatment in children with pneumonia. Surveys that rely on a two-week recall of pneumonia are inadequate.[210] Breastfeeding is an effective means of reducing the risk of diarrhoeal disease. There is a positive association between rates of exclusive breastfeeding and access to paid breastfeeding breaks for at least six months.[211] Routine data suggest general improvement in children's access to health services and the incidence of priority childhood conditions (Figure 15).

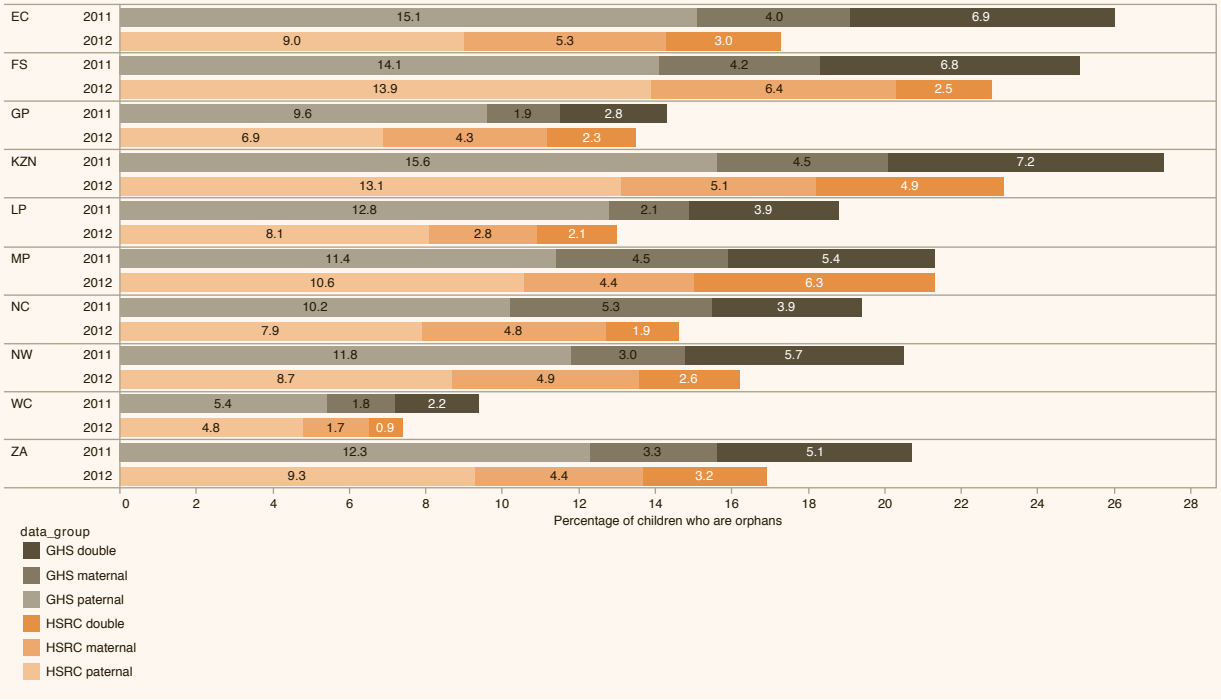
In April 2013, the results of possibly the largest-ever randomised clinical trial were reported. The Deworming and Enhanced Vitamin A (DEVTA) study was a cluster-randomised trial in about 1 million under 5s, given six-monthly vitamin A and albendazole.[86,212] The results did not confirm the expectation that vitamin A supplementation would reduce child mortality by 20–30%, although the authors were at pains to show that more modest effects were still possible. Combining the DEVTA results with those from previous studies still yielded a weighted average mortality reduction of 11%. Presumptive deworming with albendazole also had no discernible effects on mortality.

Like the SA Child Gauge, the UNICEF publication "The State of the World's Children" is an authoritative source of information.[213] The 2014 edition, sub-titled "Every Child Counts", draws heavily on data from Multiple Indicator Cluster Surveys (MICS) conducted by national authorities. Each survey samples about 10 000 households and elicits responses from women and men aged 15–49 years, as well as mothers and caretakers of all children under five years of age. Drawing on a wide range of data sources, World Vision has also produced a report that identifies the factors that contribute to

the gap between the most and least vulnerable children.[214] These are:

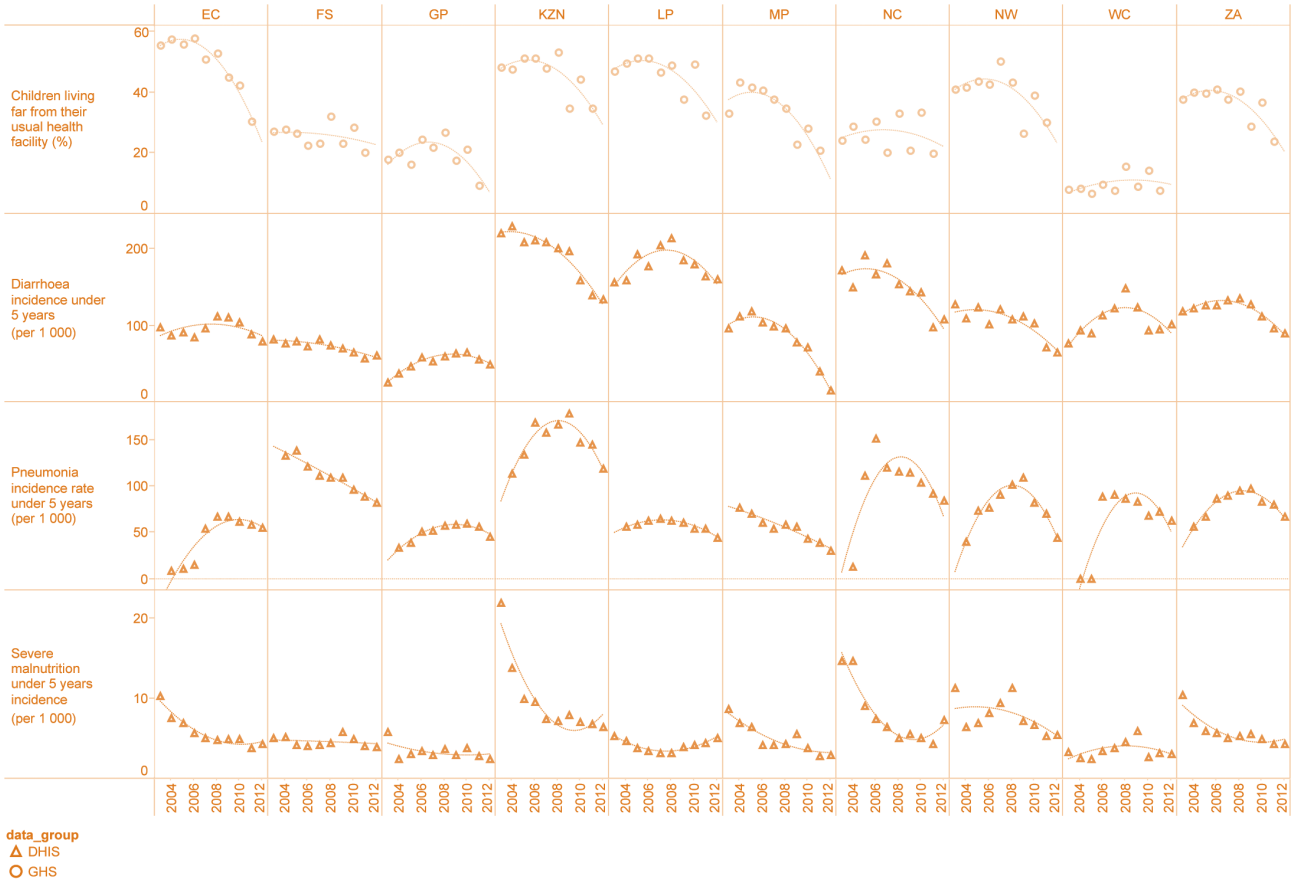
- The conditions in which people are born, grow, live, work and age.
- Lack of equal investment in the early years of life, which is the period that holds the greatest potential for life-long good health.
- Policies and practices that have prioritised urban growth, leaving rural communities to suffer from chronic underinvestment in infrastructure and amenities.
- Unequal employment and working conditions.
- Lack of social security: globally, four out of five people lack the backup of basic social security coverage. Generous social protection systems contribute to better health, including lower mortality.
- High out-of-pocket healthcare spending.
- Lack of investment in national health workforces: there is little balance between rural and urban health worker density within countries.
- Gender disparities; the position of women in society is associated with child health and survival.

Figure 14: Percentage of children who are paternal, maternal or double orphans, 2011 (GHS) and 2012 (HSRC)



Source: General Household Survey (GHS) 2011 as quoted by Children Count website[215] and HIV Household Survey 2012.[147]

Figure 15: Provincial and national trends for selected child health indicators



Source: DHIS[30] and General Household Survey (GHS) as quoted by Children Count website.[215]

Table 21: Child health indicators by province

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Children living far from their usual health facility (%)											
2010 GHS	42.4	28.6	21.3	44.3	49.2	28.1	33.5	38.9	14.3	36.7	a
2011 GHS	30.5	20.3	9.5	34.8	32.4	20.9	19.9	30.1	7.6	23.9	a
Children under 5 years weighing rate											
2010 DHIS	85.9	87.1	88.4	77.5	77.4	87.4	82.0	87.5	71.8	81.9	b
2011 DHIS	85.4	86.6	88.5	89.0	77.9	85.6	80.5	90.4	74.5	84.8	b
2012 DHIS	85.2	87.6	89.0	85.9	80.2	87.0	82.1	91.1	-	77.6	b
Diarrhoea incidence under 5 years (per 1 000)											
2010 DHIS	104.2	64.6	64.5	159.2	180.7	71.4	142.9	102.8	93.9	112.4	b
2011 DHIS	89.1	57.4	55.4	139.1	164.9	40.0	97.0	71.9	94.7	95.9	b
2012 DHIS	79.3	61.4	49.3	133.8	160.4	14.8	107.6	65.0	101.8	90.3	b
Not gaining weight under 5 years rate (%)											
2010 DHIS	0.7	2.0	0.5	1.1	0.6	1.0	1.9	1.2	2.2	1.0	b
2011 DHIS	0.6	1.7	0.4	1.0	0.5	0.6	2.1	1.2	2.4	0.9	b
2012 DHIS	0.5	1.5	0.3	0.5	0.4	0.5	1.8	0.8	-	0.6	b
Number of orphans											
2010 ASSA2008 maternal/double	246 962	112 775	317 132	486 793	139 820	158 836	20 105	134 158	88 492	1 668 901	c
2010 GHS double	171 000	76 000	96 000	285 000	68 000	80 000	15 000	73 000	21 000	885 000	a
2010 GHS maternal	115 000	42 000	71 000	222 000	50 000	67 000	16 000	43 000	31 000	658 000	a
2010 GHS maternal/double	286 000	118 000	167 000	507 000	118 000	147 000	31 000	116 000	52 000	1 543 000	a
2010 GHS paternal	405 000	137 000	31 400	658 000	311 000	166 000	43 000	145 000	117 000	2 297 000	a
2010 GHS total	691 000	255 000	198 400	1 165 000	429 000	313 000	74 000	261 000	169 000	3 840 000	a
2011 ASSA2008 maternal/double	249 595	114 801	330 393	495 545	141 975	163 174	20 986	136 964	91 301	1 712 677	c
2011 GHS double	186 000	73 000	94 000	304 000	87 000	79 000	17 000	73 000	40 000	952 000	a
2011 GHS maternal	108 000	44 000	63 000	190 000	47 000	66 000	23 000	39 000	32 000	613 000	a

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
2011 GHS maternal/double	294 000	117 000	157 000	494 000	134 000	145 000	40 000	112 000	72 000	1 565 000	a
2011 GHS paternal	405 000	149 000	320 000	658 000	288 000	168 000	44 000	152 000	99 000	2 283 000	a
2011 GHS total	699 000	266 000	477 000	1 152 000	422 000	313 000	84 000	264 000	171 000	3 848 000	a
2012 HSRC double	-	-	-	-	-	-	-	-	-	593 461	d
2012 HSRC maternal	-	-	-	-	-	-	-	-	-	809 778	d
2012 HSRC maternal/double	-	-	-	-	-	-	-	-	-	1 403 239	d
2012 HSRC paternal	-	-	-	-	-	-	-	-	-	1 730 471	d
2012 HSRC total	-	-	-	-	-	-	-	-	-	3 132 041	d
2012 ASSA2008 maternal/double	250 750	115 485	339 861	499 933	144 639	165 717	21 853	138 276	94 271	1 742 924	c
2013 ASSA2008 maternal/double	250 916	115 171	346 199	500 999	147 493	167 038	22 680	138 459	97 170	1 763 010	c
2014 ASSA2008 maternal/double	250 321	114 185	349 785	499 334	150 322	167 418	23 450	137 851	99 821	1 774 794	c
2015 ASSA2008 maternal/double	249 084	112 728	350 770	495 337	152 965	167 040	24 124	136 669	101 947	1 779 248	c
Orphanhood (%)											
2010 GHS maternal/double	10.7	11.0	5.0	11.9	5.2	10.1	7.3	9.1	2.9	8.4	a
2010 GHS total	25.8	23.8	14.5	27.3	19.0	21.5	17.4	20.5	9.5	22.6	a
2011 GHS double	6.9	6.8	2.8	7.2	3.9	5.4	3.9	5.7	2.2	5.1	a
2011 GHS maternal	4.0	4.2	1.9	4.5	2.1	4.5	5.3	3.0	1.8	3.3	a
2011 GHS maternal/double	10.9	11.0	4.7	11.7	6.0	9.9	9.2	8.7	4.0	8.4	a
2011 GHS paternal	15.1	14.1	9.6	15.6	12.8	11.4	10.2	11.8	5.4	12.3	a
2011 GHS total	26.0	25.1	14.3	27.3	18.8	21.3	19.4	20.5	9.4	20.7	a
2012 HSRC double	3.0	2.5	2.3	4.9	2.1	6.3	1.9	2.6	0.9	3.2	d
2012 HSRC maternal	5.3	6.4	4.3	5.1	2.8	4.4	4.8	4.9	1.7	4.4	d
2012 HSRC maternal/double	8.3	8.9	6.6	10.0	4.9	10.7	6.7	7.5	2.6	7.6	d
2012 HSRC paternal	9.0	13.9	6.9	13.1	8.1	10.6	7.9	8.7	4.8	9.3	d
2012 HSRC total	17.3	22.8	13.5	23.1	13.0	21.3	14.6	16.3	7.5	16.9	d
Pneumonia incidence rate under 5 years (per 1 000)											
2010 DHIS	61.6	96.1	59.3	147.8	54.6	43.7	104.3	82.8	68.7	83.6	b
2011 DHIS	58.2	89.3	56.6	145.5	53.9	38.6	92.2	70.0	72.1	80.3	b
2012 DHIS	55.7	82.3	45.5	119.0	44.8	30.8	85.0	44.5	63.0	66.8	b
Severe malnutrition under 5 years incidence (per 1 000)											
2010 DHIS	4.9	4.9	3.7	7.1	4.1	3.8	5.1	6.7	2.7	4.9	b
2011 DHIS	3.8	4.1	2.8	6.8	4.4	2.8	4.4	5.3	3.2	4.3	b
2012 DHIS	4.3	3.9	2.5	6.5	5.0	2.9	7.2	5.5	3.0	4.4	b

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a Children Count website.[215] Based on GHS 2010 and GHS 2011; Stats SA. Children are defined as people aged 0-17 years.

b DHIS.[30] Data for financial year from April of the year to March of the following year (not calendar year).

c ASSA2008.[72] Children whose mother has died, regardless of whether or not father has died, i.e. maternal plus double orphans.

d HIV Household Survey 2012.[147]

Child mortality

No new final reports have yet been released by either the Committee on Morbidity and Mortality in Children Under 5 Years (CoMMiC) or the National Perinatal Mortality and Morbidity Committee (NaPeMMCo). The last CoMMiC report covered the period from 2008 to 2011, whereas the NaPeMMCo report covered the period 2008 to 2010. An interim report from CoMMic, dated 2012, was published on the NDoH website in July 2013.[216] The intent of this publication was stated as "an update on mortality data for the country for 2009, disaggregated to provincial and district level including trends for the three-year period 2007–2009". There are a number of potential problems with these data. Firstly, the district boundaries used are out of date. Secondly, while the report notes that the rates are an underestimation since completeness of VR data is much lower for child deaths than adult deaths, the data have not been adjusted for variable under-reporting across districts, resulting in implausibly low mortality rates in very deprived districts. Lastly, the most recent years reported have not taken late registration of deaths into account, so the decline in mortality rates will be somewhat reduced once late registrations are updated.

The MRC Rapid Mortality Surveillance (RMS) Report 2012 adjusts for these limitations at national level, but notes the need to develop a methodology to provide estimates of sub-national trends.[64] The most recent causes of death report from Stats SA provided revised estimates of completeness of adult deaths but indicated that more time was needed to work on estimating completeness of child deaths.[35] This is a crucial piece of information in estimating mortality rates from crude recorded death data. The RMS report triangulated data from DHIS, vital registration and rapid mortality surveillance records and concluded that the neonatal mortality rate (NMR) has remained between 12 and 14 per 1 000 live births for the period 2006 to 2012. In contrast, the infant mortality rate (IMR) and the under-five mortality rate (U5MR) have declined rapidly since 2008, and by 2011 were well below the targets recommended by the Health Data

Advisory and Co-ordination Committee (HDACC) (35 and 50 per 1 000 live births, respectively). By 2011, the figures were 28 and 40 per 1 000 live births. However, the rapid decline appears to have ended, with no further decline noted in 2012. The latest RMS report, however, contends that after review of selected causes in the Stats SA data for 2006–2010 "it remains a challenge to know what contribution the reductions in HIV infection, the introduction of new vaccines, and improved access to water and sanitation have made to the decrease. However, generally, as the U5MR decreases, perinatal conditions contribute a higher proportion of the deaths".[64]

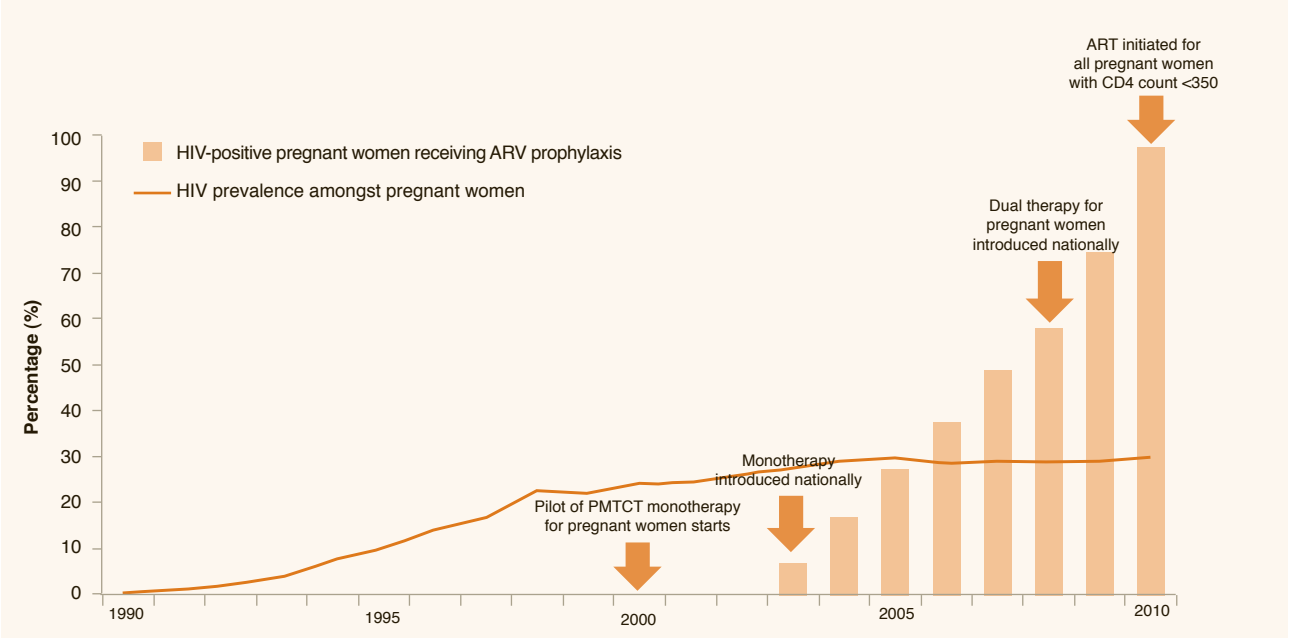
A comparison of data from three models used to estimate AIDS deaths in children (the Spectrum UNAIDS model, the University of Cape Town paediatric HIV model, and the ASSA 2008 model), estimates of under-five mortality from global modelling exercises (Institute for Health Metrics and Evaluation – IHME and UN Inter-agency Group for Child Mortality Estimation – UN-IGME), and data from the vital registration system and national Rapid Mortality Surveillance (2011) database was published in 2013.[217] The trends for the period 1990 to 2011 were similar, showing a peak in child mortality in 2005, and then a rapid decline, most likely due to access to prevention of mother-to-child transmission of HIV interventions and to some extent access to ART (Figure 16). In the 2013 UN-IGME report[218] a new method for estimating and extrapolating mortality rates is described, and country spreadsheets containing the data and graphs are available from www.childmortality.org.

Data from small area surveys also add to the understanding of child mortality. For example, a retrospective review of death certificates from the Pietersburg/Mankweng hospital complex for 2008 to 2010 showed that the 10 leading causes of death in children under five years old (in descending order: prematurity/low birth weight, pneumonia, diarrhoeal diseases, birth asphyxia, severe malnutrition, HIV/AIDS, hydrocephalus, unintentional injuries, meningitis and other infections) captured 73.9% of the causes of death at the facility.[219] Data on neonatal deaths at Steve Biko Academic Hospital in Gauteng during 2011 were also reviewed, identifying the top four causes of death (immaturity-related causes, infections, congenital abnormalities and hypoxia).[220]

A neglected issue that attracted increased attention in 2013 was that of child homicides. A cross-sectional mortuary-based study in a national sample of 38 facilities identified 1 108 child homicides in 2009, with child abuse and neglect having preceded almost half (44.5%) of these homicides.[221,222]

Global efforts to quantify the extent and determinants of child mortality and the coverage of proven interventions continue.[205] The mortality risk associated with being pre-term or small-for-gestational-age were estimated for low- and middle-income countries, highlighting that these factors, and not merely low birth weight, are important.[223] These mortality risks extend beyond the neonatal period. A worldwide longitudinal study was used to generate global determinants of under-five mortality, showing the complexity of these relationships, some of which have significant lags or non-linear behaviours.[224]

Figure 16: Antenatal HIV prevalence and prevention of mother-to-child transmission (PMTCT) scale-up in South Africa, 1990–2010



Source: Kerber et al., 2013.[217]

Table 22: Child mortality and related indicators by province

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Infant mortality rate (deaths under 1 year per 1 000 live births)											
2009 ASSA2008	50.0	43.7	25.3	45.3	28.3	41.4	26.9	30.8	20.1	35.2	a
2009 Inter-agency group (2013)	-	-	-	-	-	-	-	-	-	39.8	b
2009 RMS 2012	-	-	-	-	-	-	-	-	-	39.0	c
2009 mid-year	-	-	-	-	-	-	-	-	-	49.1	d
2010 ASSA2008	47.9	41.9	25.2	44.0	28.2	38.9	26.3	30.7	19.7	34.5	a
2010 Inter-agency group (2013)	-	-	-	-	-	-	-	-	-	35.0	b
2010 RMS 2012	-	-	-	-	-	-	-	-	-	35.0	c
2010 mid-year	-	-	-	-	-	-	-	-	-	47.1	d
2011 ASSA2008	46.5	40.7	24.7	43.1	27.7	37.5	25.5	30.1	19.0	33.8	a
2011 Inter-agency group (2013)	-	-	-	-	-	-	-	-	-	34.2	b
2011 RMS 2012	-	-	-	-	-	-	-	-	-	28.0	c
2011 mid-year	-	-	-	-	-	-	-	-	-	45.1	d
2012 ASSA2008	45.4	39.8	24.3	42.4	27.2	36.4	24.8	29.6	18.3	33.2	a
2012 Inter-agency group (2013)	-	-	-	-	-	-	-	-	-	33.3	b
2012 RMS 2012	-	-	-	-	-	-	-	-	-	27.0	c
2012 mid-year	-	-	-	-	-	-	-	-	-	43.5	d
2013 ASSA2008	44.4	39.1	23.8	41.7	26.7	35.6	24.1	29.1	17.7	32.5	a
2013 mid-year	-	-	-	-	-	-	-	-	-	41.7	d
2014 ASSA2008	43.6	38.5	23.4	40.9	26.2	35.0	23.5	28.5	17.1	31.9	a
2015 ASSA2008	42.8	37.8	22.9	40.3	25.8	34.3	22.9	28.0	16.5	31.3	a
Low birth weight rate (% live births <2500g)											
2010 DHIS	12.6	14.5	13.0	12.0	10.0	9.8	20.0	14.5	16.0	12.7	e
2010 PPIP all levels	-	22.8	-	-	13.0	13.3	-	-	-	-	f
2011 DHIS	12.3	13.1	15.8	11.9	10.1	12.3	18.5	13.3	15.5	13.2	e
2011 PPIP CHC	-	-	-	-	-	-	-	-	-	9.1	g
2011 PPIP DH	-	-	-	-	-	-	-	-	-	12.9	g
2011 PPIP NC	-	-	-	-	-	-	-	-	-	25.9	g
2011 PPIP PT	-	-	-	-	-	-	-	-	-	22.1	g
2011 PPIP RH	-	-	-	-	-	-	-	-	-	17.6	g
2011 PPIP all levels	-	22.0	-	-	12.0	13.4	-	-	-	-	f
2012 DHIS	13.8	13.5	15.3	12.5	10.7	11.8	18.1	13.4	15.7	13.5	e
Neonatal death rate (NNDR) (deaths <28 days old per 1 000 live births)											
2009 DHIS	13.5	13.9	10.2	10.4	11.8	11.2	12.9	11.3	6.1	10.9	e
2009 Inter-agency group (2013)	-	-	-	-	-	-	-	-	-	16.8	b
2009 PPIP CHC	-	-	-	-	-	-	-	-	-	2.1	h
2009 PPIP DH	-	-	-	-	-	-	-	-	-	12.3	h
2009 PPIP NC	-	-	-	-	-	-	-	-	-	18.1	h
2009 PPIP PT	-	-	-	-	-	-	-	-	-	16.5	h
2009 PPIP RH	-	-	-	-	-	-	-	-	-	13.5	h
2009 Private hospitals	-	-	-	-	-	-	-	-	-	4.0	i
2009 RMS 2012	-	-	-	-	-	-	-	-	-	14.0	c
2010 DHIS	15.1	16.0	11.4	10.4	12.0	10.1	13.5	15.4	5.5	11.6	e
2010 Inter-agency group (2013)	-	-	-	-	-	-	-	-	-	16.0	b
2010 PPIP all levels	17.0	-	-	13.5	-	-	-	13.0	8.5	-	f
2010 RMS 2012	-	-	-	-	-	-	-	-	-	14.0	c
2011 DHIS	16.7	15.5	13.4	10.7	12.3	10.6	14.6	13.1	5.9	12.3	e
2011 Inter-agency group (2013)	-	-	-	-	-	-	-	-	-	15.7	b
2011 PPIP CHC	1.1	-	-	-	-	-	-	-	-	1.6	g
2011 PPIP DH	10.3	-	-	-	-	-	-	-	-	12.4	g
2011 PPIP NC	-	-	-	-	-	-	-	-	-	26.9	g
2011 PPIP PT	38.1	-	-	-	-	-	-	-	-	23.0	g
2011 PPIP RH	18.8	-	-	-	-	-	-	-	-	14.9	g
2011 PPIP all levels	15.7	-	11.1	13.6	-	-	-	12.0	7.3	-	g
2011 RMS 2012	-	-	-	-	-	-	-	-	-	13.0	c
2012 DHIS	18.2	13.0	12.2	10.4	12.8	10.3	13.5	11.9	7.1	12.1	e
2012 Inter-agency group (2013)	-	-	-	-	-	-	-	-	-	15.3	b
2012 RMS 2012	-	-	-	-	-	-	-	-	-	12.0	c

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Number of under-5 deaths											
2009 Inter-agency group est (2010)	-	-	-	-	-	-	-	-	-	66 000	j
2009 Stats SA	-	-	-	-	-	-	-	-	-	50 471	k
2009 vital registration	-	-	-	-	-	-	-	-	-	51 719	l
2010 vital registration	-	-	-	-	-	-	-	-	-	47 747	l
2011 vital registration	-	-	-	-	-	-	-	-	-	38 010	l
Perinatal care index (perinatal MR / LBWR)											
2011 PPIP CHC	-	-	-	-	-	-	-	-	-	1.05	h
2011 PPIP DH	-	-	-	-	-	-	-	-	-	2.59	h
2011 PPIP NC	-	-	-	-	-	-	-	-	-	2.44	h
2011 PPIP PT	-	-	-	-	-	-	-	-	-	2.31	h
2011 PPIP RH	-	-	-	-	-	-	-	-	-	2.25	h
2011 PPIP all levels	-	2.10	-	-	2.90	2.10	-	1.90	-	-	h
Perinatal mortality rate (deaths <8 days old per 1 000 total births)											
2009 DHIS	33.0	39.8	29.8	32.9	32.1	35.1	32.4	34.6	27.9	32.3	e
2009 PPIP =>500g	-	-	-	-	-	-	-	-	-	35.3	h
2009 PPIP CHC	-	-	-	-	-	-	-	-	-	10.4	h
2009 PPIP DH	-	-	-	-	-	-	-	-	-	33.3	h
2009 PPIP NC	-	-	-	-	-	-	-	-	-	71.4	h
2009 PPIP PT	-	-	-	-	-	-	-	-	-	48.0	h
2009 PPIP RH	-	-	-	-	-	-	-	-	-	41.7	h
2010 DHIS	35.3	42.8	29.7	31.6	32.3	33.3	39.0	37.6	25.6	32.4	e
2010 PPIP all levels	37.6	72.9	-	35.5	37.9	-	-	40.5	31.1	-	f
2011 DHIS	36.5	40.4	30.7	32.4	32.0	33.7	37.7	35.5	24.1	32.5	e
2011 PPIP CHC	8.6	-	-	-	-	-	-	-	-	9.6	g
2011 PPIP DH	28.9	-	-	-	-	-	-	-	-	33.4	g
2011 PPIP NC	-	-	-	-	-	-	-	-	-	63.3	g
2011 PPIP PT	74.9	-	-	-	-	-	-	-	-	51.0	g
2011 PPIP RH	41.3	-	-	-	-	-	-	-	-	39.5	g
2011 PPIP all levels	37.3	64.6	28.7	37.0	41.2	-	-	35.1	27.9	-	f
2012 DHIS	37.8	35.6	28.5	31.8	33.1	33.6	36.7	33.7	23.6	31.8	e
Stillbirth rate (per 1 000 total births)											
2009 DHIS	21.6	29.3	21.1	24.1	21.7	24.8	22.0	24.7	22.9	23.0	e
2009 PPIP CHC	-	-	-	-	-	-	-	-	-	8.3	h
2009 PPIP DH	-	-	-	-	-	-	-	-	-	21.3	h
2009 PPIP NC	-	-	-	-	-	-	-	-	-	54.3	h
2009 PPIP PT	-	-	-	-	-	-	-	-	-	32.1	h
2009 PPIP RH	-	-	-	-	-	-	-	-	-	28.5	h
2009 Private hospitals	-	-	-	-	-	-	-	-	-	7.5	i
2010 DHIS	22.4	30.9	20.3	22.8	21.9	24.3	27.3	25.2	20.8	22.7	e
2010 PPIP all levels	24.2	47.2	20.3	-	23.3	-	-	28.0	22.9	-	f
2011 DHIS	22.3	29.1	21.2	23.4	21.3	24.1	25.0	24.6	19.1	22.5	e
2011 PPIP CHC	7.5	-	-	-	-	-	-	-	-	8.1	g
2011 PPIP DH	19.1	-	-	-	-	-	-	-	-	22.0	g
2011 PPIP NC	-	-	-	-	-	-	-	-	-	42.9	g
2011 PPIP PT	43.9	-	-	-	-	-	-	-	-	33.3	g
2011 PPIP RH	24.8	-	-	-	-	-	-	-	-	27.6	g
2011 PPIP all levels	23.6	39.8	-	-	27.4	-	-	23.0	20.8	-	g
2012 DHIS	21.8	25.1	19.9	23.3	21.8	24.3	25.3	23.5	17.6	21.8	e
Under 5 mortality rate (deaths under 5 years per 1 000 live births)											
2009 ASSA2008	71.1	63.4	37.9	66.8	40.3	61.9	38.7	45.5	27.7	50.9	a
2009 IHME (2010)	-	-	-	-	-	-	-	-	-	53.4	m
2009 Inter-agency group (2013)	-	-	-	-	-	-	-	-	-	63.1	b
2009 RMS 2012	-	-	-	-	-	-	-	-	-	56.0	c
2009 mid-year	-	-	-	-	-	-	-	-	-	68.5	d
2010 ASSA2008	67.7	60.2	38.0	64.5	40.6	57.7	38.2	45.9	27.4	49.9	a
2010 GBD 2010 female	-	-	-	-	-	-	-	-	-	50.2	n
2010 GBD 2010 male	-	-	-	-	-	-	-	-	-	50.2	n
2010 IHME (2010)	-	-	-	-	-	-	-	-	-	50.9	m
2010 Inter-agency group (2013)	-	-	-	-	-	-	-	-	-	52.9	b
2010 RMS 2012	-	-	-	-	-	-	-	-	-	52.0	c

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
2010 mid-year	-	-	-	-	-	-	-	-	-	65.2	d
2011 ASSA2008	65.3	58.0	37.1	62.7	39.9	54.7	36.8	44.9	26.5	48.8	a
2011 IHME (2011)	-	-	-	-	-	-	-	-	-	50.7	o
2011 Inter-agency group (2013)	-	-	-	-	-	-	-	-	-	47.2	b
2011 RMS 2012	-	-	-	-	-	-	-	-	-	40.0	c
2011 mid-year	-	-	-	-	-	-	-	-	-	62.1	d
2012 ASSA2008	63.4	56.5	36.2	61.3	39.1	52.7	35.4	43.7	25.6	47.7	a
2012 Inter-agency group (2013)	-	-	-	-	-	-	-	-	-	44.6	b
2012 RMS 2012	-	-	-	-	-	-	-	-	-	41.0	c
2012 mid-year	-	-	-	-	-	-	-	-	-	59.5	d
2013 ASSA2008	62.0	55.4	35.3	60.0	38.2	51.4	34.1	42.6	24.7	46.7	a
2013 mid-year	-	-	-	-	-	-	-	-	-	56.6	d
2014 ASSA2008	60.8	54.4	34.4	58.9	37.3	50.4	33.1	41.6	23.9	45.7	a
2015 ASSA2008	59.6	53.5	33.7	57.8	36.6	49.6	32.2	40.9	23.1	44.8	a

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a ASSA2008.[72]
b Child Mortality 2013 IGME.[218] Estimates generated by the UN Inter-agency Group for Child Mortality Estimation (IGME) in 2013.
c RMS 2012.[64] Data have been adjusted for estimated under-registration.
d Stats SA Mid-year Estimates. 2013 mid-year estimates.[23]
e DHIS. Data for financial year from April of the year to March of the following year (not calendar year).
f NaPeMMCo 2010-11.[225] No national value given across all levels of care. Several provinces did not provide data in this format either.
g NaPeMMCo 2010-11.[225] Data appear to be for 2010 and 2011 combined. Includes babies 500g+.
h Saving Babies 2008-9.[226] For births => 500g. Community Health Centres, District Hospitals, National Central Hospitals, Provincial Tertiary Hospitals, Regional Hospitals.
i NaPeMMCo 2008-10.[227] Year of data not specified. Presumed to be an average of several years' data around 2009. The three large hospital groups provided data from a total of 117 hospitals with delivery numbers for the individual hospitals ranging between around 4 000 and fewer than 50 per year.
j Child Mortality 2010 IGME.[228]
k Stats SA U5 Mortality 2006–10.[229] Based on Stats SA Causes of Death data sets. Not adjusted for under-reporting. Estimated completeness of death registration for children under five years is around 87%.
l Stats SA Causes of death 2011.[35] Data have been updated with late registrations processed in 2013. Not adjusted for under-reporting – completeness of death registration for children uncertain.
m IHME Maternal and Child Mortality.[195]
n Global Burden of Disease 2010.[73]
o Lozano et al., 2011.[196]

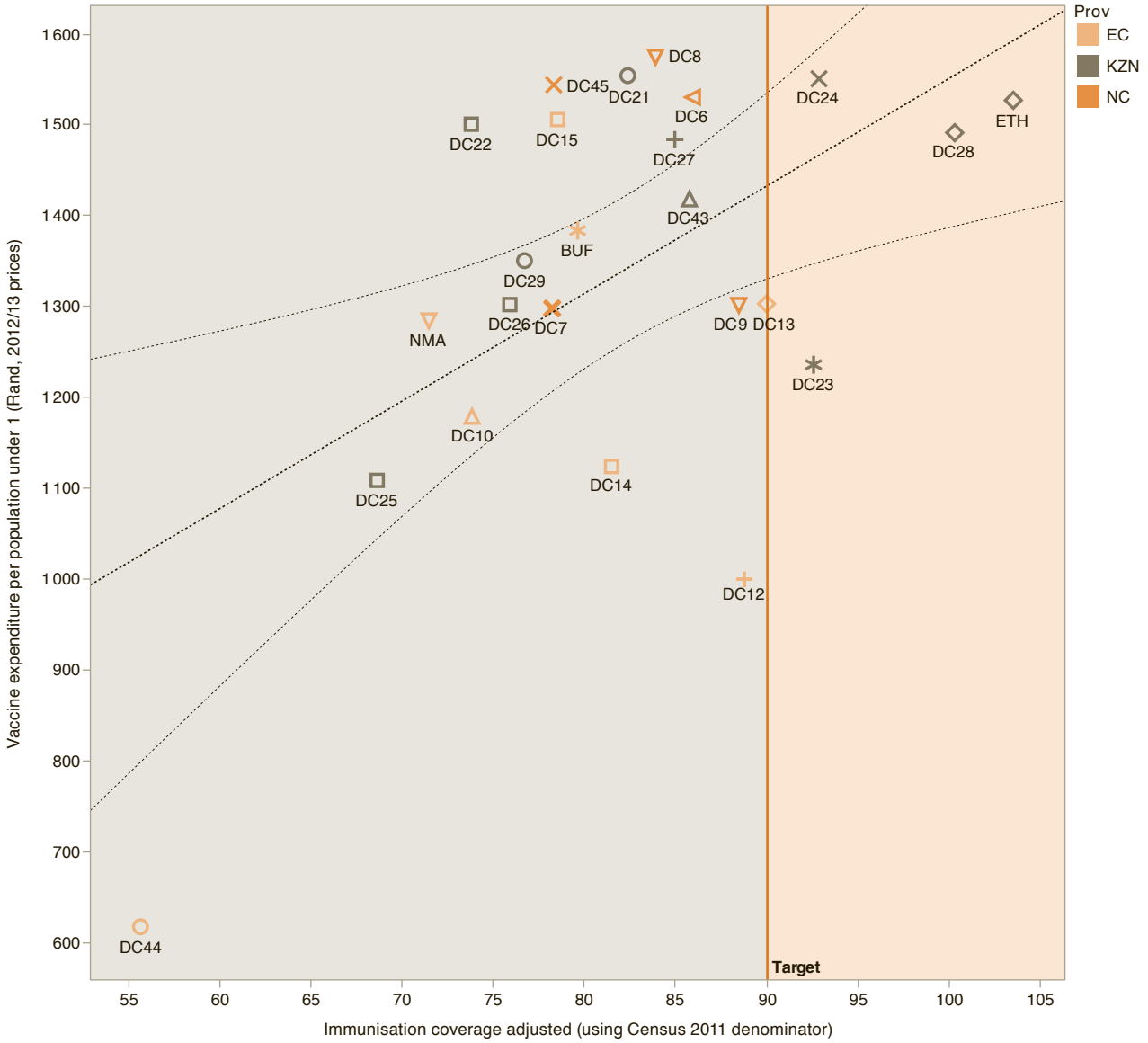
Immunisation

The provision of immunisation will be changed dramatically in 2014 with the introduction of human papillomavirus vaccination for all public school Grade 4 learners. This requires two vaccinations per child, in an age group that falls outside of that generally targeted by the current Expanded Programme on Immunisation (EPI). The District Health Barometer 2012/13 was accompanied by a supplement on immunisation coverage.[10] The authors presented the immunisation coverage data using both the DHIS denominator data and Census 2011 population figures. They recommended that the Census 2011 data be used "despite the unresolved contention about its accuracy", as this might present a more insightful reflection of immunisation coverage. If the DHIS denominator data represent an undercount of children aged under one year, coverage will continue to be overstated. Despite considerable problems with the data sources used, this report also succeeded in correlating immunisation coverage with expenditure on vaccines (Figure 17). Such correlations should be increasingly used to interrogate routine data and identify outliers that require investigation. The exercise also pointed to significant inconsistencies in the way in which medicines expenditure is recorded on financial systems. Some provinces (such as Limpopo and North West) record virtually no expenditure for vaccines, for instance. Although recording of vaccine expenditure is unreliable at provincial level, National Treasury estimated that the total cost to government of the current immunisation schedule is less than 1.5% of public expenditure for health, even though roll-out of the pneumococcal and rotavirus vaccines led to a fivefold increase in spending on vaccines.[230]

The effect of mass vaccination campaigns is controversial. Bernhardt et al. showed that a mass vaccination campaign for measles was able to reach a highly mobile population in Cape Town, where coverage from routine services was inadequate.[231] However, Verguet et al. showed a significant decrease in eight of 12 child, maternal and reproductive health indicators across 52 South African districts associated with the 2010 supplemental immunisation activity (which included measles vaccination, oral polio vaccination, vitamin A supplementation and deworming medicine).[232] These authors emphasised that such campaigns may disrupt the regular functioning of health facilities and divert resources from routine child and maternal health services.

Globally, a joint WHO/UNICEF repository of data on immunisation coverage was published in 2014, showing data up to and including 2012.[233] The South African data presented showed that, in 2012, no districts had less than 50% immunisation coverage, 6% were between 50 and 79%, while 83% were achieving more than 80% coverage. This represented a drop from the 90% of districts reported to have 80% or higher coverage in 2011. However, as has been described, the issue of the accuracy of the denominator used to calculate coverage remains unresolved.

Figure 17: Comparison of vaccine expenditure per population under one year (Rand, real 2012/13 prices) and immunisation coverage (using Census 2011 denominator), by district for selected provinces, 2011/12



Source: National Treasury data on provincial expenditure, DHIS numerator data on children under 1 year fully immunised and Stats SA Census 2011 data on population under 1 year, as reported in Immunisation supplement to DHB 2012/13.[10]

Table 23: Immunisation indicators by province

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
BCG coverage (%)											
2010 DHIS	80.7	93.6	119.2	83.7	110.3	79.9	95.9	85.1	79.5	93.3	a
2011 DHIS	92.6	96.9	117.3	91.7	122.5	97.4	94.0	91.1	62.4	98.0	a
2011 UNICEF/WHO	-	-	-	-	-	-	-	-	-	78.0	b
2012 DHIS	90.1	98.8	111.1	93.0	119.1	97.0	99.3	97.9	91.1	100.1	a
2012 UNICEF/WHO	-	-	-	-	-	-	-	-	-	84.0	c
DTP3 coverage (%)											
2010 DHIS	52.0	84.8	109.2	92.2	94.1	78.6	97.6	90.2	89.8	88.2	a
2011 DHIS	85.7	99.6	105.0	105.2	109.0	90.9	100.2	93.5	93.6	99.3	a
2011 UNICEF/WHO	-	-	-	-	-	-	-	-	-	72.0	b
2012 DHIS	84.6	99.4	113.0	104.1	103.2	108.4	109.1	99.7	-	91.8	a
2012 UNICEF/WHO	-	-	-	-	-	-	-	-	-	68.0	c
Immunisation coverage of children <1 year (%)											
2010 DHIS	78.5	83.8	111.3	85.4	93.7	69.8	91.9	77.3	90.8	89.2	a
2011 DHIS	84.2	91.9	114.6	98.6	96.7	73.9	95.1	82.9	89.5	95.2	a
2011 DHIS adjusted	76.7	87.3	88.6	89.5	72.1	61.0	83.3	63.1	79.2	80.1	d
2012 DHIS	82.6	95.1	107.9	95.4	93.8	83.0	98.8	88.8	89.0	94.0	a
Immunisation drop out rate (measles 1 to 2)											
2010 DHIS	11.2	13.9	17.6	13.1	8.9	16.2	10.4	21.2	16.4	14.5	a
2011 DHIS	16.0	12.9	19.9	10.0	14.1	14.7	15.3	19.6	16.8	15.4	a
2012 DHIS	18.5	15.5	19.8	10.4	16.2	17.8	13.4	20.0	23.1	17.0	a
Measles 1st dose coverage (%)											
2010 DHIS	87.9	87.6	110.9	88.4	100.1	88.6	92.0	86.8	94.2	94.5	a
2011 DHIS	95.2	94.7	113.9	100.6	109.7	89.4	98.1	92.3	92.6	100.9	a
2012 DHIS	93.1	95.5	111.6	96.7	107.7	94.9	98.7	95.6	91.7	99.7	a
OPV 1 coverage (%)											
2010 DHIS	84.7	95.1	114.9	101.5	115.0	99.8	88.6	92.3	97.1	101.3	a
2011 DHIS	92.9	99.6	108.8	110.1	128.1	101.3	105.2	88.8	95.2	105.1	a
2012 DHIS	93.6	101.3	112.5	105.5	121.7	107.6	120.2	80.0	-	94.2	a
PCV7 3rd dose coverage (%)											
2010 DHIS	42.2	70.2	94.5	80.3	80.8	53.8	80.4	62.0	71.0	72.8	a
2011 DHIS	80.9	90.8	102.8	97.5	105.6	91.4	92.6	86.2	84.5	94.1	a
2011 UNICEF/WHO	-	-	-	-	-	-	-	-	-	72.0	b
2012 DHIS	87.7	95.0	109.3	97.5	106.0	97.6	100.6	95.8	89.0	98.4	a
2012 UNICEF/WHO	-	-	-	-	-	-	-	-	-	81.0	c
RV 2nd dose coverage (%)											
2010 DHIS	40.9	77.1	94.1	81.2	74.1	60.6	83.8	61.8	63.4	72.3	a
2011 DHIS	77.6	97.6	111.8	105.2	109.4	91.6	101.1	87.9	83.6	98.2	a
2011 UNICEF/WHO	-	-	-	-	-	-	-	-	-	72.0	b
2012 DHIS	83.7	99.0	112.4	102.2	107.7	101.1	106.7	97.7	87.1	100.3	a
2012 UNICEF/WHO	-	-	-	-	-	-	-	-	-	78.0	c

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a DHIS.[30] Data for financial year from April of the year to March of the following year (not calendar year).

b Immunization 2011.[234] Estimates derived by review of available data (including routine service delivery data and surveys), informed and constrained by a set of heuristics.

c Immunization 2012.[233] Estimates derived by review of available data (including routine service delivery data and surveys), informed and constrained by a set of heuristics.

d DHB 2012/13.[133] 2011/12 financial year. Recalculated using the DHIS numerator of children under 1 year fully immunised with the Census 2011 population under 1 year for the denominator.

Nutrition

Context	The South African Infant and Young Child Feeding Policy was issued in 2013. The monitoring and evaluation component of this policy demands data that will not be routinely available.
The New data sources	Nationally, new data have been reported in the: • South African National Health and Nutrition Examination Survey (SANHANES-1) • District Health Information System (DHIS) Internationally, reports of interest include: • Save the Children. Superfood for babies 2013 • The State of Food Insecurity in the World 2013 • Global Hunger Index 2013 • Prevalence of overweight and obesity 1980-2013
Key issues and trends	Cross-sectional baseline data for a nationally representative sample have been generated by the South African National Health and Nutrition Examination Survey (SANHANES-1).

There has been considerable debate about the most appropriate infant feeding policies for a country with high HIV burden and persistent socio-economic inequalities. In 2013, the NDoH released the South African Infant and Young Child Feeding Policy, committing to a pro-breastfeeding stance.[235] As with so many policy documents of this kind, this policy included a comprehensive monitoring and evaluation (M&E) section, which demanded data that might not be routinely accessible. Surveys would be needed, for instance, to determine the percentage of mothers initiating breastfeeding within one hour post-delivery, or who are exclusively breastfeeding at 14 weeks, or the percentage of infants under six months who are exclusively breastfed. Definitional challenges will face indicators such as "support systems for breastfeeding mothers". Save the Children have produced an extensive report on breastfeeding and its promotion as "the closest thing there is to a 'silver bullet' in the fight against malnutrition and newborn deaths".[236]

The first round of the South African National Health and Nutrition Examination Survey (SANHANES-1) was a cross-sectional survey providing baseline data for future longitudinal analysis.[61] Critically, in contrast to the self-reported data relied on for the General Household Survey, SANHANES obtains questionnaire-based data as well as health measurements though clinical examination and the collection of blood specimens for the measurement of biomarkers.[237] The objectives of SANHANES-1 were to determine:

- the knowledge, attitudes and behaviour of South Africans with respect to non-communicable and communicable infectious diseases;
- the nutritional status of South Africans as it relates to food security, dietary intake/behaviour including the consumption of alcohol, and body weight management;
- the relationship between general perceptions of health and healthcare services;
- the health status of children under the age of five years;
- the health status of children aged two to nine years with respect to physical and/or mental disabilities; and
- the behavioural (smoking, diet, physical inactivity) and social determinants of health and nutrition (demographic, socio-economic status and geolocation) and to relate these to the health and nutritional status of the South African population.

The first cross-sectional survey targeted 10 000 households, selected using a multi-stage, disproportionate, stratified cluster sampling method. A total of 27 532 individuals from 6 306 households provided data. The intent was also to establish a cohort of 5 000 households for subsequent longitudinal studies. Of relevance to nutrition, the survey showed that 24.8% of females and 20.1% of males aged 15 years and older were overweight, while 39.2% of females and 10.6% of males were obese.[61] This was in line with data reported from KwaZulu-Natal, where 70% of women enrolled in HIV prevention trials were classed as overweight or obese.[238] Figure 18 contrasts the SANHANES data on overweight and obesity with results from other selected surveys.

Data from rural school learners in KwaZulu-Natal showed evidence of a nutritional transition, with both under- and over-nutrition present. Of female primary school learners, 9% were overweight, 3.8% obese, 4% underweight and 9.2% stunted. Some underweight, overweight and obese learners were also stunted.[239] A similar finding of early stunting and adolescent obesity among girls was shown using data from the Agincourt Demographic Surveillance site.[240]

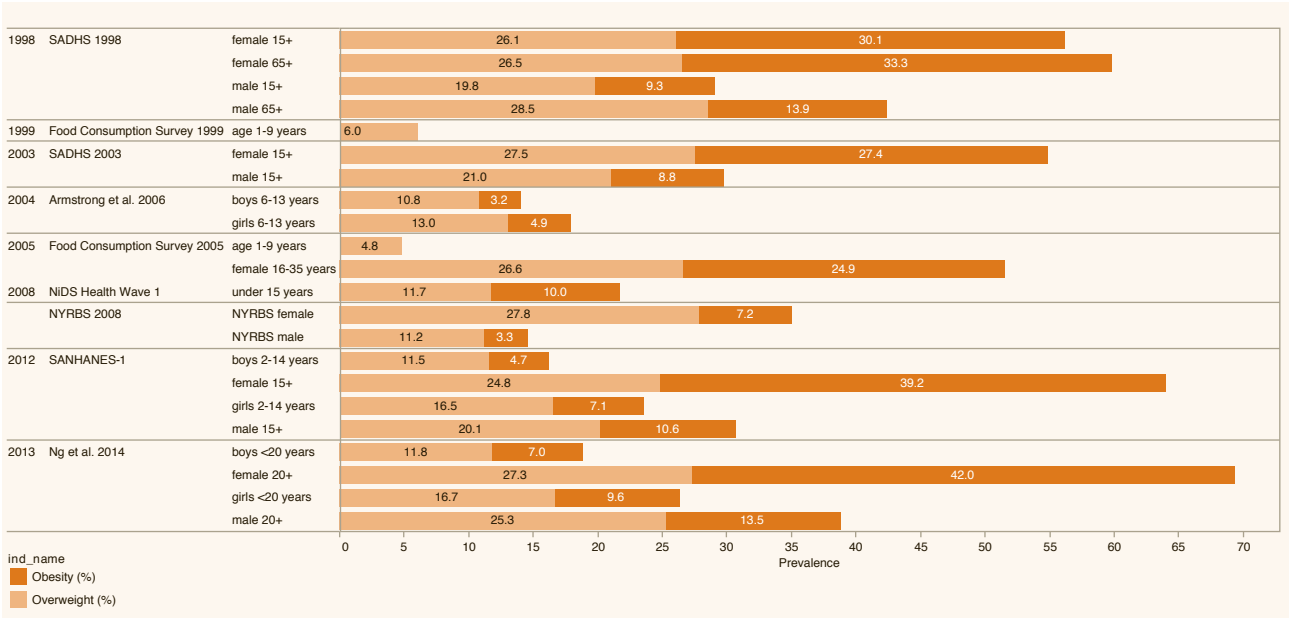
In June 2013, the Lancet published a series on maternal and child nutrition, which also examined the growing problem of overweight and obesity in low- and middle-income countries.[241-243] Data from a South African birth cohort study were combined with those from four other low- and middle-income countries to track the effects of fast weight gain and linear growth in children.[244] The authors concluded that interventions to increase birth weight and linear growth in the first two years of life were "likely to result in substantial gains in height and schooling and give some protection from adult chronic disease risk factors, with few adverse trade-offs".

Although there has been a decrease in vitamin A deficiency (VAD) among children under five years of age (from 63.6% in 2005 to 43.6% in SANHANES-1), VAD is still a severe public health problem. It is apparent that South Africa has some way to go in improving the vitamin A status of its children.[237] In 2013, an Academy of Science of South Africa consensus panel reviewed the evidence for a variety of micronutrients (vitamin A, vitamin D, folate, selenium, iron, zinc), and called for a nutritional surveillance system in which the nutritional status of the South African population is regularly monitored and evaluated, at least every five to 10 years.[245]

Globally, the joint United Nations Food and Agriculture Organization (FAO), International Fund for Agricultural Development (IFAD) and World Food Programme (WFP) report on "The State of Food Insecurity in the World 2013" noted that less than 5% of the South African population was undernourished.[246] Like many reports that look towards the post-2015 situation, the report noted that the "data sources and survey instruments currently employed in global and national monitoring cannot provide real-time data and finely disaggregated data". This challenge was also encapsulated in the discussion of the limitations of the existing "prevalence of undernourishment" indicator, maintained by the FAO Statistics Division.

The Global Hunger Index 2013 was based on a data on the proportion of undernourished people as a percentage of the population, the proportion of children younger than five years who are underweight, and the under-five mortality rate, from 120 countries.[247] On this index, a score of less than 5 is considered "low", and the maximum score of 30 or more "alarming"). Those with scores less than 5 in 2013 were excluded from the ranking. Of the balance, South Africa was rated the fifth best, having seen the index reduce from 7.2 in 1990 to 5.4 in 2013.

Figure 18: Prevalence of overweight and obesity in selected age and gender categories from a range of surveys, 1998–2012



Source: SADHS 1998 and 2003,[248,249] Food Consumption Survey 1999 and 2005,[250,251] Health of the Nation Study,[252] National Income Dynamics Study,[253] National Youth Risk Behaviour Survey,[173] SANHANES-1[61] and Global Burden of Disease Study (Ng et al.) 2013.[254]

Table 24: Nutrition indicators by province

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Anaemia prevalence (%)											
2005 age 1-5 years	30.0	27.6	25.6	21.8	34.4	21.3	5.0	28.2	41.2	28.9	a
2012 under 5 years	-	-	-	-	-	-	-	-	-	10.7	b
Iron deficiency anaemia prevalence (%)											
2005 age 1-5 years	8.4	16.1	10.4	11.3	13.8	11.6	-	8.7	12.0	11.3	a
2012 under 5 years	-	-	-	-	-	-	-	-	-	1.9	b
Iron deficiency prevalence (%)											
2005 age 1-5 years	10.2	40.3	17.8	18.8	21.2	17.0	12.5	18.8	20.3	19.7	a
2012 under 5 years	-	-	-	-	-	-	-	-	-	8.1	b
Obesity (%)											
2005 female 16-35 years	22.6	31.1	26.5	24.8	16.9	20.6	25.0	24.9	32.7	24.9	a
2008 NYRBS	4.0	4.7	9.7	5.4	2.8	6.1	5.0	3.9	5.6	5.3	c
2008 NYRBS female	-	-	-	-	-	-	-	-	-	7.2	c
2008 NYRBS male	-	-	-	-	-	-	-	-	-	3.3	c
2008 under 15 years	-	-	-	-	-	-	-	-	-	10.0	d
2012 boys 2-14 years	3.7	4.1	5.3	6.1	3.3	6.1	3.9	2.7	4.1	4.7	b
2012 female 15+	41.8	43.0	39.9	44.0	32.6	35.8	38.6	31.7	37.9	39.2	b
2012 girls 2-14 years	6.7	4.7	10.0	8.5	4.3	5.5	3.5	4.3	7.2	7.1	b
2012 male 15+	7.2	5.8	12.9	7.9	11.5	13.0	7.2	7.3	16.1	10.6	b
2013 boys <20 years	-	-	-	-	-	-	-	-	-	7.0	d
2013 female 20+	-	-	-	-	-	-	-	-	-	42.0	d
2013 girls <20 years	-	-	-	-	-	-	-	-	-	9.6	d
2013 male 20+	-	-	-	-	-	-	-	-	-	13.5	d
Overweight (%)											
2005 age 1-9 years	6.1	1.4	6.4	6.3	2.4	3.4	-	4.9	3.3	4.8	a
2005 female 16-35 years	32.1	24.5	28.9	26.7	21.1	27.5	20.8	20.7	26.0	26.6	a
2008 NYRBS	17.3	16.3	22.4	25.5	13.5	21.6	17.9	15.7	19.9	19.7	c
2008 NYRBS female	26.7	20.8	26.4	38.8	19.6	31.0	23.9	22.4	27.4	27.8	c
2008 NYRBS male	-	-	-	-	-	-	-	-	-	11.2	c
2008 under 15 years	-	-	-	-	-	-	-	-	-	11.7	e
2012 boys 2-14 years	12.4	10.8	11.0	15.1	4.8	10.6	2.9	6.4	18.2	11.5	b
2012 female 15+	21.7	20.7	28.1	25.2	24.0	26.2	23.4	22.3	24.5	24.8	b
2012 girls 2-14 years	12.4	17.7	20.3	20.3	9.1	14.1	8.3	15.2	19.1	16.5	b
2012 male 15+	17.1	19.5	21.0	23.7	16.3	17.4	17.8	9.0	26.9	20.1	b
2013 boys <20 years	-	-	-	-	-	-	-	-	-	11.8	d
2013 female 20+	-	-	-	-	-	-	-	-	-	27.3	d
2013 girls <20 years	-	-	-	-	-	-	-	-	-	16.7	d
2013 male 20+	-	-	-	-	-	-	-	-	-	25.3	d
Stunting (%)											
2005 age 1-9 years	18.0	28.2	16.8	15.1	23.8	17.8	27.7	15.1	12.0	18.0	a
2008 NYRBS	17.5	14.7	13.2	11.7	12.8	11.3	19.4	12.3	9.7	13.1	c
2008 NYRBS female	-	-	-	-	-	-	-	-	-	11.1	c
2008 NYRBS male	-	-	-	-	-	-	-	-	-	15.2	c
2008 under 15 years	-	-	-	-	-	-	-	-	-	17.1	e
2012 female <15 years	15.6	22.1	10.0	14.4	9.4	13.0	15.0	17.8	13.9	13.7	b
2012 male <15 years	21.6	19.4	11.9	13.5	13.7	23.1	22.8	23.7	17.5	16.7	b
Underweight (%)											
2005 age 1-9 years	7.8	14.1	6.4	5.0	12.3	10.9	38.3	12.4	8.2	9.3	a
2008 NYRBS	9.6	10.0	6.7	5.0	13.8	4.5	14.1	12.3	6.5	8.4	c
2008 NYRBS female	-	-	-	-	-	-	-	-	-	4.9	c
2008 NYRBS male	-	-	-	-	-	-	-	-	-	12.0	c
2008 under 10 years	-	-	-	-	-	-	-	-	-	9.6	e
2012 female 15+	5.2	3.5	1.7	5.3	4.0	5.2	8.4	7.8	3.5	4.2	b
2012 female <15 years	5.6	6.9	1.2	1.5	2.4	3.7	10.8	7.9	4.6	3.6	b
2012 male 15+	13.5	13.9	9.0	13.8	20.7	8.7	15.1	23.6	8.1	12.8	b
2012 male <15 years	1.9	2.2	8.7	3.4	9.1	10.4	23.8	15.2	7.2	7.4	b
Vitamin A coverage children 12-59 months (%)											
2005 DHIS	14.7	29.9	20.5	19.9	20.0	19.1	22.2	18.7	11.1	18.9	f
2005 NFCS	33.3	32.6	12.0	27.9	18.1	10.1	26.1	20.0	10.7	20.5	g
2006 DHIS	19.7	36.3	27.8	24.4	24.7	22.5	31.8	20.6	26.5	25.1	f

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
2007 DHIS	23.0	36.8	30.3	29.5	25.1	23.2	28.4	23.5	33.6	28.1	f
2008 DHIS	31.6	41.6	34.8	27.3	38.3	25.8	32.8	30.9	32.0	32.2	f
2009 DHIS	36.6	38.0	40.8	30.3	30.6	27.8	27.2	26.1	38.2	33.9	f
2010 DHIS	36.5	39.1	43.7	32.8	30.3	29.1	26.2	27.0	32.3	34.6	f
2011 DHIS	45.1	47.9	47.7	42.8	46.8	39.1	32.5	36.8	38.0	43.4	f
2012 DHIS	43.6	49.9	46.3	43.6	40.2	40.2	36.4	35.8	39.1	42.8	f
Vitamin A coverage infants 6-11 months (%)											
2005 DHIS	83.9	94.0	93.8	97.1	98.6	93.8	97.1	79.3	26.1	86.2	f
2006 DHIS	84.2	94.2	106.6	98.2	103.5	98.0	125.8	81.3	70.5	94.8	f
2007 DHIS	78.0	91.5	110.1	102.6	99.5	102.4	108.2	85.9	90.2	96.7	f
2008 DHIS	90.3	95.8	109.0	98.8	111.7	96.9	114.4	97.2	93.4	100.2	f
2009 DHIS	93.2	86.3	110.1	101.9	105.7	103.5	94.1	89.6	95.0	100.0	f
2010 DHIS	93.6	90.5	103.7	104.4	102.6	97.6	90.6	89.3	80.1	97.4	f
2011 DHIS	102.7	102.3	109.5	121.8	122.9	103.4	103.2	95.7	82.1	107.9	f
2012 DHIS	96.8	108.2	100.7	112.1	111.7	106.0	108.7	89.8	-	93.2	f
Vitamin A deficiency (%)											
2005 age 1-9 years	64.2	61.7	65.2	89.1	75.7	52.1	23.0	49.6	43.5	63.6	a
2012 under 5 years	-	-	-	-	-	-	-	-	-	43.5	h
Waist-hip ratio (WHR) above cut-off (%)											
2012 female 15+	46.1	43.1	43.3	50.0	44.7	49.6	46.7	50.9	51.5	47.1	b
2012 male 15+	3.9	6.3	6.7	9.0	5.2	5.3	2.7	10.1	8.2	6.8	b
Wasting (%)											
2005 age 1-9 years	4.1	2.8	3.3	1.3	4.4	7.5	19.1	3.2	11.5	4.5	a
2008 NYRBS	4.4	4.4	4.1	1.9	6.8	3.6	10.6	7.8	3.7	4.4	c
2008 NYRBS female	-	-	-	-	-	-	-	-	-	2.3	c
2008 NYRBS male	-	-	-	-	-	-	-	-	-	6.7	c
2008 under 5 years	-	-	-	-	-	-	-	-	-	4.7	e
2012 female <15 years	3.2	1.4	0.4	-	2.8	1.8	5.1	5.2	1.3	1.7	i
2012 male <15 years	1.6	1.7	3.6	2.4	6.5	2.8	18.5	8.5	2.0	3.8	b

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a Food Consumption Survey 2005.[250]
b SANHANES-1.[61]
c NYRBS 2008.[173] Learners in grades 8-11.
d Ng et al., 2014. Age-standardised estimate. Overweight calculated as "overweight and obese" minus "obese" since not given separately.
e NiDS Health Wave 1.[253] Children aged six months to 14 years (six months to nine years for the indicator underweight).
f DHIS.[30] Data for financial year from April of the year to March of the following year (not calendar year).
g Food Consumption Survey 2005.[250] A further 10.1% nationally were unsure whether vitamin A supplements were received or not.
h SANHANES-1.[61] Vitamin A <0.7 micromol/L
i SANHANES-1.[61] No data recorded for KZN in report.

Table 25: Nutrition indicators by ethnic group

	African	Coloured	Indian	White	Other	All	Ref
Obesity (%)							
2008 NYRBS	5.0	4.9	7.2	9.7	6.6	5.3	a
2012 boys 2-14 years	4.8	3.8	-	-	-	4.7	b
2012 female 15+	39.9	34.9	32.4	-	-	39.2	b
2012 girls 2-14 years	7.3	5.3	-	-	-	7.1	b
2012 male 15+	9.4	15.1	7.6	-	-	10.6	b
Overweight (%)							
2008 NYRBS	19.5	17.5	22.9	25.8	22.2	19.7	a
2012 boys 2-14 years	11.9	8.0	-	-	-	11.5	b
2012 female 15+	24.9	24.4	22.8	-	-	24.8	b
2012 girls 2-14 years	16.2	14.6	-	-	-	16.5	b
2012 male 15+	19.1	22.1	32.2	-	-	20.1	b
Stunting (%)							
2008 NYRBS	13.8	13.6	10.3	4.6	13.1	13.1	a
2012 female <15 years	13.6	16.1	-	-	-	13.7	b
2012 male <15 years	16.7	18.6	-	-	-	16.7	b
Underweight (%)							
2008 NYRBS	8.6	9.4	11.5	4.5	5.4	8.4	a
2012 female 15+	3.6	4.9	16.4	-	-	4.2	b
2012 female <15 years	0.5	9.8	-	-	-	3.6	b
2012 male 15+	12.9	12.4	32.6	-	-	12.8	b
2012 male <15 years	1.3	2.2	-	-	-	7.4	b
Waist-hip ratio (WHR) above cut-off (%)							
2012 female 15+	45.7	52.9	64.8	-	-	47.1	b
2012 male 15+	5.1	8.4	24.9	-	-	6.8	b
Wasting (%)							
2008 NYRBS	4.3	6.6	7.0	1.1	4.6	4.4	a
2012 female <15 years	1.4	4.2	-	-	-	1.7	b
2012 male <15 years	3.8	4.5	-	-	-	3.8	b

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a NYRBS 2008.[173] Learners in grades 8-11.
b SANHANES-1.[61]

Non-communicable diseases

Context	The NDoH has developed a Strategic Plan for the Prevention and Control of Non-communicable Diseases 2013–17. The National Mental Health Policy Framework and Strategic Plan 2013–2020 has continued the implementation of the Mental Health Act (17 of 2002), and mirrored the WHO's Comprehensive Mental Health Action Plan 2013–2020.
New data sources	Nationally, new data have been reported in the: • SAGE Wave 1 • Stats SA General Household Survey (GHS) 2012 • South African National Health and Nutrition Examination Survey (SANHANES-1) • District Health Information System (DHIS) • Stats SA Mortality and causes of death 2010 and 2011 • National Cancer Registry summary statistics on histologically diagnosed cancer up to 2007 Internationally, reports of interest include: • IDF Diabetes Atlas: Global estimates of the prevalence of diabetes for 2011 and 2030 • 1990-2010 Global Cardiovascular Disease Atlas • GLOBOCAN 2012 • Global Action Plan for the prevention and control of NCDs 2013–2020
Key issues and trends	Current routine collection and periodic survey data sources do not provide high-quality data about the prevalence of NCDs, so much is expected from new longitudinal studies, particularly from SANHANES. Only the initial cross-sectional baseline data for SANHANES have been produced to date, whereas three waves of data have been released for the National Income Dynamics Study.

The NDoH Strategic Plan for the Prevention and Control of Non-communicable Diseases 2013–17 has set a range of targets.[255] Global targets have also been set as part of a comprehensive monitoring framework.[256,257] Table 26 compares the local and global targets, and whether they have been included or not in the National Indicator Data Set (NIDS) (Table 27).

Some important baseline data for at least some of these indicators have been produced by the SANHANES-1 survey.[61,258] In the first cross-sectional survey, 16.5% of respondents indicated that they had high blood pressure, 5.0% diabetes, 4.2% high cholesterol, 2.2% heart disease and 1.8% reported having had a stroke. Importantly, SANHANES-1 also involved medical examination, which showed that 10.2% of respondents aged 15 years or older were hypertensive (>140/90 mmHg), 23.9% had an elevated LDL-cholesterol and 47.9% had an abnormally low HDL-cholesterol. Diabetes was detected in 9.5% of respondents.

Relevant data were also provided by the Study on global AGEing and adult health (SAGE) Wave 1, for which the South African report was published in 2012.[259] SAGE is part of a Longitudinal Survey Programme in the WHO's Multi-Country Studies unit. Wave 1 of SAGE collected data on 4 227 South Africans aged 50 years or older over the period 2007 to 2008, of whom 60% were female. As with SANHANES, data collection was by means of questionnaires as well as medical examination and the collection of specimens for biomarkers. Of the sample, 14.8% self-identified as being hypertensive, and 15.5% as diabetic. Based on the examination, 71.4% had an elevated blood pressure (>140/90 mmHg). Data on the prevalence of NCD risk factors (tobacco use, alcohol, physical inactivity, fruit and vegetable intake, overweight or obesity, hypertension) among members of the SAGE cohort were also published.[260] Those at highest risk were female, aged 60 to 90 years and either Coloured or African. The SAGE cohort at Agincourt also provided evidence on self-reported health, showing that hypertension was the second-most reported condition after musculoskeletal pain.[261] Although some of the screening tests listed were of questionable value, data from a private medical scheme showed national uptake of screening for chronic diseases of lifestyle (20.5%), HIV (8.2%) and cancer (31.9%) in a single year (2011) to be low.[262] Low levels of health-seeking behaviour were also shown among middle-aged and older African women in an urban setting.[263]

Although hypertension and diabetes are but two of the NCDs deserving of closer attention, they can provide important insights because of their prevalence. Drawing on the global SAGE data, the prevalence of hypertension has been shown to be as high in low- and middle-income countries as in developed countries.[264,265] Among those aged 50 years and older, hypertension prevalence ranged from 32.3% in India to 77.9% in South Africa. A systematic review of national health surveys showed hypertension prevalence ranging from 12% in Bangladesh, Egypt and Thailand to 30% in Armenia, Lesotho and Ukraine, in the age band of 35 to 49 years.[266] Importantly, this review also showed that the proportion of those diagnosed with hypertension who were controlled with medication was low. The sixth edition of the IDF Diabetes Atlas was published in 2013.[267-269] Globally, it was estimated that 8.3% of adults had diabetes, representing 382 million people.

The 1990–2010 Global Cardiovascular Disease Atlas provides an easily visualised set of data on this important set of communicable diseases.[270] A sub-Saharan African version is also available.[271]

Table 26: Non-communicable disease prevention and control goals and targets set by the World Health Assembly and the South African Strategic Plan for the Prevention and Control of NCDs

WHO: 66th World Health Assembly A set of voluntary global targets for the prevention and control of non-communicable diseases		South Africa Strategic Plan for the Prevention and Control of Non-communicable diseases 2013-2017
	Indicator	**2020 Goals and targets**
Premature mortality from non-communicable disease		1 Reduce by at least 25% the relative premature mortality (under 60 years of age) from NCDs by 2020; 2 Reduce by 20% tobacco use by 2020; 3 Reduce by 20% the per capita consumption of alcohol by 2020; 4 Reduce mean population intake of salt to <5 grams per day by 2020; 5 Reduce by 10% the percentage of people who are obese and/or overweight by 2020; 6 Reduce the prevalence of people with raised blood pressure by 20% by 2020 (through lifestyle and medication); 7 Increase the prevalence of physical activity (defined as 150 minutes of moderate-intensity physical activity per week, or equivalent) by 10%; 8 Every woman with sexually transmitted diseases to be screened for cervical cancer every five years, otherwise every woman to have three screens in a lifetime (and as per policy for women who are HIV-positive); 9 Increase the percentage of people controlled for hypertension, diabetes and asthma by 30% by 2020 in sentinel sites; and 10 Increase the number of people screened and treated for mental disorders by 30% by 2030.
Target: A 25% relative reduction in overall mortality from cardiovascular diseases, cancer, diabetes, or chronic respiratory diseases.	Unconditional probability of dying between ages 30 and 70 from cardiovascular diseases, cancer, diabetes, or chronic respiratory diseases.	
Behavioural risk factors		
Target: At least a 10% relative reduction in the harmful use of alcohol, as appropriate, within the national context.	• Total (recorded and unrecorded) alcohol per capita (15+ years old) consumption within a calendar year in litres of pure alcohol, as appropriate, within the national context. • Age-standardised prevalence of heavy episodic drinking among adolescents and adults, as appropriate, within the national context. • Alcohol-related morbidity and mortality among adolescents and adults, as appropriate, within the national context.	
Target: A 10% relative reduction in prevalence of insufficient physical activity.	• Prevalence of insufficiently physically active adolescents defined as less than 60 minutes of moderate to vigorous intensity activity daily. • Age-standardised prevalence of insufficiently physically active persons aged 18+ years (defined as less than 150 minutes of moderate-intensity activity per week, or equivalent).	
Target: A 30% relative reduction in mean population intake of salt/sodium.	Age-standardised mean population intake of salt (sodium chloride) per day in grams in persons aged 18+ years.	
Target: A 30% relative reduction in prevalence of current tobacco use in persons aged 15+ years.	• Prevalence of current tobacco use among adolescents. • Age-standardised prevalence of current tobacco use among persons aged 18+ years.	
Biological risk factors:		
Target: A 25% relative reduction in the prevalence of raised blood pressure or contain the prevalence of raised blood pressure according to the national circumstances.	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).	
Target: Halt the rise in diabetes and obesity.	• Age-standardised prevalence of raised blood glucose/diabetes among persons aged 18+ years (defined as fasting plasma glucose value ≥ 7.0 mmol/L (126 mg/dl) or on medication for raised blood glucose. • Prevalence of overweight and obesity in adolescents (defined according to the WHO growth reference for school-aged children and adolescents, overweight – one standard deviation body mass index for age and sex and obese – two standard deviations body mass index for age and sex). • Age-standardised prevalence of overweight and obesity in persons aged 18+ years (defined as body mass index ≥25 kg/m² for overweight and body mass index ≥30 kg/m² for obesity).	
National systems response		
Target: At least 50% of eligible people receive drug therapy and counselling (including glycaemic control) to prevent heart attacks and strokes.	Proportion of eligible persons (defined as aged 40 years and over with a 10-year cardiovascular risk ≥30%, including those with existing cardiovascular disease) receiving drug therapy and counselling (including glycaemic control) to prevent heart attacks and strokes.	
Target: An 80% availability of the affordable basic technologies and essential medicines, including generics, required to treat major non-communicable diseases in both public and private facilities.	Availability and affordability of quality, safe and efficacious essential non-communicable disease medicines, including generics, and basic technologies in both public and private facilities.	

Table 27: Main chronic non-communicable indicators currently available in the District Health Information System (DHIS), and changes to indicators from the National Indicator Data Set (NIDS) 2013

		Existing data based on NIDS 2010					Status in NIDS 2013
Group	Indicator	2008/09	2009/10	2010/11	2011/12	2012/13	
Chronic care	Asthma detection rate			0.1	0.2	0.1	Discontinued
	Asthma under 18 years rate			15.5	16.9	18.2	Discontinued
	Diabetes high risk cases incidence rate (annualised) *			2.3	2.8	1.8	NIDS 2013 – changed to "Diabetes incidence (annualised"
	Diabetes mellitus case load	3.1	3.2	2.5	1.7	1.3	Discontinued
	Diabetes mellitus detection rate	0.1	0.1	0.1	0.1	0.1	NIDS 2013 (split into <18 years and 18+)
	Epilepsy detection rate			0.1	0.1	0.1	Discontinued
	Epilepsy under 18 years rate			18.0	17.2	17.2	Discontinued
	Hypertension case load	12.1	12.3	9.0	6.4	5.1	Discontinued
	Hypertension detection rate	0.3	0.3	0.4	0.3	0.2	Discontinued
	Hypertension high risk cases incidence rate (annualised) *			7.6	7.6	4.9	NIDS 2013 – changed to 'Hypertension incidence (annualised)'
Eye care	Cataract surgery rate (annualised)	231.5	387.6	546.9	729.8	553.2	NIDS 2013
Mental Health	Mental health case load	0.3	0.3	0.9	1.3	1.4	NIDS 2013 – additional indicators added relating to mental health admissions
	Mental health visits 18 years and older rate	94.7	94.0	94.8	95.7	95.6	NIDS 2013
Reproductive Health	Cervical cancer screening coverage (annualised)	46.5	47.6	52.2	55.0	55.4	NIDS 2013

Note: The diabetes and hypertension high risk incidence rates were included in the Negotiated Service Delivery Agreement. The NIDS 2013 measures Hypertension incidence (annualised), which includes newly diagnosed hypertension clients (of all ages) initiated on treatment per 1 000 population 40 years and older.

Global estimates of cancer prevalence in adults were published for 2008 by GLOBOCAN.[272] While breast cancer is predominant in most countries, cervical cancer is the most prevalent cancer in much of sub-Saharan Africa. GLOBOCAN 2012 was released in December 2013 and provides incidence, mortality and prevalence estimates for 28 types of cancer in 184 countries (accessible from http://globocan.iarc.fr) (Table 28).[273,274] Within South Africa, the National Cancer Registry is being reinvigorated, with reporting made compulsory (as a notifiable disease).[275] Data on histologically diagnosed cases by gender, ethnic group and cause are available up to 2007 (Table 29).[a] Regional data have also been issued, from Gauteng (focusing on cervical human papillomavirus infection and cytological abnormalities)[276] and the Eastern Cape (reporting cancer incidence in selected municipalities for 2003 to 2007).[277]

According to the vital registration data, neoplasms (ICD-10 codes C00-D48) comprised 36 340 (6.7%) of deaths in 2011, increasing from 5.9% in 2008 (Table 30 to Table 32).[35]

Table 28: South African projected statistics on cancer from GLOBOCAN 2012, 2012

	Male	Female	Both sexes
Number of new cancer cases	37 400	40 000	77 400
Age-standardised rate (world population)	224.3	168.9	187.1
Risk of getting cancer before age 75 (%)	22.8	16.5	19.0
Number of cancer deaths	23 200	24 200	47 400
Age-standardised rate (world population)	144.1	103.3	117.9
Risk of dying from cancer before age 75 (%)	14.1	10.5	11.9

Source: GLOBOCAN 2012.[274]

a Available from: http://www.nioh.ac.za/?page=national_cancer_registry&id=41

Table 29: Summary statistics of leading cancers diagnosed histologically in 2007, males and females

Site	Number of new cases adjusted for those with sex unknown	Percentage of all cancers	Crude number of cases per 100 000 per year	ASR (Age standardardised incidence rate per 100 000 (world standard population)	Cumulative lifetime incidence risk (0-74 years)
Males					
BCC	4 682	18.3	19.75	28.96	3.33
Prostate	4 355	17.0	18.37	29.39	3.78
SCC of skin	2 254	8.8	9.51	14.3	1.60
Primary site unknown	1 658	6.5	6.99	9.9	1.18
Lung	1 411	5.5	5.95	8.73	1.10
Kaposi sarcoma	1 373	5.4	5.79	5.79	0.51
Colorectal	1 145	4.5	4.83	7.12	0.87
Oesophagus	1 004	3.9	4.24	6.13	0.76
Non-hodgkin lymphoma	747	2.9	3.15	3.84	0.41
Bladder	679	2.7	2.86	4.34	0.50
Total	25 607		78.77	110.69	18.07
Females					
Breast	5 720	21.0	22.78	25.72	2.84
Cervix	4 927	18.1	19.62	21.78	2.37
BCC	3 216	11.8	12.81	14.26	1.61
Primary site unknown	1 498	5.5	5.97	6.84	0.83
SCC of skin	1 461	5.4	5.82	6.25	0.66
Kaposi sarcoma	1 096	4.0	4.37	4.09	0.33
Colorectal	978	3.6	3.89	4.34	0.50
Uterus	959	3.5	3.82	4.45	0.57
Oesophagus	683	2.5	2.72	3.18	0.40
Non-hodgkin lymphoma	660	2.4	2.63	2.70	0.27
Total	27 215		89.77	99.47	13.29

Source: National Cancer Registry.[278]

Note: Rates calculated for totals exclude basal cell carcinoma (BCC) and squamous cell carcinoma (SCC) of the skin

Table 30: Leading broad causes of death due to cancer, 2010

Broad groups of the underlying causes of death (ICD-10)	Number of deaths	% of all neoplasms	% of all deaths
Malignant neoplasms of digestive organs (C15-C26)	9 505	26.2	1.7
Malignant neoplasms of respiratory and intrathoracic organs (C30-C39)	5 203	14.3	0.9
Malignant neoplasms of female genital organs (C51-C58)	4 101	11.3	0.7
Malignant neoplasms of ill-defined, secondary and unspecified sites (C76-C80)	3 187	8.8	0.6
Malignant neoplasms of breast (C50)	2 958	8.1	0.5
Malignant neoplasms, stated or presumed to be primary, of lymphoid, haematopoietic and related tissue (C81-C96)	2 547	7.0	0.5
Malignant neoplasms of male genital organs (C60-C63)	2 534	7.0	0.5
Malignant neoplasms of mesothelial and soft tissue (C45-C49)	1 303	3.6	0.2
Malignant neoplasms of lip, oral cavity and pharynx (C00-C14)	1 094	3.0	0.2
Neoplasms of uncertain or unknown behaviour (D37-D48)	1 042	2.9	0.2
Malignant neoplasms of urinary tract (C64-C68)	852	2.3	0.2
Malignant neoplasms of eye, brain and other parts of central nervous system (C69-C72)	543	1.5	0.1
Malignant neoplasms of skin (C43-C44)	523	1.4	0.1
Malignant neoplasms of independent (primary) multiple sites (C97)	441	1.2	0.1
Benign neoplasms (D10-D36)	170	0.5	0
Malignant neoplasms of thyroid and other endocrine glands (C73-C75)	165	0.5	0
Malignant neoplasms of bone and articular cartilage (C40-C41)	155	0.4	0
In situ neoplasms (D00-D09)	17	0.0	0
All neoplasms	36 340		
Total deaths	558 719		

Source: Stats SA Causes of Death 2010.[62]

Table 31: Leading underlying causes of death due to cancer, Male, 2010

Underlying cause of death	Number of deaths	% of all neoplasms	% of all deaths
Malignant neoplasm of bronchus and lung (C34)	3 164	17.4	1.10
Malignant neoplasm of prostate (C61)	2 442	13.4	0.85
Malignant neoplasm of oesophagus (C15)	1 824	10.0	0.63
Malignant neoplasm without specification of site (C80)	1 368	7.5	0.48
Malignant neoplasm of liver and intrahepatic bile ducts (C22)	954	5.2	0.33
Malignant neoplasm of colon (C18)	796	4.4	0.28
Malignant neoplasm of stomach (C16)	711	3.9	0.25
Malignant neoplasm of pancreas (C25)	633	3.5	0.22
Other and unspecified types of non-Hodgkin's lymphoma (C85)	509	2.8	0.18
Kaposi's sarcoma (C46)	480	2.6	0.17
Total neoplasms	18 231		

Source: Stats SA Causes of Death 2010.[62]

Table 32: Leading underlying causes of death due to cancer, Female, 2010

Underlying cause of death	Number of deaths	% of all neoplasms	% of all deaths
Malignant neoplasm of breast (C50)	2 899	16.0	1.08
Malignant neoplasm of cervix uteri (C53)	2 850	15.8	1.06
Malignant neoplasm of bronchus and lung (C34)	1 539	8.5	0.57
Malignant neoplasm without specification of site (C80)	1 316	7.3	0.49
Malignant neoplasm of oesophagus (C15)	1 084	6.0	0.40
Malignant neoplasm of colon (C18)	742	4.1	0.28
Malignant neoplasm of pancreas (C25)	638	3.5	0.24
Malignant neoplasm of ovary (C56)	637	3.5	0.24
Malignant neoplasm of liver and intrahepatic bile ducts (C22)	616	3.4	0.23
Malignant neoplasm of stomach (C16)	499	2.8	0.19
Total neoplasms	18 083		

Source: Stats SA Causes of Death 2010.[62]

As mentioned, human papillomavirus vaccine has been added to the Expanded Programme of Immunisation (EPI) schedule from 2014, but only for girls. Countries have also been advised to carefully consider the evidence for vaccinating young men.[279]

Targets for the WHO's Comprehensive Mental Health Action Plan 2013–2020[280] include a 20% increase in service coverage for severe mental health disorders and a 10% reduction in the suicide rate by 2020.[281] In July 2013, the National Health Council adopted the National Mental Health Policy Framework and Strategic Plan 2013–2020.[282] Implementation of this plan will require considerable resources, as there are enormous differences between the distribution of mental health infrastructure between provinces, with undue reliance on psychiatric hospitals. Attention will also have to be paid to improving the collection of routine data on mental health service provision. The Global Burden of Disease Study 2010 has provided estimates of the global burden of disease related to mental and substance use disorder.[283] Globally, the burden of such disorders increased by 37.6% between 1990 and 2010, driven by population growth but also by population ageing. Within South Africa, data from the Eastern Cape showed a prevalence of depression of 31.4% among those aged 18 to 40 years, although based on a relatively small sample of just 977 participants.[284]

Table 33: Chronic disease indicators by province

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Cervical cancer screening coverage											
2006 DHIS	6.1	32.6	41.1	32.4	54.8	24.8	35.1	18.1	34.7	32.0	a
2007 DHIS	24.8	35.0	39.8	39.3	38.2	31.8	30.4	36.4	38.4	36.1	a
2008 DHIS	30.1	38.9	46.1	51.1	52.5	40.9	30.1	51.7	52.9	45.6	a
2009 DHIS	34.0	40.3	45.6	47.0	63.9	52.2	35.1	47.0	57.9	47.6	a
2010 DHIS	36.2	38.1	51.4	58.2	55.9	60.2	37.9	48.4	65.8	52.2	a
2011 DHIS	37.8	44.2	44.9	77.1	60.1	59.3	32.4	48.8	64.4	55.0	a
2012 DHIS	38.8	51.0	44.1	81.8	56.5	57.1	31.6	49.0	61.3	55.4	a
Diabetes prevalence (%)											
2012 age 15+	8.5	10.1	7.9	10.0	4.6	5.6	21.7	12.5	11.2	9.5	b
2013 age 20-79	-	-	-	-	-	-	-	-	-	8.3	c
2013 age 20-79 (age standardised)	-	-	-	-	-	-	-	-	-	9.3	c
Hypertension prevalence (%)											
2006 age 50+ female	-	-	-	-	-	56.7	-	-	-	-	d
2006 age 50+ female self-reported	-	-	-	-	-	36.1	-	-	-	-	d
2006 age 50+ male	-	-	-	-	-	56.9	-	-	-	-	d
2006 age 50+ male self-reported	-	-	-	-	-	20.7	-	-	-	-	d
2007 age 50+	-	-	-	-	-	-	-	-	-	77.9	e
2007 age 50+ female	-	-	-	-	-	-	-	-	-	80.3	e
2007 age 50+ male	-	-	-	-	-	-	-	-	-	74.7	e
2008 age 50+	-	-	-	-	-	-	-	-	-	75.3	f
2008 age 50+ female	-	-	-	-	-	-	-	-	-	79.6	f
2008 age 50+ high wealth	-	-	-	-	-	-	-	-	-	78.6	f
2008 age 50+ low wealth	-	-	-	-	-	-	-	-	-	75.4	f
2008 age 50+ male	-	-	-	-	-	-	-	-	-	74.4	f
2008 age 50+ medium wealth	-	-	-	-	-	-	-	-	-	78.3	f
2008 age 50+ rural	-	-	-	-	-	-	-	-	-	77.5	f
2008 age 50+ urban	-	-	-	-	-	-	-	-	-	77.2	f
2008 NiDS female 15+	-	-	-	-	-	-	-	-	-	35.8	g
2008 NiDS female 25+	-	-	-	-	-	-	-	-	-	45.3	g
2008 NiDS female 65+	-	-	-	-	-	-	-	-	-	78.9	g
2008 NiDS male 15+	-	-	-	-	-	-	-	-	-	33.9	g
2008 NiDS male 25+	-	-	-	-	-	-	-	-	-	40.8	g
2008 NiDS male 65+	-	-	-	-	-	-	-	-	-	71.7	g
2008 NiDS total 25+	-	-	-	-	-	-	-	-	-	43.4	g
2010 NiDS female 15+	-	-	-	-	-	-	-	-	-	33.6	g
2010 NiDS female 25+	-	-	-	-	-	-	-	-	-	42.6	g
2010 NiDS female 65+	-	-	-	-	-	-	-	-	-	77.5	g
2010 NiDS male 15+	-	-	-	-	-	-	-	-	-	32.1	g
2010 NiDS male 25+	-	-	-	-	-	-	-	-	-	38.1	g
2010 NiDS male 65+	-	-	-	-	-	-	-	-	-	71.0	g
2010 NiDS total 25+	-	-	-	-	-	-	-	-	-	40.6	g
Prevalence of abnormal lipid profiles (%)											
2012 female 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	b
2012 male 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	b
Prevalence of mental disorders											
2012 current (depression) female	16.1	-	-	-	-	-	-	-	-	-	
2012 current (depression) male	14.7	-	-	-	-	-	-	-	-	-	h
2012 current (depression) total	15.2	-	-	-	-	-	-	-	-	-	h
2012 lifetime (depression) female	33.2	-	-	-	-	-	-	-	-	-	h
2012 lifetime (depression) male	29.8	-	-	-	-	-	-	-	-	-	h
2012 lifetime (depression) total	31.4	-	-	-	-	-	-	-	-	-	h
Prevalence of raised blood pressure (%)											
2012 raised SYS and DIA	10.4	17.3	11.4	8.4	6.6	9.1	10.8	13.0	9.4	10.2	i
2012 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	j

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a DHIS.[30] Data for financial year from April of the year to March of the following year (not calendar year).

b SANHANES-1.[61]

c Diabetes Atlas 2013.[268] Modelled estimates based on best published studies. Estimated number of cases of diabetes = 2 646 050 of which 1 217 180 estimated to be undiagnosed.

d Gomez-Olive et al., 2013.[261] Agincourt sub-district.

e Lloyd-Sherlock et al., 2014.[264] Study of Global Ageing and Adult Health (SAGE). Data collection over 2007–8.

f Phaswana-Mafuya et al., 2013.[260] Study of Global Ageing and Adult Health (SAGE).

g AHS 2012.[6] The measured prevalence of hypertension was defined as those with BP equal or above 140/90 mmHg and/or taking anti-hypertensive medication.

h Andersson et al., 2013.[284] Cross-sectional population-based survey of persons aged 18-40 living in the EC.

i SANHANES-1.[61] Restrictive definition of both parameters raised. Of participants 15 years and older.

j SANHANES-1.[61] Calculated from (raised SYS) + (raised DIA) – (both SYS and DIA raised). Age 15+.

Table 34: Chronic disease indicators by ethnic group

	African	Coloured	Indian	White	Other	All	Ref
Diabetes prevalence (%)							
2012 age 15+	8.2	13.4	30.7	8.1	-	9.5	a
Hypertension prevalence (%)							
2008 age 50+	77.3	85.0	76.8	79.6	-	75.3	b
Prevalence of abnormal lipid profiles (%)							
2012 female serum chol >5 mmol/L	24.9	40.6	45.3	-	-	28.1	c
2012 male serum chol >5 mmol/L	15.3	27.2	41.2	-	-	18.9	c
Prevalence of raised blood pressure (%)							
2012 raised SYS and DIA	9.9	11.8	7.3	12.2	-	10.2	d
2012 raised SYS or DIA or both	25.6	33.2	25.9	29.3	-	26.6	e

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a SANHANES-1.[61]

b Phaswana-Mafuya et al., 2013.[260] Study of Global Ageing and Adult Health (SAGE).

c SANHANES-1.[61] Too few observations in White ethnic group.

d SANHANES-1.[61] Restrictive definition of both parameters raised. Of participants 15 years and older.

e SANHANES-1.[61] Calculated from (raised SYS) + (raised DIA) – (both SYS and DIA raised). Age 15+.

Risk behaviour and determinants of health

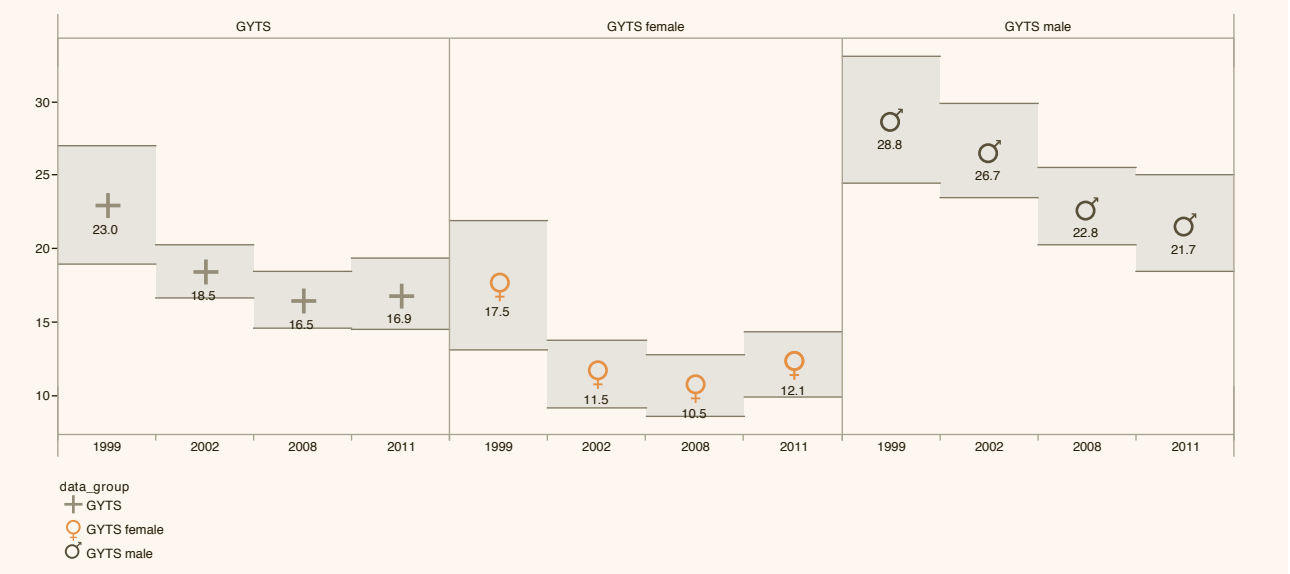
Context	The first cross-sectional baseline data from the South African National Health and Nutrition Examination Survey (SANHANES-1) provide new insights into behaviour and awareness in relation to various health risks.
New data sources	Nationally, new data have been reported in the: • South African National Health and Nutrition Examination Survey (SANHANES-1) • South African Community Epidemiology Network on Drug Use (SACENDU) updates • Global Youth Tobacco Survey (GYTS) 2011 Internationally, reports of interest include: • United National Office on Drugs and Crime (UNODC) World Drug Report 2013 • Global Burden of Disease Study 2010 – mental and substance use disorders • Smoking prevalence and Cigarette Consumption in 187 countries, 1980 to 2012 • WHO report on the Global Tobacco Epidemic 2013 • WHO Global Status Report on Alcohol and Health 2014 • WHO Air Pollution Database Update 2014
Key issues and trends	Systems to track substance abuse remain poorly developed, but there is increased attention being paid to alcohol abuse, including the impact of foetal alcohol syndrome. The focus on non-communicable diseases has also highlighted the risks associated with obesity, related to poor diet and to levels of inactivity.

The Global Burden of Disease Study 2010 estimated that mental and substance abuse disorders accounted for 7.5% of global disability-adjusted life years (DALYs) in 2010.[283] Of these, 9.6% were attributed to alcohol use disorders. Illicit drug dependence alone accounted for 0.8% of global DALYs in 2010.[285] The UNODC's World Drug Report 2013 pointed to the challenges posed by the introduction of new psychoactive products: "The multitude of new psychoactive substances and the speed with which they have emerged in all regions of the world is one of the most notable trends in drug markets over the past five years. While the existing international control system is equipped to deal with the emergence of new substances that pose a threat to public health, it is currently required to provide a response commensurate with the unprecedented fast evolving nature of the phenomenon of new psychoactive substances."[286] This poses a challenge not only to legal systems, but also to any attempts to gather data on the use of specific products.

Data on illicit drug use in South Africa are only available from rehabilitation services, as gathered by the South African Community Epidemiology Network on Drug Use.[287] However, in relation to alcohol and tobacco, new data have been generated from the South African National Health and Nutrition Examination Survey (SANHANES-1) baseline study. Slightly more than half of the households surveyed (53.2%) reported that no-one in the household drank alcohol, but alcohol misuse was reported as serious in 8.4% and very serious in 8.8%.[288] The same survey showed that 20.8% of participants had ever smoked tobacco, and 16.2% were currently daily smokers.[289] South Africa has shown a trajectory of tobacco use that is quite different from other countries on the continent.[290] Whereas the tobacco market in South Africa declined by 46% from 1990 to 2010, it grew by 68% in the rest of Africa. Data from four consecutive Global Youth Tobacco Surveys in South African Grade 8 to 10 learners also showed a marked overall decline in tobacco use between 1999 and 2011 (Figure 19).[291] Over a longer time-frame, global trends in smoking prevalence and cigarette consumption are positive, but much remains to be achieved.[292] An online visualisation tool provides access to data gathered for each country as part of this research (Figure 20). The 2013 WHO report on Tobacco focused on advertising, promotion and sponsorship.[293] South Africa received a score of 9 out of 10 for overall compliance with the ban on direct advertising. However, more than 60% of teenagers are exposed to billboard tobacco advertising and over 10% were reported to have been targeted by tobacco companies offering free cigarettes.

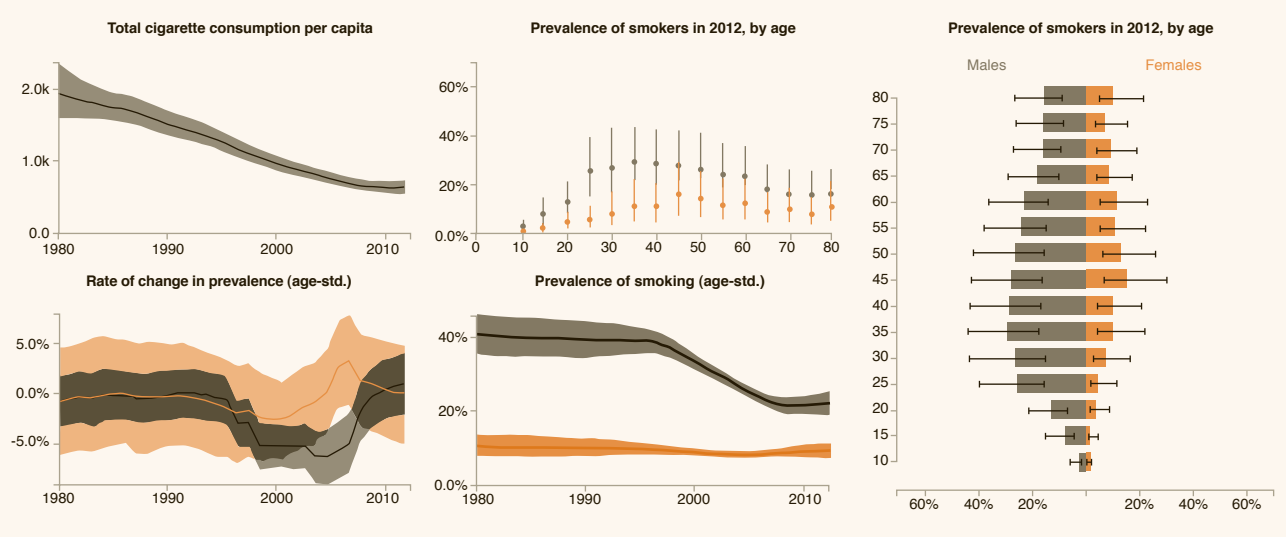
The WHO Global Status Report on Alcohol and Health 2014 emphasised that almost a quarter (24.8%) of global alcohol consumption was unrecorded (for example, in the form of homemade alcohol, illegally produced or sold outside normal government controls).[294] Of the estimated global consumption in 2010 of 6.2 litres of pure alcohol per person aged 15 years or older, half was in the form of spirits. Globally it was estimated that about 16.0% of drinkers engaged in heavy episodic drinking. In 2012, alcohol consumption was responsible for about 3.3 million deaths (5.9% of all global deaths), and 139 million DALYs (5.1% of the global burden of disease and injury).

Figure 19: Prevalence of current (past month) smoking by gender for Grades 8–12, 1999–2011



Source: Global Youth Tobacco Surveys (GYTS) reported in Reddy et al..[291]

Figure 20: Snapshot from online interactive visualisation of IHME tobacco-related data, South Africa



Source: Institute for Health Metrics and Evaluation (IHME) available from viz.healthmetricsandevaluation.org/tobacco.[295]

Uniquely, South Africa includes a question about tobacco use in its death notification forms.[296] Using data on 481 640 deaths recorded between 1999 and 2007, important differences in the smoking-attributed relative risk of mortality between different ethnic groups was shown.[297] These risks were highest among Coloured South Africans, where smoking prevalence is high among both men and women. The relative risks of mortality were almost 50% higher in smokers than non-smokers or ex-smokers in Coloured men (relative risk 1.55; 95% CI 1.43 – 1.67) and women (RR 1.49; 95% CI 1.38 – 1.60).

In 2013, the MRC published the results of the Survey on Substance Use, Risk Behaviour and Mental Health among Grade 8–10 Learners in Western Cape Provincial Schools, 2011.[176] Based on a large sample (20 227 learners), high prevalence of overuse of alcohol (66%), tobacco (47.4%) and cannabis (23.6%) were reported. Reported use of methamphetamine was lower, at 3.1% of male and 1.2% of female learners. A number of other research studies have provided important insights into the extent, contributory causes and costs of substance abuse (focused primarily on alcohol and tobacco) in South Africa. Of direct relevance for the policy debates about intensified regulation of alcohol marketing, it has been estimated that harmful alcohol use cost South Africa 1.6% of gross domestic product (GDP) in 2009, amounting to R37.9 billion.[298] Data have also been extracted from private sector sources. An estimate of the extent of alcohol or other drug use in different workplace types was reported, using data recorded by a large employee assistance programme provider.[299] The impact of obesity, tobacco and alcohol use on healthcare expenditures was also estimated from the claims database of a large medical scheme.[300] Obesity and smoking were shown to have a greater impact than alcohol use in this population.

Targeted studies have focused on problem drinking in the African population of Cape Town, showing a prevalence of 49.7% in men and 18.1% in women.[301] Cross-sectional data from a sample of 720 alcohol and other drug-using women in Cape Town showed marked differences between African and Coloured women.[302] While heavy episodic drinking and methamphetamine use were more common among Coloured women, cannabis use was more common among African women. Extremely high rates of foetal alcohol syndrome (FAS) or partial FAS were reported in an isolated rural West Coast community, outside of the viticultural region.[303] Of 160 children screened, 28 were affected to some degree (17.5%; 95% CI 12.0 – 24.2).

It has been claimed that inactivity is "the biggest single risk factor for death".[304] Data from SANHANES showed that 27.8% of males and 45.2% of females were unfit, based on the outcome of a submaximal cardiovascular fitness test.[61] However, the SANHANES report also pointed out that "research data on the magnitude and impact of physical inactivity and cardiovascular fitness in sub-Saharan Africa, including South Africa, remains sparse". The problem of physical inactivity is complex and multifactorial. The determinants of inactivity are known to vary between countries. It has been pointed out, for instance, that countries with a low prevalence of physical inactivity include many developing countries in which physically demanding labour is common. Data from the Agincourt DSS collected in 2009 showed that lower socio-economic status (at the maternal, household and community level) was significantly associated with less sedentary time, more walking for transport and lower moderate-to-vigorous physical activity in schools and clubs.[305] Few have the ability to engage in moderate or vigorous physical activity for the recommended minimum of 150 minutes per week, but it has been argued that "some activity, no matter how little, is better than none".[306] It has been proposed that health professionals should use the argument that "physical activity makes life worth living".

Tackling social determinants of health is now firmly on the global health agenda, although few indicators are routinely reported at present. In May 2014, the WHO released updated urban air quality data, covering 1 600 cities in 91 countries.[307] It was shown that, in most cities, air pollution is getting worse. Factors that contribute to this problem include the use of fossil fuels (such as coal-fired power plants), heavy dependence on private transport motor vehicles, inefficient use of energy in buildings, and the use of biomass for cooking and heating. Each of these problems affects South Africa's larger cities.

Table 35: Behaviour and awareness indicators by province

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Alcohol dependence (%)											
2010 HCWs	-	-	-	22.4	-	-	-	-	-	-	a
Currently drink alcohol (%)											
2008 NYRBS	25.8	39.6	48.1	30.6	26.0	31.1	45.6	38.8	53.0	34.9	b
2008 NYRBS female	-	-	-	-	-	-	-	-	-	29.5	b
2008 NYRBS male	-	-	-	-	-	-	-	-	-	40.5	b
2011 Gr 8-10	-	-	-	-	-	-	-	-	35.1	-	c
2011 Gr 8-10 female	-	-	-	-	-	-	-	-	34.3	-	c
2011 Gr 8-10 male	-	-	-	-	-	-	-	-	35.9	-	c
Ever drank alcohol (%)											
2008 NYRBS	36.2	58.7	65.1	46.4	38.6	41.6	57.2	58.7	71.0	49.6	b
2008 NYRBS female	-	-	-	-	-	-	-	-	-	45.1	b
2008 NYRBS male	-	-	-	-	-	-	-	-	-	54.4	b
2011 Gr 8-10	-	-	-	-	-	-	-	-	66.0	-	d
2011 Gr 8-10 female	-	-	-	-	-	-	-	-	65.6	-	d
2011 Gr 8-10 male	-	-	-	-	-	-	-	-	66.6	-	d
Ever smoked cigarettes (%)											
2008 GYTS	-	-	-	-	-	-	-	-	-	34.0	e
2008 GYTS female	-	-	-	-	-	-	-	-	-	25.4	e
2008 GYTS male	-	-	-	-	-	-	-	-	-	43.2	e
2008 NYRBS	22.2	33.0	40.5	24.5	21.7	23.1	33.8	30.8	54.8	29.5	b
2008 NYRBS female	-	-	-	-	-	-	-	-	-	22.4	b
2008 NYRBS male	-	-	-	-	-	-	-	-	-	36.8	b
2010 HCWs	-	-	-	18.1	-	-	-	-	-	-	f
2010 HCWs female	-	-	-	6.9	-	-	-	-	-	-	f
2010 HCWs male	-	-	-	43.1	-	-	-	-	-	-	f
2011 Gr 8-10	-	-	-	-	-	-	-	-	47.7	-	d
2011 Gr 8-10 female	-	-	-	-	-	-	-	-	44.5	-	d
2011 Gr 8-10 male	-	-	-	-	-	-	-	-	51.3	-	d
2012 age 15+	22.5	32.2	16.0	20.8	14.4	17.6	33.2	14.9	38.5	20.8	g
2012 female age 15+	9.3	14.6	7.3	7.0	2.9	3.9	26.4	6.5	31.7	10.1	g
2012 male age 15+	36.8	50.4	24.6	38.1	29.4	33.6	40.2	25.2	46.0	32.8	g

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Ever used drugs (%)											
2008 cannabis (dagga)	9.6	10.6	14.2	10.7	12.6	11.1	15.7	12.5	24.5	12.7	h
2008 cocaine	6.1	3.7	6.3	5.8	9.9	7.3	10.4	4.3	6.5	6.7	h
2008 heroin	7.3	3.7	4.4	4.7	10.2	6.8	10.2	4.0	5.7	6.2	h
2008 inhalants	11.2	8.1	11.7	14.8	13.9	11.1	13.0	7.2	11.9	12.2	h
2008 mandrax	7.3	4.1	7.0	6.2	8.2	7.1	16.2	7.7	10.4	7.4	h
Frequent smokers (%)											
2008 GYTS	-	-	-	-	-	-	-	-	-	5.0	e
2008 GYTS female	-	-	-	-	-	-	-	-	-	2.4	e
2008 GYTS male	-	-	-	-	-	-	-	-	-	7.7	e
2008 NYRBS	5.5	5.5	8.3	4.1	3.3	3.0	7.9	6.4	14.6	5.8	b
2008 NYRBS female	-	-	-	-	-	-	-	-	-	3.1	b
2008 NYRBS male	-	-	-	-	-	-	-	-	-	8.6	b
Number of admissions for alcohol and other drug abuse											
2008 Jul-Dec	612	-	3 158	1 537	-	-	-	-	2 807	9 479	i
2009 Jul-Dec	648	-	2 646	1 138	-	-	-	-	2 642	8 217	i
2010 Jul-Dec	707	-	2 884	669	-	-	-	-	2 933	8 407	i
2011 Jul-Dec	721	-	2 786	610	-	-	-	-	2 733	8 291	i
2012 Jul-Dec	316	-	3 552	831	-	-	-	-	3 178	9 190	i
2013 Jan-Jun	587	-	4 026	934	-	-	-	-	3 717	10 677	i
Percentage participating in insufficient physical activity											
2008 NYRBS	45.4	30.2	39.0	43.6	36.8	44.4	48.6	35.2	51.6	41.5	b
2008 NYRBS female	-	-	-	-	-	-	-	-	-	46.2	b
2008 NYRBS male	-	-	-	-	-	-	-	-	-	36.7	b
2008 age 50+	-	-	-	-	-	-	-	-	-	60.5	j
2008 age 50+ female	-	-	-	-	-	-	-	-	-	63.1	j
2008 age 50+ male	-	-	-	-	-	-	-	-	-	57.2	j
Prevalence of smoking (%)											
2008 GYTS	-	-	-	-	-	-	-	-	-	16.5	k
2008 GYTS female	-	-	-	-	-	-	-	-	-	10.5	k
2008 GYTS male	-	-	-	-	-	-	-	-	-	22.8	k
2008 NYRBS	16.8	22.1	26.7	18.2	17.3	17.4	27.0	19.9	36.7	21.0	b
2008 NYRBS female	-	-	-	-	-	-	-	-	-	15.8	b
2008 NYRBS male	-	-	-	-	-	-	-	-	-	26.4	b
2008 age 50+ daily tobacco use	-	-	-	-	-	-	-	-	-	19.7	j
2010 Allied HCWs	-	-	-	16.0	-	-	-	-	-	-	l
2010 Doctors	-	-	-	11.7	-	-	-	-	-	-	f
2010 HCWs female	-	-	-	2.4	-	-	-	-	-	-	f
2010 HCWs male	-	-	-	30.3	-	-	-	-	-	-	f
2010 HCWs total	-	-	-	11.1	-	-	-	-	-	-	f
2010 Nurses	-	-	-	8.0	-	-	-	-	-	-	f
2010 Other	-	-	-	27.3	-	-	-	-	-	-	m
2010 Student nurses	-	-	-	7.5	-	-	-	-	-	-	f
2011 GYTS	-	-	-	-	-	-	-	-	-	16.9	k
2011 GYTS Grade 10	-	-	-	-	-	-	-	-	-	19.3	k
2011 GYTS Grade 8	-	-	-	-	-	-	-	-	-	12.3	k
2011 GYTS Grade 9	-	-	-	-	-	-	-	-	-	19.2	k
2011 GYTS female	-	-	-	-	-	-	-	-	-	12.1	k
2011 GYTS male	-	-	-	-	-	-	-	-	-	21.7	k
2011 Gr 8-10	-	-	-	-	-	-	-	-	40.7	-	n
2011 Gr 8-10 female	-	-	-	-	-	-	-	-	38.9	-	n
2011 Gr 8-10 male	-	-	-	-	-	-	-	-	42.9	-	n
2012 IHME female	-	-	-	-	-	-	-	-	-	9.1	o
2012 IHME male	-	-	-	-	-	-	-	-	-	22.0	o
2012 IHME total	-	-	-	-	-	-	-	-	-	15.3	o
2012 age 15+	-	-	-	-	-	-	-	-	-	16.2	p

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Primary drug of abuse as % of all drugs of abuse											
2012 OTC/prescription meds	2.2	-	1.8	0.6	-	-	-	-	0.4	-	q
2012 alcohol	37.7	-	27.8	51.0	-	-	-	-	22.2	-	q
2012 cannabis	24.4	-	25.9	24.6	-	-	-	-	22.4	-	q
2012 cocaine	7.3	-	4.3	4.1	-	-	-	-	1.4	-	q
2012 ecstasy	0.0	-	0.0	0.0	-	-	-	-	0.2	-	q
2012 heroin	2.8	-	9.6	6.2	-	-	-	-	15.1	-	q
2012 mandrax	6.3	-	0.7	1.4	-	-	-	-	3.8	-	q
2012 methamphetamine	15.8	-	2.5	0.5	-	-	-	-	33.3	-	q
Smoking age of initiation <10 years (%)											
2008 GYTS	-	-	-	-	-	-	-	-	-	14.3	e
2008 GYTS female	-	-	-	-	-	-	-	-	-	14.0	e
2008 GYTS male	-	-	-	-	-	-	-	-	-	14.6	e
2008 NYRBS	4.5	6.1	8.9	7.0	4.9	5.9	9.1	6.3	11.4	6.8	b
2008 NYRBS female	-	-	-	-	-	-	-	-	-	4.6	b
2008 NYRBS male	-	-	-	-	-	-	-	-	-	9.0	b
2011 Gr 8-10 onset <13 years	-	-	-	-	-	-	-	-	37.5	-	d
Watch TV more than 3 hours per day (%)											
2008 NYRBS	24.8	32.8	33.9	29.2	27.9	31.8	26.3	30.8	26.7	29.3	b
2008 NYRBS female	-	-	-	-	-	-	-	-	-	29.4	b
2008 NYRBS male	-	-	-	-	-	-	-	-	-	29.3	b

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a Okeke et al., 2012.[308] Presence of alcohol use problems assessed using CAGE questionnaire – "yes" answer to two or more CAGE questions. The study was conducted among healthcare workers (HCWs) in three public hospitals in a health district in KwaZulu-Natal.

b NYRBS 2008.[173] Learners in Grades 8-11.

c WC Substance use survey 2011.[176] Of those who have ever drunk alcohol. Data further disaggregated by metro areas.

d WC Substance use survey 2011.[176]

e GYTS 2008.[309]

f Okeke et al., 2012.[308] The study was conducted among healthcare workers (HCWs) in three public hospitals in a health district in KwaZulu-Natal.

g SANHANES-1.[61] Indicated as "have ever smoked tobacco" in SANHANES survey.

h NYRBS 2008.[173] Learners in grades 8-11. Examples of inhalants include glue, aerosols, paint thinners, petrol or benzene.

i SACENDU. Update 29 May 2009, Update June 2010, Update June 2011, Update June 2012, Update June 2013 and Update Dec 2013.[287] Data for Jan to Jun 2013. The total figure includes patients from MP and LP (Northern Region) and from FS, NW and NC combined (Central Region).

j Phaswana-Mafuya et al. 2013.[260] Study of Global Ageing and Adult Health (SAGE).[259]

k Reddy et al., 2013.[291] Smoked cigarettes on 1 or more days in the past 30 days.

l Okeke et al., 2012.[308] Included: paramedics, lay counsellors, clinical orderlies, pharmacists, pharmacy assistants, laboratory technologists, laboratory technicians, radiographers and social workers.

m Okeke et al., 2012.[308] Clerks and data capturers.

n WC Substance use survey 2011.[176] Of those who have ever smoked.

o Smoking 1980–2012.[292] Age-standardised prevalence.

p SANHANES-1.[61]

q SACENDU.[287]

Table 36: Behaviour and awareness indicators by ethnic group

	African	Coloured	Indian	White	Other	All	Ref
Currently drink alcohol (%)							
2008 NYRBS	31.8	48.7	34.8	56.4	39.1	34.9	a
Ever drank alcohol (%)							
2008 NYRBS	45.5	67.0	62.6	75.9	47.3	49.6	a
Ever smoked cigarettes (%)							
2008 NYRBS	24.4	54.4	50.6	53.4	27.1	29.5	a
2012 age 15+	17.4	44.9	25.2	24.5	-	20.8	b
2012 female age 15+	4.8	39.7	9.4	23.7	-	10.1	b
2012 male age 15+	31.4	50.8	41.4	25.5	-	32.8	b
Ever used drugs (%)							
2008 cannabis (dagga)	11.2	23.2	18.1	15.7	21.9	12.7	c
2008 cocaine	6.4	7.8	5.8	7.6	16.2	6.7	c
2008 heroin	6.1	7.4	3.1	5.3	12.7	6.2	c
2008 inhalants	11.5	12.2	11.0	16.9	25.7	12.2	c
2008 mandrax	6.5	12.9	4.7	8.7	22.6	7.4	c
Frequent smokers (%)							
2008 NYRBS	4.2	13.1	13.0	16.0	6.0	5.8	a
Percentage participating in insufficient physical activity							
2008 NYRBS	46.5	50.9	55.1	27.2	51.2	41.5	a
2008 age 50+	57.7	76.9	52.3	55.7	-	60.5	d
Prevalence of smoking (%)							
2008 GYTS	13.0	38.0	28.3	25.6	-	16.5	e
2008 NYRBS	17.9	35.9	26.5	34.4	25.9	21.0	a
2008 age 50+ daily tobacco use	17.2	33.9	18.7	21.1	-	19.7	d
2011 GYTS	15.4	31.4	26.5	12.4	-	16.9	e
Smoking age of initiation <10 years (%)							
2008 NYRBS	5.5	12.7	10.9	12.5	5.0	6.8	a
Watch TV more than 3 hours per day (%)							
2008 NYRBS	30.0	27.4	17.6	29.0	21.3	29.3	a

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a NYRBS 2008.[173] Learners in Grades 8-11.

b SANHANES-1.[61] Indicated as "have ever smoked tobacco" in SANHANES survey.

c NYRBS 2008.[173] Learners in grades 8-11. Examples of inhalants include glue, aerosols, paint thinners, petrol or benzene.

d Phaswana-Mafuya et al., 2013.[259] Study of Global Ageing and Adult Health (SAGE).

e Reddy et al., 2013.[291] Smoked cigarettes on one or more days in the past 30 days.

Injuries

Context	Although there is periodic evidence of political attention to the issues of road traffic accidents and violence, particularly during high-profile time slots, the quality of data available is still inadequate.
New data sources	Nationally, new data have been reported in the: • Stats SA Victims of Crime Survey (VOCS) 2012 Internationally, data of interest have been reported in the: • WHO Global Status Report on Road Safety 2013 • IHME Global Burden of Disease from Motorized Road Transport • The World Bank report on NCDs and Road Traffic Injuries in sub-Saharan Africa • WHO Global and regional estimates of violence against women: prevalence and health effects of intimate partner violence and non-partner sexual violence
Key issues and trends	There is some evidence of a reduction in road traffic fatalities at a national scale, but full data are not available beyond 2011. There is some evidence, though, of a positive response to strengthened gun control legislation, with a marked reduction in fatalities from gunshot wounds between 1999 and 2009.

The 2012 report of the Stats SA Victims of Crime Survey (VOCS) was conducted from January to March 2012 and referred primarily to the period January to December 2011.[310] This is the second in a planned annual series, following similar surveys in 1998, 2003, 2007 and 2011. The sampling frame for this survey was originally designed for the Quarterly Labour Force Survey (QLFS), and elicited responses from 31 007 dwelling units. The objectives of the survey are to "provide information about the dynamics of crime from the perspective of households and the victims of crime", to "explore public perceptions of the activities of the police, prosecutors, courts and correctional services in the prevention of crime and victimisation" and to "provide complementary data on the level of crime within South Africa in addition to the statistics published annually by the South African Police Service (SAPS)". The survey does not, therefore, provide reliable data on the incidence of crime-related injuries. The report also acknowledges that "assault and sexual offences are difficult to capture in a household survey because of their sensitivity, and as a result they are normally under-reported".

Based on data from 38 medico-legal laboratories, Mathews et al. recorded 1 018 child homicides in 2009, and thus a rate of 5.5 (95% CI: 4.6 – 6.4) homicides per 100 000 children younger than 18 years.[221,311] The authors stated that this rate was more than twice the global estimate. In terms of violence against women, global estimates are that 35% of women have experienced either physical and/or sexual intimate partner violence or non-partner sexual violence, and that as many as 38% of all murders of women are committed by intimate partners.[312] Locally, also based on the same sample of 38 medico-legal laboratories (mortuaries), there was a decrease female homicide and in the rate of intimate partner femicide (although not statistically significant) in South Africa, from 8.8 per 100 000 women in 1999 to 5.6 per 100 000 in 2009, in those aged 14 years or older.[313] The number of homicides on which these estimates were based was small (930 in 2009, compared to 1 052 in 1999). There was evidence, though, of a marked decrease in gun-related homicides, which the authors attribute to the effective implementation of gun control legislation.

No newer data than those reported for 2011 appear to be available from the Road Traffic Management Corporation (RTMC). While festive season reports have been issued, these are of limited value. For the 12-month period to 31 March 2011, a total of 13 802 road traffic accident fatalities were reported, down from 13 923 the year before.[314] Of these, 3 983 were driver fatalities, 5 205 were passengers, and 4 614 were pedestrians. The majority (76.36%) were male. There were 27.51 fatalities per 100 000 population in 2010–2011, and 12.36 fatal accidents per 10 000 registered motorised vehicles. Preliminary data on the Arrive Alive website for 2012 show a total of 12 211 fatalities. Africa's roads are considered the deadliest in the world, with the road death rate in South Africa only exceeded by that in Nigeria.[315] The United Nations General Assembly has committed to a Decade of Action for Road Safety 2011–2020. The WHO report – Global Status Report on Road Safety 2013 – has highlighted the need for "standardized data collection on fatalities and the need for improvement in the quality of road safety data on road traffic deaths, non-fatal injuries and disability".[316] In this regard, the Report states that for South Africa, while a vital registration system exists, an emergency room-based injury surveillance system does not exist. Data of this nature were reported for the Edendale Hospital, Pietermaritzburg, in 2013.[317] Data were extracted for a 10-week period over the year-end (2011–2012), showing that 305 patients were treated after road traffic accidents, 100 of whom were admitted, and that 45 succumbed to their injuries. More broadly, the pre-hospital burden of disease due to trauma in KwaZulu-Natal has been described, highlighting the limitations of the existing emergency services.[318]

In 2014, the World Bank-led Global Road Safety Facility and the Institute for Health Metrics and Evaluation at the University of Washington produced a report entitled "Transport for Health: The Global Burden of Disease from Motorized Road Transport".[319] The report pointed out that deaths from road transport exceed those from HIV, tuberculosis or malaria, and that they contribute to six of the top 10 causes of death globally. While injuries from motor vehicle accidents were the immediate problem (responsible for 1.3 million deaths annually and 78.2 million non-fatal injuries warranting medical care), pollution from vehicles was estimated to be the cause of 184 000 deaths globally, including 91 000 deaths from ischaemic heart disease, 59 000 deaths from stroke, and 34 000 deaths from lower respiratory infections, chronic obstructive pulmonary disease and lung cancer. For South Africa, the GBD 2010 count of road deaths (4 479) is only about one third of national statistics for road fatalities (14 804). In most other countries, the GBD counts exceed country-reported statistics. The impact of road traffic injuries is also

emphasised in the 2013 World Bank report "The Challenge of Non-Communicable Diseases and Road Traffic Injuries in Sub-Saharan Africa".[320]

Data on the causes and consequences of acute poisoning have been reported from the Tygerberg Poison Information Centre.[321,322] Of 4 771 consultations over a one-year period (2008–2009), 52.7% involved non-drug chemicals, 35.2% involved medicines, and 12.6% involved biological toxins. Of 662 admissions to Tygerberg Academic Hospital and 2 459 hospital-based consultations at the Centre, the most common causative agents were paracetamol and cholinesterase inhibitors.

Table 37: Injury indicators by province

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Road accident fatalities per 100 000 population											
2009	22.9	34.4	22.6	27.1	27.8	46.7	30.7	35.6	25.0	27.8	a
2010	26.5	41.4	19.5	26.2	28.1	44.0	40.1	36.2	25.3	27.9	b
2011	-	-	-	-	-	-	-	-	-	27.6	c

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a Road Accidents 2009.[323] Ratios updated in 2010 using new Stats SA mid-year population time series estimates.

b Road Accidents 2010.[324]

c Arrive Alive.[325] Number of fatalities: 13 954. No provincial values available in source found. No updated stats on RTMC website.

Health services indicators

Health facilities

Context	Much will be expected of the independent Office of Health Standards Compliance (OHSC), which has been created by law and for which a Board has been appointed by the Minister of Health.
New data sources	Nationally, new data have been reported in the: • South African National Health and Nutrition Examination Survey (SANHANES-1) • National Income Dynamics Study (NiDS) • Stats SA General Household Survey 2012 • District Health Information System (DHIS) • TAC Stop Stock Outs Survey 2013 Internationally, data of interest were reported in the: • UNICEF/ICPCN Assessment of the Need for Palliative Care for Children. Three Country Report: South Africa, Kenya and Zimbabwe 2013 • World Palliative Care Alliance. Global Atlas of Palliative Care 2014
Key issues and trends	➢ Although there were concerns about the reliance on retrospective recall, the civil society-conducted Stop Stock Outs Survey in 2013 raised awareness of the persistent problems with medicine supply systems in the public sector. ➢ There are increasing numbers of survey instruments which focus on access to health care and patient satisfaction, adding to what is learned every year from the General Household Survey.

Each year the Stats SA General Household Survey (GHS) includes questions about health service utilisation.[38] In 2013, Stats SA also published a report entitled "Use of health facilities and levels of selected health conditions in South Africa: Findings from the General Household Survey, 2011".[326] The 2012 survey showed that 69.6% of households reported going to public clinics and hospitals first when household members fell ill or were injured, up from 61.2% in 2011. Of households that used a public sector facility, 79.2% were either very satisfied or satisfied with the service they received, compared with 97.1% of households that attended private healthcare facilities. A higher proportion of households that attended public facilities were very dissatisfied with the service they received. (7.7%), as opposed to those that used private facilities (1.1%).

Whilst affordability (in relation to fees charged at the point of care) has been regarded as a major determinant of the choices made in this regard, distance has been identified as an important consideration.[327] Although 90% of South Africans live within seven kilometres of a public sector clinic and two thirds within two kilometres, monetary and time-related costs associated with travel to a local clinic can pose considerable barriers to vulnerable populations. The data for this study were obtained from the first wave of the National Income Dynamics Study (NiDS). Transport costs were also emphasised in a large exit-interview survey of patients seeking care for obstetrics, tuberculosis and antiretroviral treatment.[328] Data on utilisation and perceived quality of service have also been obtained from the baseline cross-sectional survey conducted for the South African National Health and Nutrition Examination Survey (SANHANES-1).[329] The data from this first survey closely match those from the General Household Survey, with 71.0% of respondents reporting that they accessed inpatient care being admitted to a public sector hospital. Of those who did access public sector facilities, 83.1% were satisfied or very satisfied with the service received.

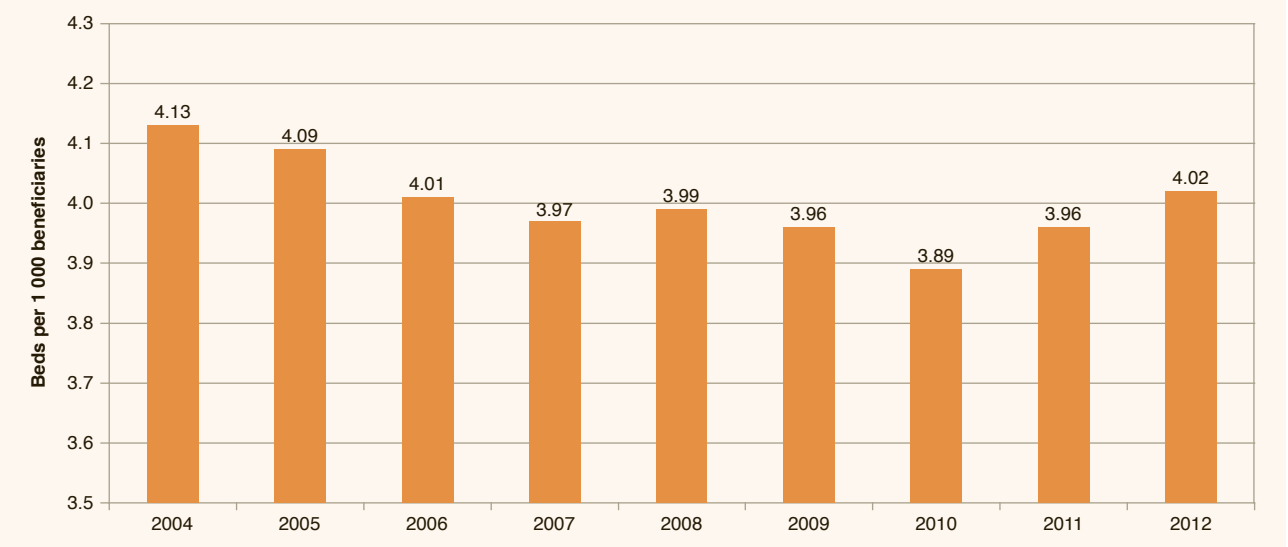
The National Health Care Facilities Baseline Audit National Summary Report 2012 was published in a revised form in February 2013.[330] This report showed that public healthcare facilities "collectively scored less than 50% compliance with vital measures in two out of the six ministerial priority areas". Primary care facilities score less well than hospitals, in general. Overall, the highest compliance score was recorded in Gauteng and the lowest (40%) in the Northern Cape. The national audit showed that "hospitals and PHC facilities throughout the country show a high percentage failure in compliance to the vital measure dealing with the availability of medicines as per the Essential Drug List". This impression was confirmed by the cross-sectional medicines stock-out survey conducted by civil society in 2013[331] and is also reflected in the DHIS medicine stock-out indicators. Much will be expected of the newly created Office of Health Standards Compliance, which will be able to hold both public and private sector health facilities to a national set of norms and standards. Although there is evidence from the peer-reviewed literature that, at a global level, the private sector is not usually more efficient, accountable or medically effective than the public sector, the expectation in South Africa is that the public sector will struggle to meet such national standards.[332] The private sector is also expected to have significant over-capacity, as has been shown for private operating theatres in South Africa.[333] The development of appropriate metrics for surgical care, as with all other elements of a comprehensive health service, has been identified as a gap in the current system.[334]

An Econex analysis on market concentration trends in the private sector also collated useful information on infrastructure, showing an increase in private hospital beds from 24 402 in 2000 to 34 600 in 2012.[335] This is equivalent to 4.02 beds per 1 000 beneficiaries in 2012 (Figure 21).

Palliative care is a neglected part of the health system. A three-country survey (Kenya, South Africa, Zimbabwe) showed very high unmet need for palliative care services for children, as did a survey among 11 public sector hospitals in Cape Town.[336,337] Overall, South Africa was listed as a country with preliminary integration of palliative care into the health system as a whole.[338]

Indicators of success in attempting to integrate vertical health initiatives into a comprehensive and effective primary care delivery system are scarce. Reflecting on the role of District Clinical Specialist Teams (DCSTs), Feucht made this useful observation: "Measuring indicators on performance of individual health programmes does not guarantee excellent and client-centred services, and facility managers need to be empowered and incentivised towards the provision of integrated, high-quality services and promoting local teamwork and caring attitudes towards clients".[339] Likewise, "access" has been conceptualised as far more than the mechanics of availability, accessibility and affordability.[340] A patient-centred approach demands attention to the abilities of populations to interact with the dimensions of accessibility, including the ability to perceive, to seek, to reach, to pay, and to engage.

Figure 21: Number of private hospital beds per 1 000 beneficiaries, 2004–2012



Source: Econex Occasional Note March 2014.[335]

Table 38: Health services indicators by province

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Percentage of users of private health services highly satisfied with the service received											
2010 GHS	95.1	91.0	91.2	88.5	96.1	91.3	90.8	92.7	94.9	92.1	a
2011 GHS	98.6	95.3	92.4	85.9	97.2	94.8	89.9	89.9	92.0	92.9	a
2012 GHS	96.0	93.5	94.7	81.0	94.1	93.0	87.0	91.8	94.1	92.2	b
2012 inpatient care	-	-	-	-	-	-	-	-	-	69.5	c
2012 outpatient care	-	-	-	-	-	-	-	-	-	57.1	c
Percentage of users of public health services highly satisfied with the service received											
2010 GHS	52.7	55.8	52.4	48.9	75.4	57.4	64.1	50.5	60.4	55.9	a
2011 GHS	67.0	68.4	57.6	51.5	78.1	62.2	54.5	52.0	65.6	61.9	a
2012 GHS	64.6	61.4	52.3	51.6	67.5	59.2	61.7	50.7	57.8	57.3	b
2012 inpatient care	-	-	-	-	-	-	-	-	-	32.7	c
2012 outpatient care	-	-	-	-	-	-	-	-	-	24.5	c

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a Stats SA GHS 2011.[60]
b Stats SA GHS 2012.[38]
c SANHANES-1.[61] All participants aged 15 years and older very satisfied with care.

Table 39: Health facilities indicators by province

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Average length of stay (ALOS)											
2010 DHIS	6.7	4.9	5.1	6.9	5.5	4.7	3.3	5.7	5.3	5.7	a
2011 DHIS	6.7	4.9	4.9	6.7	5.7	4.5	3.2	5.5	5.3	5.6	a
2012 DHIS	6.9	4.9	4.8	6.5	5.7	4.5	3.2	5.8	5.9	5.6	a
Number of beds											
2010 Private sector	1 723	2 337	14 278	4 514	600	1 252	293	1 685	4 385	31 067	b
2011 District Hospitals	6 214	1 539	2 424	8 522	4 057	2 719	528	1 528	2 477	30 007	c
2011 National Central Hospitals	0	616	6 170	834	0	0	0	0	2 541	10 160	c
2011 Provincial Tertiary	3 770	0	0	493	952	630	638	0	0	6 484	c
2011 Regional Hospitals	585	1 813	6 346	7 291	1 581	877	145	1 881	1 355	21 873	c
Number of health facilities											
2010 Private hosp total	15	16	84	33	8	9	3	14	34	216	b
2012 CHC/CDC	33	6	31	16	23	47	26	49	51	282	d
2012 District Hospitals	65	25	10	39	30	22	14	15	34	254	d
2012 National Central Hospitals	0	0	3	1	0	0	0	0	2	6	d
2012 Provincial Tertiary	2	1	1	1	2	2	-	1	-	10	d
2012 Public clinics	719	214	321	556	436	233	128	256	212	3 075	d
2012 Regional Hospitals	6	5	12	13	5	3	2	4	5	55	d
2012 Specialised Hospitals	18	1	6	18	4	5	1	2	13	68	d
Useable bed utilisation (occupancy) rate (BUR)											
2010 DHIS	71	69	73	65	68	66	59	70	80	70	a
2011 DHIS	71	72	74	70	72	70	59	71	82	73	a
2012 DHIS	69	74	76	68	72	72	61	73	83	72	a
Useable beds per 1 000 population											
2010 Private sector	2.1	4.9	4.8	2.7	1.3	2.4	2.0	3.6	3.4	3.5	e
2011 District Hospitals	1.1	0.6	0.3	1.0	0.8	0.9	0.8	0.5	0.5	0.7	f
2011 Public sector	2.3	2.0	2.1	2.7	1.6	1.5	1.5	1.5	2.2	2.1	g
2011 Regional Hospitals	0.1	0.7	0.8	1.0	0.3	0.3	0.6	0.6	0.6	0.6	h
2011 Total population	2.3	2.4	2.8	2.4	1.6	1.5	1.4	1.9	2.4	2.3	i
Utilisation rate PHC											
2010 DHIS	2.7	2.3	1.8	2.5	2.7	2.2	3.0	2.4	2.9	2.4	a
2011 DHIS	2.7	2.5	2.0	2.8	2.8	2.4	2.9	2.3	2.8	2.5	a
2012 DHIS	2.7	2.5	2.0	2.9	2.7	2.5	2.9	2.3	2.6	2.5	a
Utilisation rate PHC <5 years											
2010 DHIS	4.3	3.5	3.9	4.4	5.9	4.8	4.7	4.5	4.7	4.5	a
2011 DHIS	4.6	3.7	4.1	4.6	6.2	4.8	4.6	4.4	4.7	4.7	a
2012 DHIS	4.4	3.8	4.2	4.7	6.0	4.8	4.9	4.4	4.3	4.6	a

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a DHIS.[30] All facility types. Data for financial year from April of the year to March of the following year (not calendar year).

b Hospitals Direct Database.[341]

c DHIS.[30] Extracted June 2012. Data average for 2011/12 financial year.

d AHS 2012.[6] Based on National Facilities Audit. Note that a number of facilities received updated classifications compared to their current OrgUnitType in DHIS, therefore the numbers may vary, but this is not necessary due to a real change in the number of physical facilities on the ground. DHIS also has some units within facilities as separate orgunits.

e Hospitals Direct Database.[341] Calculated from Wilbury & Claymore data on beds, per 1 000 population with medical scheme cover from Stats SA GHS.

f DHIS.[30] Calculated from DHIS usable beds for district hospitals, per 1 000 uninsured population (calculated from Stats SA GHS medical schemes coverage and mid-year population estimates).

g DHIS.[30] Calculated from DHIS usable beds for all types of public sector hospitals, per 1 000 uninsured population (calculated from Stats SA GHS medical schemes coverage and mid-year population estimates).

h DHIS.[30] Calculated from DHIS usable beds for regional hospitals, per 1 000 uninsured population (calculated from Stats SA GHS medical schemes coverage and mid-year population estimates).

i AHS 2012.[6] Calculated from Wilbury & Claymore data on private hospitals (2010/11) and DHIS data on main public hospital types (district, regional, provincial, central, specialised psychiatric and TB hospitals) per total population (DHIS population estimates).

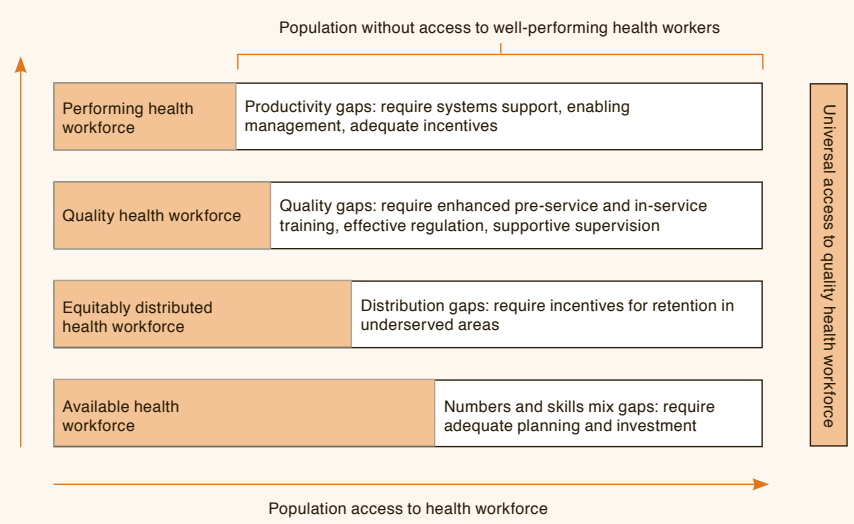
Health personnel

Context	Data on healthcare personnel numbers can be obtained from various sources, few of which are easily accessible. Data held by statutory health councils generally overestimate the number of professionals available, and cannot accurately show where such professionals are practising (if at all).
New data sources	Nationally, new data have been reported in the: • PERSAL 2013 • NDoH data on community service professionals • Data from the various statutory health councils Internationally, data of interest have been reported in the: • WHO report on the Third Global Forum on Human Resources for Health: "Universal Truth: No Health Without A Workforce" • Bulletin of the World Health Organization special theme on HRH for universal health coverage, November 2013
Key issues and trends	Data on only selected categories of health professionals are provided in this chapter and the online database. However, exclusion of some categories should not be taken to imply that the data do not exist, and users are encouraged to consult the original sources if further details or breakdowns are required. Some sources may also have more detail on age and gender breakdowns which are not included here for space reasons.

It is worth recalling that the total number of health professionals recorded in the registers of the various statutory health councils, such as the Health Professions Council of South Africa (HPCSA), the South African Nursing Council (SANC) and the South African Pharmacy Council (SAPC), includes those who are retired, abroad, working part-time, working in other sectors or not working at all. In general, the registers do not have reliable information on how many people fall into these categories, or on the proportion working in the public or private sectors, or on the distribution working part-time or across sectors. Other areas that have been poorly documented are the number and distribution of community health workers, allied health professionals and traditional healers. In the *South African Health Review*, indicators of human resources distribution per population have been calculated using the estimated population dependent on each sector (i.e. public sector personnel per uninsured population vs. private sector personnel per medical scheme beneficiaries). However, such figures hide the maldistribution of human resources for health within provinces.[342] In rural areas in South Africa, retaining such human resources remains a challenge.[343] However, the reasons for job satisfaction and intention to leave are complex, and defy generalisation.[344] This applies equally to medical specialists, who have been shown to consider a range of issues beyond merely the financial when deciding to either stay in the public sector or move to private practice.[345]

The lack of accurate data on the health workforce was highlighted by the WHO in its report on the Third Global Forum on Human Resources for Health.[346] Access to such data has also been identified as necessary to inform national policies and enable planning of universal health coverage.[347,348] Some simple changes, such as settling definitions of non-physicians, clinical staff and community health workers, can be made fairly easily.[349] Setting benchmarks for human resources for health remains challenging. One simple measure is the International Labour Organization's staff-related access deficit indicator (SAD), which measures the relative difference between a particular country's health workforce density and the population-weighted median workforce density in a group of countries regarded as having low vulnerability (and hence setting the global standard).[350] The current ILO SAD is 34.5 health workers per 10 000 population. There is a need for more nuanced benchmarks that take into account the following factors: population growth and the demographic transition; the growing burden of non-communicable diseases; the need to adapt the skills and competencies of health workers; an appreciation of health workforce challenges other than numerical shortages; the potential contributions of cadres other than physicians, nurses and midwives; and the role of non-state actors (Figure 22).[351,352]

Figure 22: HRH actions required to achieve universal health coverage



Source: Cornetto and Witter, 2013.[352]

Despite the recognition that community health workers are a critical resource for comprehensive primary health care, there are few data available on their deployment in South Africa at present. Locally, some sparse data are available on their effectiveness, which also highlight the need for increased support for this cadre.[353,354] Their potential role in HIV care across Africa has also been reviewed.[355] The South African report of a multi-country review of community health workers' role in HIV care also emphasised the potential of this cadre, and made this trenchant and revealing comment: "It also remains to be seen whether state-employed 'community health workers' organised in outreach teams will function better in the PHC structures of the health system than some of the current organisations with a high degree of informal integration with PHC structures."[356]

One of the key interventions forming part of the PHC Re-engineering package has been the creation of District Clinical Specialist Teams (DCSTs). However, with the exception of family physicians and public health specialists, a number of risks have been associated with placing other medical specialists in positions where their scope of practice may be limited.[357] Retention at this level might become a challenge as heads of clinical units seek career advancement.

There is also an entrenched shortage of environmental health practitioners (EHPs) in the country, with the ratio of EHPs to population falling well below international guidelines (Cele A, "Strengthening the provision of MHS within the country" – unpublished paper presented at the Municipal Health Conference, Pretoria, 20 June 2013).[358]

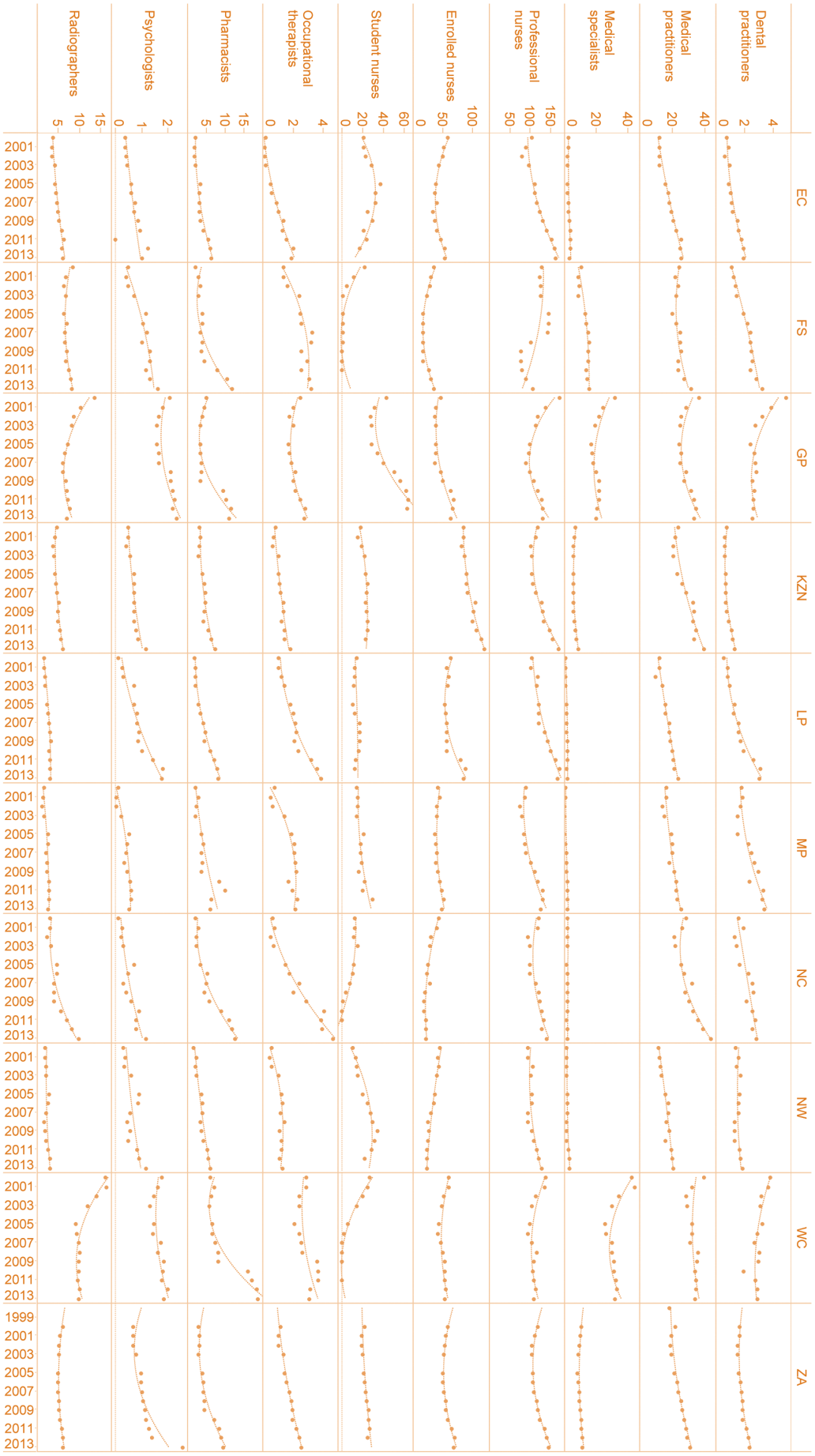
The number of clinical associates registered with the HPCSA remains low, with only 130 of 220 on the register apparently employed in the public sector, according to the available PERSAL data. A minimum target of 1 350 clinical associates, equivalent to five per district hospital, has been mentioned, although figures of six to 20 per hospital have also been advocated.[359] It appears that those provinces that have deployed clinical associates have used them to fill vacant posts for other health professionals. Doherty et al. also pointed out that the universities providing training to this cadre have had to draw on existing resources, "leaving teaching faculty stretched to the maximum". The resources to allow for a significant increase in production of this cadre simply have not been identified or mobilised to date.

Proving a quality health workforce requires addressing the adequacy or pre-service and in-service training, as well as effective regulation and supervision. A cross-sectional descriptive study was conducted with 60 community service medical officers at 22 district hospitals in KwaZulu-Natal in 2012, and showed that most felt that their two-year internship had prepared them well in all disciplines, with the possible exception of obstetrics and anaesthetics.[360] Other areas of relative weakness included otorhinolaryngology, urology, ophthalmology and dermatology.

Using a structured self-report questionnaire, national data were collected from community service professionals who served during 2009.[361] Although few participants planned to continue work in rural, underserved communities (171 out of 657 responses – 25%), those serving in a rural facility during the community service year had higher intentions of continuing rural work. Rural placement was more likely among unmarried, male and black practitioners as well as those who received professional development during the community service year.

Figures 23 and 24 show trends in the provision of selected health professionals in the public sector over the period 2000–2013, based primarily records in PERSAL.

Figure 23: Trends in selected public sector health professionals per 100 000 uninsured population by province, 2000–2013



Source: Calculated from PERSAL, Stats SA mid-year population estimates and GHS medical scheme coverage.

Figure 24: Trends in the number of selected health professionals working in the public sector by ethnic group, 2001–2013

Source: PERSAL.[362]

Table 40: Number of health personnel practising by sector, and registered with applicable professional council, by province

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Number of clinical associates											
2012 Public sector	29	5	18	-	-	4	3	5	-	64	a
2013 Public sector	53	5	19	19	8	5	4	17	0	130	a
Number of clinical associates registered											
2011 Registered with HPCSA	0	0	4	0	0	1	0	0	0	24	b
2012 Registered with HPCSA	-	2	10	-	-	1	-	-	-	93	b
2013 Registered with HPCSA	29	16	69	35	13	19	10	26	3	220	b
Number of dental practitioners											
2011 Public sector	108	59	213	101	127	103	28	51	116	906	c
2012 Public sector	116	70	224	113	152	104	26	53	123	982	c
2013 Public sector	114	74	234	123	156	120	27	58	130	1 037	c
Number of dental practitioners registered											
2011 Registered with HPCSA	232	147	1 816	605	126	338	66	81	1 019	5 409	b
2012 Registered with HPCSA	230	149	1 734	581	124	322	59	75	990	5 572	b
2013 Registered with HPCSA	321	192	2 252	813	215	275	94	191	1 289	5 769	b
Number of dental specialists											
2011 Public sector	-	-	65	6	1	12	-	-	34	118	c
2012 Public sector	-	-	98	1	1	10	1	-	30	141	c
2013 Public sector	-	1	102	1	4	1	1	-	33	143	c
Number of dental therapists											
2011 Public sector	8	2	37	27	54	17	10	18	3	176	c
2012 Public sector	11	2	41	80	75	21	9	18	2	259	c
2013 Public sector	10	2	39	104	76	23	8	16	2	280	c
Number of dental therapists registered											
2011 Registered with HPCSA	7	12	114	155	31	62	7	15	3	504	b
2012 Registered with HPCSA	6	10	100	141	31	55	7	18	3	536	b
2013 Registered with HPCSA	14	17	174	213	57	43	9	40	3	572	b
Number of enrolled nurses											
2011 Public sector	2 794	653	5 534	9 634	3 860	1 556	216	740	2 268	27 256	c
2012 Public sector	3 229	755	5 675	10 800	4 344	1 634	219	746	2 332	29 735	c
2013 Public sector	3 193	819	5 793	11 016	4 303	1 707	213	764	2 406	30 215	c
Number of enrolled nurses registered											
2011 Registered with SANC	3 965	1 918	13 627	19 771	4 685	2 539	450	2 691	5 762	55 408	d
2012 Registered with SANC	4 416	1 971	14 476	20 978	5 101	2 668	451	2 766	5 895	58 722	d
2013 Registered with SANC	4 775	2 094	15 853	23 011	5 491	2 891	449	2 976	6 248	63 788	d
Number of environmental health practitioners											
2011 Public sector	113	51	106	182	155	125	19	33	9	794	c
2012 Public sector	112	80	132	186	159	161	23	42	5	901	c
2013 Public sector	76	91	122	265	154	169	32	43	5	962	c
Number of environmental health practitioners registered											
2011 Registered with HPCSA	195	126	567	457	165	234	65	46	382	2 970	b
2012 Registered with HPCSA	191	115	535	432	167	218	60	49	345	3 215	b
2013 Registered with HPCSA	368	215	801	680	289	201	102	148	459	3 267	b
Number of medical practitioners											
2011 Public sector	1 490	588	2 709	3 101	997	704	361	595	1 463	12 014	c
2012 Public sector	1 477	665	2 920	3 178	1 059	729	392	613	1 468	12 508	c
2013 Public sector	1 513	723	3 027	3 624	1 208	900	413	646	1 540	13 614	c
Number of medical practitioners (including specialists) registered											
2011 HPCSA General MPs	1 534	931	6 757	3 647	760	1 443	298	476	4 026	25 898	b
2011 HPCSA Specialist MPs	493	497	4 095	1 598	126	274	64	127	2 542	11 685	b
2011 Registered with HPCSA	2 027	1 428	10 852	5 245	886	1 717	362	603	6 568	37 583	b
2012 HPCSA General MPs	1 327	791	5 996	3 208	687	1 276	256	423	3 513	25 053	b
2012 HPCSA Specialist MPs	556	530	4 249	1 708	149	336	86	151	2 670	13 391	b
2012 Registered with HPCSA	1 883	1 321	10 245	4 916	836	1 612	342	574	6 183	38 444	b
2013 HPCSA General MPs	2 008	1 205	8 354	4 693	1 152	1 190	436	974	5 048	25 826	b
2013 HPCSA Specialist MPs	699	653	5 286	2 257	200	276	131	303	3 620	14 021	b
2013 Registered with HPCSA	2 707	1 858	13 640	6 950	1 352	1 466	567	1 277	8 668	39 847	b

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Number of medical researchers											
2011 Public sector	-	6	18	11	3	1	1	1	38	109	c
2012 Public sector	-	6	19	15	7	1	1	-	32	109	c
2013 Public sector	-	6	21	28	9	-	1	-	31	130	c
Number of medical specialists											
2011 Public sector	231	348	1 760	641	98	66	16	83	1 371	4 620	c
2012 Public sector	223	364	1 782	739	78	66	19	96	1 405	4 776	c
2013 Public sector	197	359	1 820	813	98	74	20	112	1 450	4 948	c
Number of nursing assistants											
2011 Public sector	5 644	2 077	7 053	6 143	5 733	1 981	903	2 744	4 037	36 315	c
2012 Public sector	5 968	2 053	6 829	6 440	5 846	1 874	925	2 721	4 114	36 770	c
2013 Public sector	5 716	2 133	6 620	6 538	5 668	1 721	926	2 831	4 122	36 275	c
Number of nursing assistants registered											
2011 Registered with SANC	6 330	3 071	16 532	11 565	8 699	3 963	1 287	4 831	8 248	64 526	d
2012 Registered with SANC	6 428	3 249	16 914	11 987	8 785	4 059	1 259	4 913	8 375	65 969	d
2013 Registered with SANC	6 973	3 318	17 416	12 236	9 220	4 101	1 196	4 949	8 486	67 895	d
Number of occupational therapists											
2011 Public sector	92	63	201	133	156	62	39	38	156	940	c
2012 Public sector	123	76	239	140	179	73	40	34	134	1 038	c
2013 Public sector	112	73	254	171	197	77	44	42	140	1 110	c
Number of occupational therapists registered											
2011 Registered with HPCSA	123	205	992	323	83	195	43	43	751	3 629	b
2012 Registered with HPCSA	113	180	919	301	82	182	39	43	690	3 805	b
2013 Registered with HPCSA	188	281	1 436	451	165	197	77	121	1 071	4 024	b
Number of pharmacists											
2011 Public sector	333	194	842	513	348	314	112	158	724	3 550	c
2012 Public sector	368	261	994	600	389	200	120	175	779	3 902	c
2013 Public sector	384	272	1 015	682	422	222	119	194	844	4 225	c
Number of pharmacists registered											
2011 Registered with SAPC	1 179	473	4 536	1 743	409	517	164	605	1 992	12 460	e
2012 Registered with SAPC	854	402	4 274	1 540	400	451	139	538	1 852	13 003	e
2014 Registered with SAPC	939	429	4 463	1 717	436	530	171	601	2 028	13 364	e
2014 Registered with SAPC - female	-	-	-	-	-	-	-	-	-	7 795	e
2014 Registered with SAPC - male	-	-	-	-	-	-	-	-	-	5 576	e
Number of physiotherapists											
2011 Public sector	120	69	212	233	120	68	59	44	132	1 057	c
2012 Public sector	134	83	219	238	141	65	49	63	140	1 132	c
2013 Public sector	139	82	206	276	159	76	58	77	146	1 219	c
Number of physiotherapists registered											
2011 Registered with HPCSA	217	245	1 698	665	122	290	65	75	1 249	5 937	b
2012 Registered with HPCSA	209	225	1 589	640	118	272	62	70	1 178	6 150	b
2013 Registered with HPCSA	324	340	2 242	887	235	261	107	191	1 671	6 359	b
Number of professional nurses											
2011 Public sector	8 980	1 981	10 359	13 377	7 863	4 095	1 333	3 479	4 606	56 075	c
2012 Public sector	9 495	2 227	11 167	14 531	8 435	4 170	1 316	3 713	4 833	59 890	c
2013 Public sector	9 653	2 430	11 836	15 688	8 555	4 485	1 326	3 964	4 999	63 833	c
Number of professional nurses registered											
2011 Registered with SANC	14 118	7 623	30 770	25 440	9 404	5 927	2 202	7 978	14 800	118 262	d
2012 Registered with SANC	14 608	7 788	32 106	27 041	10 080	6 331	2 242	8 394	15 455	124 045	d
2013 Registered with SANC	14 938	7 946	33 597	28 158	10 536	6 700	2 199	8 910	16 031	129 015	d
Number of psychologists											
2011 Public sector	66	29	183	71	69	19	8	25	75	545	c
2012 Public sector	75	33	186	84	90	19	8	28	85	608	c
2013 Public sector	62	37	212	109	91	19	11	37	85	1 131	c
Number of psychologists registered											
2011 Registered with HPCSA	332	219	2 953	651	96	221	37	144	1 270	7 160	b
2012 Registered with HPCSA	305	216	2 823	617	91	208	36	139	1 204	7 370	b
2013 Registered with HPCSA	454	263	3 683	832	137	171	54	230	1 668	7 622	b
Number of pupil auxiliary nurses registered											
2011 Registered with SANC	240	137	2 920	1 280	212	168	113	147	527	5 744	d
2012 Registered with SANC	624	171	2 611	1 371	178	142	113	170	530	5 910	d
2013 Registered with SANC	479	140	3 287	1 473	220	79	113	260	696	6 747	d

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Number of pupil nurses registered											
2011 Registered with SANC	1 081	327	6 550	6 364	584	355	0	2	1 165	16 428	d
2012 Registered with SANC	1 114	366	6 535	6 465	431	372	0	45	1 096	16 424	d
2013 Registered with SANC	1 104	357	6 210	5 868	458	264	0	65	1 011	15 337	d
Number of radiographers											
2011 Public sector	382	184	601	486	153	89	71	79	408	2 454	c
2012 Public sector	361	198	660	534	154	93	84	96	429	2 611	c
2013 Public sector	360	186	642	569	158	95	94	101	445	2 652	c
Number of radiographers registered											
2011 Registered with HPCSA	404	321	1 682	935	104	283	79	92	980	6 431	b
2012 Registered with HPCSA	373	312	1 565	869	96	255	79	83	895	6 748	b
2013 Registered with HPCSA	590	490	2 409	1 254	229	266	152	243	1 387	7 072	b
Number of student nurses											
2011 Public sector	1 425	-	5 155	2 237	665	643	-	851	-	10 976	f
2012 Public sector	1 044	-	5 299	2 159	630	953	-	664	-	10 749	f
Number of student nurses registered											
2011 Registered with SANC	3 637	1 205	5 076	3 288	1 865	794	108	1 732	2 876	20 581	d
2012 Registered with SANC	3 758	1 354	5 151	3 009	1 840	911	218	1 729	2 950	20 920	d
2013 Registered with SANC	3 776	1 349	5 048	3 083	1 915	909	217	1 713	2 946	20 956	d
Total number of health professional posts											
2011 Public sector (filled)	21 786	6 304	35 048	36 896	20 402	9 855	3 176	8 939	15 440	157 905	f
2012 Public sector (filled)	22 736	6 873	36 484	39 838	21 739	10 173	3 232	9 062	15 911	166 111	f

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a PERSAL.[362] Note that in PERSAL Clinical Associates are a "Rank" under Medical Practitioners and therefore these numbers are included within the number of MPs. In the 2013 data Clinical Associates were identified based on "Rank" in PERSAL and are included within several Occupational Classifications such as medical practitioners, medical researchers, medical specialists and Health Sciences-related categories.

b HPCSA.[363] Total for South Africa includes those with REGION indicated as Foreign or Unknown. The number on the register includes those professionals who are retired, overseas, working part-time, working in other sectors or not working at all (a substantial proportion of the total for some professions).

c PERSAL.[362] Note that this total includes only the posts that are filled at the time of data extraction. The South African total includes the sum of the provinces plus posts within the National Department of Health. Data for Environmental Health Practitioners only include those employed by provincial government. Note that for provinces such as GP and WC a substantial number of EHPs may be employed by local government.

d SANC.[364] The number on the register includes those professionals who are retired, overseas, working part-time, working in other sectors or not working at all.

e SAPC.[365] The total for South Africa includes large numbers of pharmacists for whom province was unknown and thus the provincial breakdown should be interpreted with caution. The number on the register also includes those professionals who are retired, overseas, working part-time, working in other sectors or not working at all.

f PERSAL.[362] Data were not extracted for student nurses for 2013. For this reason the total number of health professional posts was also not updated, since it would not cover the same cadres as in previous years.

Table 41: Public and private sector health personnel per 100 000 sector population

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Dental practitioners per 100 000 population											
2011 Public sector	1.85	2.42	2.65	1.13	2.64	3.29	2.80	1.71	2.76	2.19	a
2012 Public sector	1.96	2.87	2.65	1.20	3.10	3.29	2.57	1.74	2.91	2.31	a
2013 Public sector	1.93	3.28	2.59	1.34	3.07	3.40	2.86	1.88	2.89	2.38	a
Dental specialists per 100 000 population											
2011 Public sector	0.00	0.00	0.81	0.07	0.02	0.38	0.00	0.00	0.81	0.28	a
2012 Public sector	-	-	1.16	0.01	0.02	0.32	0.10	-	0.71	0.33	a
2013 Public sector	-	0.04	1.13	0.01	0.08	0.03	0.11	-	0.73	0.33	a
Dental therapists per 100 000 population											
2011 Public sector	0.14	0.08	0.46	0.30	1.12	0.54	1.00	0.60	0.07	0.42	a
2012 Public sector	0.19	0.08	0.49	0.85	1.53	0.66	0.89	0.59	0.05	0.61	a
2013 Public sector	0.17	0.09	0.43	1.13	1.50	0.65	0.85	0.52	0.04	0.64	a
Enrolled nurses per 100 000 population											
2011 Public sector	47.8	26.8	68.9	107.6	80.3	49.8	21.6	24.8	54.0	65.8	a
2012 Public sector	54.4	30.9	67.2	115.0	88.6	51.7	21.7	24.5	55.2	69.9	a
2013 Public sector	54.1	36.3	64.1	120.1	84.8	48.4	22.6	24.7	53.5	69.5	a
Environmental health practitioners per 100 000 population											
2011 Public sector	1.93	2.09	1.32	2.03	3.22	4.00	1.90	1.11	0.21	1.92	a
2012 Public sector	1.89	3.28	1.56	1.98	3.24	5.10	2.27	1.38	0.12	2.12	a
2013 Public sector	1.29	4.04	1.35	2.89	3.03	4.79	3.39	1.39	0.11	2.21	a
Medical practitioners per 100 000 population											
2011 Public sector	25.5	24.1	33.7	34.6	20.7	22.5	36.1	19.9	34.8	29.0	a
2012 Public sector	24.9	27.2	34.6	33.9	21.6	23.1	38.8	20.2	34.7	29.4	a
2013 Public sector	25.7	32.1	33.5	39.5	23.8	25.5	43.8	20.9	34.2	31.3	a
Medical researchers per 100 000 population											
2011 Public sector	0.00	0.25	0.22	0.12	0.06	0.03	0.10	0.03	0.91	0.26	a
2012 Public sector	-	0.25	0.23	0.16	0.14	0.03	0.10	-	0.76	0.26	a
2013 Public sector	-	0.27	0.23	0.31	0.18	-	0.11	-	0.69	0.30	a
Medical specialists per 100 000 population											
2011 Public sector	3.9	14.3	21.9	7.2	2.0	2.1	1.6	2.8	32.7	11.2	a
2012 Public sector	3.8	14.9	21.1	7.9	1.6	2.1	1.9	3.2	33.2	11.2	a
2013 Public sector	3.3	15.9	20.1	8.9	1.9	2.1	2.1	3.6	32.2	11.4	a
Nursing assistants per 100 000 population											
2011 Public sector	96.5	85.2	87.8	68.6	119.2	63.3	90.2	92.0	96.1	87.7	a
2012 Public sector	100.6	84.1	80.9	68.6	119.3	59.3	91.5	89.5	97.4	86.4	a
2013 Public sector	96.9	94.6	73.3	71.3	111.7	48.8	98.2	91.6	91.6	83.4	a
Occupational therapists per 100 000 population											
2011 Public sector	1.6	2.6	2.5	1.5	3.2	2.0	3.9	1.3	3.7	2.3	a
2012 Public sector	2.1	3.1	2.8	1.5	3.7	2.3	4.0	1.1	3.2	2.4	a
2013 Public sector	1.9	3.2	2.8	1.9	3.9	2.2	4.7	1.4	3.1	2.6	a
Pharmacists per 100 000 population											
2011 Public sector	5.7	8.0	10.5	5.7	7.2	10.0	11.2	5.3	17.2	8.6	a
2012 Public sector	6.2	10.7	11.8	6.4	7.9	6.3	11.9	5.8	18.4	9.2	a
2013 Public sector	6.5	12.1	11.2	7.4	8.3	6.3	12.6	6.3	18.8	9.7	a
Physiotherapists per 100 000 population											
2011 Public sector	2.05	2.83	2.64	2.60	2.50	2.17	5.90	1.47	3.14	2.55	a
2012 Public sector	2.26	3.40	2.59	2.54	2.88	2.06	4.84	2.07	3.31	2.66	a
2013 Public sector	2.36	3.64	2.28	3.01	3.13	2.15	6.15	2.49	3.24	2.80	a
Professional nurses per 100 000 population											
2011 Public sector	153.5	81.3	129.0	149.4	163.5	130.9	133.2	116.6	109.7	135.4	a
2012 Public sector	160.1	91.2	132.3	154.8	172.1	132.0	130.1	122.1	114.4	140.8	a
2013 Public sector	163.7	107.8	131.0	171.1	168.5	127.1	140.6	128.3	111.1	146.8	a
Psychologists per 100 000 population											
2011 Public sector	0.00	1.19	2.28	0.79	1.43	0.61	0.80	0.84	1.79	1.32	a
2012 Public sector	1.26	1.35	2.20	0.89	1.84	0.60	0.79	0.92	2.01	1.43	a
2013 Public sector	1.05	1.64	2.35	1.19	1.79	0.54	1.17	1.20	1.89	2.60	a
Radiographers per 100 000 population											
2011 Public sector	6.5	7.5	7.5	5.4	3.2	2.8	7.1	2.6	9.7	5.9	a
2012 Public sector	6.1	8.1	7.8	5.7	3.1	2.9	8.3	3.2	10.2	6.1	a
2013 Public sector	6.1	8.3	7.1	6.2	3.1	2.7	10.0	3.3	9.9	6.1	a

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Student nurses per 100 000 population											
2011 Public sector	24.4	0.0	64.2	25.0	13.8	20.6	0.0	28.5	0.0	26.5	a
2012 Public sector	17.6	-	62.8	23.0	12.9	30.2	-	21.8	-	25.3	a

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a PERSAL.[362] Note that these values were calculated using only the posts that are filled at time of data extraction. Population estimates for the applicable year and medical scheme coverage from Stats SA GHS were used to estimate the public sector dependent population denominator. Data were not extracted for student nurses for 2013.

Table 42: Number of health personnel by ethnic group

	African	Coloured	Indian	White	Other	All	Ref
Number of clinical associates							
2012 Public sector	61	1	2	-	-	64	a
2013 Public sector	127	1	2	-	-	130	a
Number of clinical associates registered							
2011 Registered with HPCSA	20	0	0	3	1	24	b
2012 Registered with HPCSA	85	1	2	4	1	93	b
2013 Registered with HPCSA	202	6	2	8	2	220	b
Number of dental practitioners							
2011 Public sector	436	102	176	192	-	906	c
2012 Public sector	481	98	188	215	-	982	c
2013 Public sector	520	91	208	216	2	1 037	c
Number of dental practitioners registered							
2011 Registered with HPCSA	669	183	844	1 955	1 758	5 409	b
2012 Registered with HPCSA	748	204	897	2 004	1 719	5 572	b
2013 Registered with HPCSA	813	223	978	2 088	1 667	5 769	b
Number of dental specialists							
2011 Public sector	32	7	31	48	-	118	c
2012 Public sector	37	8	33	63	-	141	c
2013 Public sector	39	8	30	66	-	143	c
Number of dental therapists							
2011 Public sector	156	5	13	2	-	176	c
2012 Public sector	222	3	30	4	-	259	c
2013 Public sector	239	4	33	4	-	280	c
Number of dental therapists registered							
2011 Registered with HPCSA	257	1	101	32	113	504	b
2012 Registered with HPCSA	293	3	107	30	103	536	b
2013 Registered with HPCSA	328	3	114	30	97	572	b
Number of enrolled nurses							
2011 Public sector	23 997	2 395	363	501	-	27 256	c
2012 Public sector	26 530	2 398	343	464	-	29 735	c
2013 Public sector	27 103	2 340	319	435	18	30 215	c
Number of environmental health practitioners							
2011 Public sector	727	20	15	23	-	794	c
2012 Public sector	842	22	11	26	-	901	c
2013 Public sector	896	18	20	25	3	962	c
Number of environmental health practitioners registered							
2011 Registered with HPCSA	1 539	152	75	389	815	2 970	b
2012 Registered with HPCSA	1 804	174	73	389	775	3 215	b
2013 Registered with HPCSA	1 900	187	75	375	730	3 267	b
Number of medical practitioners							
2011 Public sector	5 902	621	1 914	3 577	-	12 014	c
2012 Public sector	6 316	640	1 944	3 608	-	12 508	c
2013 Public sector	7 031	705	2 045	3 725	108	13 614	c
Number of medical practitioners (including specialists) registered							
2011 HPCSA General MPs	6 741	705	3 774	10 456	4 222	25 898	b
2011 HPCSA Specialist MPs	1 002	109	1 393	6 227	2 954	11 685	b
2011 Registered with HPCSA	7 743	814	5 167	16 683	7 176	37 583	b
2012 HPCSA General MPs	6 779	762	3 621	10 021	3 870	25 053	b
2012 HPCSA Specialist MPs	1 575	165	1 693	6 915	3 043	13 391	b

	African	Coloured	Indian	White	Other	All	Ref
2012 Registered with HPCSA	8 354	927	5 314	16 936	6 913	38 444	b
2013 HPCSA General MPs	7 368	850	3 685	10 208	3 715	25 826	b
2013 HPCSA Specialist MPs	1 774	212	1 873	7 235	2 927	14 021	b
2013 Registered with HPCSA	9 142	1 062	5 558	17 443	6 642	39 847	b
Number of medical researchers							
2011 Public sector	34	14	12	49	-	109	c
2012 Public sector	55	21	9	24	-	109	c
2013 Public sector	78	20	10	22	-	130	c
Number of medical specialists							
2011 Public sector	1 189	232	880	2 319	-	4 620	c
2012 Public sector	1 289	244	929	2 314	-	4 776	c
2013 Public sector	1 405	254	958	2 319	12	4 948	c
Number of nursing assistants							
2011 Public sector	31 298	3 917	238	862	-	36 315	c
2012 Public sector	31 868	3 845	230	827	-	36 770	c
2013 Public sector	31 445	3 757	236	790	47	36 275	c
Number of occupational therapists							
2011 Public sector	353	121	82	384	-	940	c
2012 Public sector	393	102	93	450	-	1 038	c
2013 Public sector	450	116	102	438	4	1 110	c
Number of occupational therapists registered							
2011 Registered with HPCSA	440	181	252	2 278	478	3 629	b
2012 Registered with HPCSA	479	205	264	2 398	459	3 805	b
2013 Registered with HPCSA	533	237	283	2 540	431	4 024	b
Number of pharmacists							
2011 Public sector	1 904	471	442	733	-	3 550	c
2012 Public sector	2 105	504	517	776	-	3 902	c
2013 Public sector	2 267	547	568	821	22	4 225	c
Number of pharmacists registered							
2012 Registered with SAPC	2 047	443	2 472	7 947	96	13 003	d
2014 Registered with SAPC	2 260	463	2 595	7 978	74	13 364	d
Number of physiotherapists							
2011 Public sector	426	171	142	318	-	1 057	c
2012 Public sector	476	174	165	317	-	1 132	c
2013 Public sector	527	192	165	329	6	1 219	c
Number of physiotherapists registered							
2011 Registered with HPCSA	754	387	509	3 123	1 164	5 937	b
2012 Registered with HPCSA	817	435	542	3 247	1 109	6 150	b
2013 Registered with HPCSA	878	489	567	3 399	1 026	6 359	b
Number of professional nurses							
2011 Public sector	47 115	5 260	1 316	2 384	-	56 075	c
2012 Public sector	50 676	5 483	1 409	2 322	-	59 890	c
2013 Public sector	53 864	5 857	1 486	2 407	219	63 833	c
Number of psychologists							
2011 Public sector	202	37	43	263	-	545	c
2012 Public sector	258	35	41	274	-	608	c
2013 Public sector	646	70	67	342	6	1 131	c
Number of psychologists registered							
2011 Registered with HPCSA	652	223	400	4 066	1 819	7 160	b
2012 Registered with HPCSA	723	256	430	4 214	1 747	7 370	b
2013 Registered with HPCSA	803	277	452	4 448	1 642	7 622	b
Number of radiographers							
2011 Public sector	1 306	430	271	447	-	2 454	c
2012 Public sector	1 388	468	291	464	-	2 611	c
2013 Public sector	1 425	468	302	450	7	2 652	c
Number of radiographers registered							
2011 Registered with HPCSA	1 378	471	549	2 046	1 987	6 431	b
2012 Registered with HPCSA	1 568	568	594	2 163	1 855	6 748	b
2013 Registered with HPCSA	1 764	630	648	2 275	1 755	7 072	b

	African	Coloured	Indian	White	Other	All	Ref
Number of student nurses							
2011 Public sector	10 168	291	279	238	-	10 976	c
2012 Public sector	10 014	269	269	197	-	10 749	c
Total number of health professional posts							
2011 Public sector (filled)	125 246	14 099	6 217	12 343	-	157 905	c
2012 Public sector (filled)	132 950	14 314	6 502	12 345	-	166 111	c

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a PERSAL.[362] Note that in PERSAL Clinical Associates are a "Rank" under Medical Practitioners and therefore these numbers are included within the number of MPs. In the 2013 data Clinical Associates were identified based on "Rank" in PERSAL and are included within several Occupational Classifications such as medical practitioners, medical researchers, medical specialists and Health Sciences-related categories.

b HPCSA.[363] Total for South Africa includes those with unknown ethnic group. The number on the register includes those professionals who are retired, overseas, working part-time, working in other sectors or not working at all.

c PERSAL.[362] Note that this total includes only the posts that are filled at time of data extraction. The South African total includes the sum of the plus those of unknown group. Data for Environmental Health Practitioners include only those employed by provincial government.

d SAPC.[365] The total for South Africa includes pharmacists for whom ethnic group was unknown. The number on the register also includes those professionals who are retired, overseas, working part-time, working in other sectors or not working at all.

Table 43: Number of community service professionals by province

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Number of CS clinical psychologists											
2011	12	1	47	12	7	2	1	0	12	111	a
2012	14	3	43	11	6	2	1	4	13	108	a
2013	9	5	43	15	10	1	2	3	14	105	a
Number of CS dentists											
2011	16	22	9	26	21	46	13	15	15	206	a
2012	13	23	8	22	22	32	13	10	14	178	a
2013	15	21	5	31	17	41	12	13	13	188	a
Number of CS dieticians											
2011	16	10	42	32	37	5	11	16	10	183	a
2012	21	10	50	27	32	24	13	11	12	207	a
2013	17	10	39	30	41	22	11	13	8	192	a
Number of CS doctors											
2011	172	51	208	194	96	97	83	93	160	1 215	a
2012	136	44	134	146	110	106	87	88	131	1 027	a
2013	138	46	202	176	86	105	76	68	154	1 109	a
Number of CS environmental health practitioners											
2011	21	23	34	55	22	23	7	9	5	213	a
2012	[14] 17	22	31	34	37	30	11	12	5	211	a
2013	14	23	4	31	36	17	10	16	1	155	a
Number of CS nurses											
2011	429	209	644	339	221	143	66	250	320	2 624	a
2012	567	127	680	368	313	5	-	165	342	2 571	a
2013	1	20	4	144	-	24	3	172	-	2 566	a, b
Number of CS occupational therapists											
2011	28	18	68	44	14	15	13	8	15	227	a
2012	31	26	70	32	25	23	17	9	14	248	a
2013	36	14	69	39	22	23	14	9	13	239	a
Number of CS pharmacists											
2011	32	29	51	39	50	34	28	25	34	358	a
2012	38	31	38	36	0	33	25	28	32	311	a
2013	38	25	66	63	71	51	27	31	35	415	a

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Number of CS physiotherapists											
2011	46	19	79	55	21	22	17	12	20	299	a
2012	46	24	90	41	31	26	18	17	21	319	a
2013	46	24	60	47	27	30	14	25	27	301	a
Number of CS radiographers											
2011	29	23	102	49	19	9	22	17	49	323	a
2012	38	25	109	57	25	17	16	18	47	357	a
2013	41	24	88	66	33	13	16	9	49	342	a
Number of CS speech therapists											
2011	14	8	44	31	6	13	4	7	7	137	a
2012	15	7	55	30	10	16	10	4	6	154	a
2013	13	8	60	34	11	12	7	6	9	160	a

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a DoH Community Service.[366] The national figure also includes CSPs allocated to SA Military Health Services – SAMHS and Department of Correctional Services – DCS and is therefore greater than the sum of provincial figures.

b A significant amount of data for 2013 is missing for nurses, which is why the sum of provincial allocations is so much lower than the national total of community services nurses.

Table 44: Number of community service professionals by ethnic group

	African	Coloured	Indian	White	Other	All	Ref
Number of CS clinical psychologists							
2013	36	5	6	58	-	105	a
Number of CS dentists							
2013	59	12	59	58	-	188	a
Number of CS dieticians							
2013	84	13	4	91	-	192	a
Number of CS doctors							
2013	459	91	169	385	5	1 109	a
Number of CS environmental health practitioners							
2013	142	11	2	-	-	155	a
Number of CS nurses							
2013	323	12	21	12	-	2 566	a
Number of CS occupational therapists							
2013	40	20	24	154	1	239	a
Number of CS pharmacists							
2013	216	16	95	84	4	415	a
Number of CS physiotherapists							
2013	58	50	22	165	6	301	a
Number of CS radiographers							
2013	151	38	50	98	5	342	a
Number of CS speech therapists							
2013	39	10	27	84	-	160	a

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

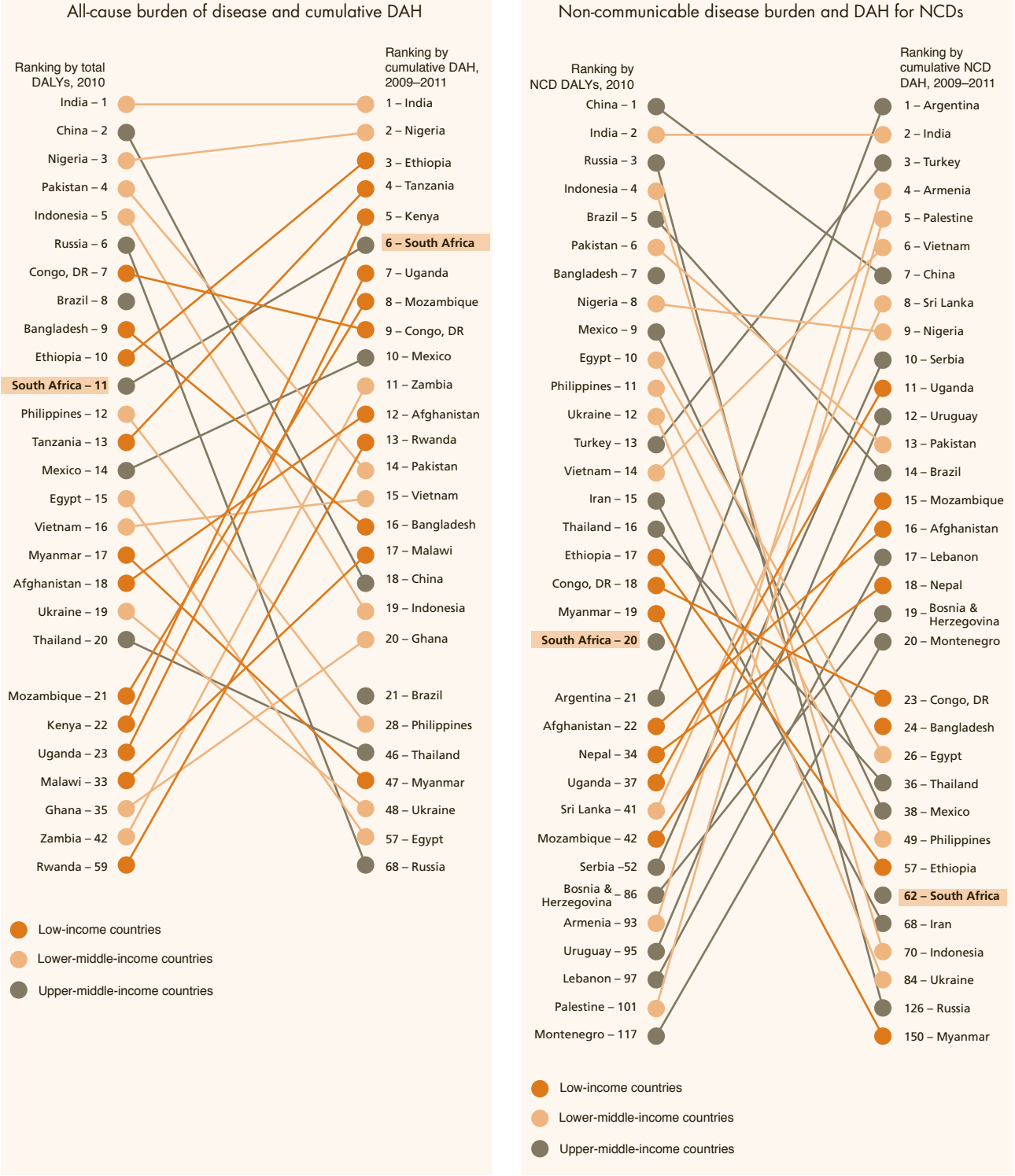
a DoH Community Service.[366] The national figure also includes CSPs allocated to SA Military Health Services – SAMHS and Department of Correctional Services – DCS and is therefore greater than the sum of provincial figures.

Health financing

Context	The White Paper on National Health Insurance, together with a National Treasury discussion document on the financing options for universal healthcare coverage, were expected to be released before the General Election in May 2014, but were not issued.
New data sources	Nationally, new data have been reported in the: • Medical Schemes Annual Report 2012-13 • Mediscor Medicines Review 2012 • National Treasury databases • Stats SA General Household Survey (GHS) 2012 Internationally, reports of interest include: • IHME Financing Global Health 2013
Key issues and trends	While global attention is firmly fixed on efforts to match funding to burden of disease and provide universal healthcare coverage, the local process is still awaiting the release of the promised White Paper, as well as a discussion document on financing options to be provided by the National Treasury. The Competition Commission's inquiry into private healthcare has also been delayed, but is expected to provide much greater insight into this industry, its cost structures and financing.

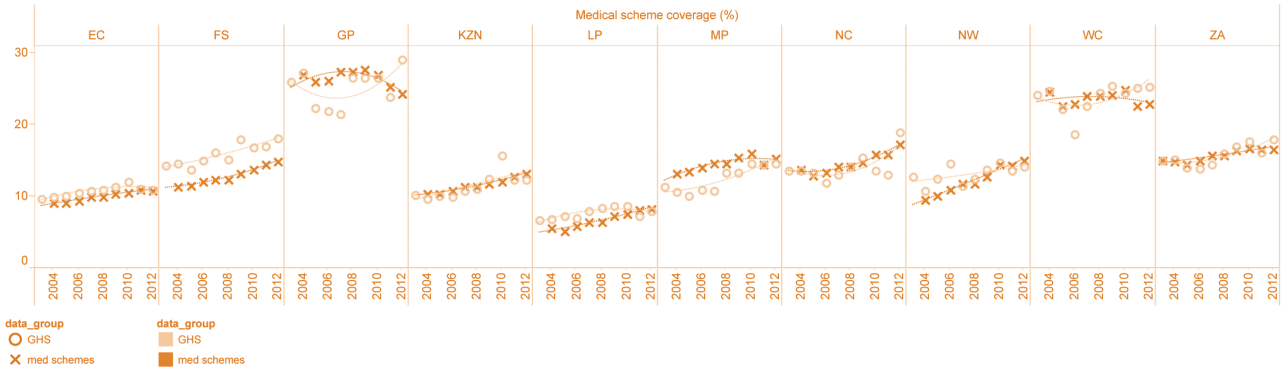
Moon and Omole note the unprecedented political attention to health challenges in developing countries over the past decade, together with enormous growth in international financing and the array of "actors" engaged in global health.[367] They provide a number of critiques of the current development assistance for health (DAH) and proceed to discuss the key criteria of proposals to reform the DAH system. IHME's fifth annual report on global health expenditure records that total assistance reached an all-time high of $31.3 billion in 2013 despite international economic pressures and austerity measures, with the greatest increase in funding for maternal, newborn and child health.[368] This report used data from the Global Burden of Disease study, finding gaps between donor funding and disease burden in most regions for tobacco control and non-communicable diseases in particular. Many countries with the highest overall disease burdens do not receive the most DAH, although South Africa was ranked 11th in terms of DALYs for 2010 yet ranked sixth in terms of cumulative DAH, 2009–2011 (Figure 25). On the other hand, DAH funding for NCDs in South Africa was ranked 62nd against a higher burden of disease (20th for NCD DALYs). South Africa was one of five countries receiving more than five times the total DAH expected, primarily in the form of HIV/AIDS funding.[369]

Figure 25: Top 20 countries by 2010 burden of disease versus 2009–2011 development assistance for health (DAH)



Source: Financing Global Health 2013.[368]

Figure 26: Medical scheme coverage trends from CMS data and GHS, 2003–2012



Source: Calculated from Council for Medical Schemes (CMS) Annual Reports, Stats SA General Household Surveys and Stats SA mid-year population estimates.

Kutzin adds to the burgeoning literature on financing universal health coverage (UHC), offering a more precise specification of UHC as the "system-wide effective coverage combined with universal financial protection."[370] The links to UHC can be made even more precise by connecting financing policy (revenue collection, pooling and purchasing arrangements) to the three goals or objectives associated with UHC: (i) reducing the gap between need and utilisation; (ii) improving quality, and (iii) improving financial protection. An accessible summary of this topic is provided in the Equinet Policy Series.[371] Mathauer and Wittenbecher explore diagnosis-related groups (DRGs) to reform hospital payment mechanisms, since improving efficiency of resource use on hospital services would accelerate UHC.[372]

Private sector financing

The major source of accessible data about the private healthcare sector remains the annual report of the Council for Medical Schemes (CMS).[39] Consolidation in the medical scheme environment has continued, with the total number of registered schemes dropping from 95 to 90 in 2013, but offered in a total of 311 different scheme options. Gross contributions in 2013 amounted to R117.5 billion, and the total benefits paid amounted to R103.3 billion. As in previous years, the largest proportion of health benefit payments in 2012 was for private hospitals (29.9%), medical specialists (23.3%) and medicines (15.8%).

Medical schemes coverage has remained stagnant over a long period. Figure 26 highlights the difference between provincial estimates from the General Household Survey (self-reported insurance status) and the Council for Medical Schemes (based on the location determined from the address of the primary member).

Econex analysed CMS data on demographics of beneficiaries between 2006 and 2011 and highlighted widely divergent trends between open and restricted schemes. On average, open schemes lost 5.7% of their beneficiaries and the average age of beneficiaries increased by at least 18 months. In contrast, there was an 81% increase in restricted scheme beneficiaries and a decrease in the average age of beneficiaries by about two years.[373]

In the absence of a clear pathway to National Health Insurance, various stakeholders are continuing to "stake out their territory". An example of this effort can be seen in the study conducted by Econex on behalf of the South African Private Practitioners Forum and HealthMan, entitled "The South African Private Healthcare Sector: Role and Contribution to the Economy".[374,375] This report claimed that "the private healthcare sector currently provides primary healthcare services to an estimated 28%–38% of the population". More importantly from a policy perspective, the authors argued that "some form of mandatory membership or risk-equalisation fund is necessary to curb the actuarial death spiral while alternative payment systems are required to address the perverse incentives associated with the current fee-for-service model". Evidence of adverse selection, which drives the "actuarial death spiral" was identified in the net deficits of open schemes compared with the net surpluses of restricted schemes, which the authors claimed "may partially be explained by the respective risk profiles in open and restricted schemes".

As always, data on the utilisation of medicines in the private sector are difficult to access, as most medical scheme administrators regard such data as proprietary. The exception remains Mediscor, which publishes an annual Mediscor Medicines Review.[376] The 2012 report showed generic utilisation (in volume terms) increasing to 53.4%.

Public sector financing

Both the health policy focus on UHC and discussions around the broader post-2015 sustainable development goals call for increased government funding of health and other social services. To provide both financial protection and access to needed health services, an analysis of government spending on health and various indicators related to the goal of UHC supports a target of domestic government spending on health of at least 5% of GDP.[377] South Africa's (public sector) expenditure on health was reported as 4.1% of GDP in 2011, external funding being 2.1% of total health expenditure.

Expenditure on public sector health services consists primarily of provincial health expenditure (sourced through the provincial equitable share),[c] conditional grants[d] and provincial own revenue. Provincial health expenditure is classified under eight budget programmes (Table 45). District health services accounted for 43.7% of provincial expenditure on health in 2012/13 (Figure

c The equitable share formula is used to divide funding from national government between provinces. Provincial governments then determine what proportion is used for health relative to other services.

d These funds are allocated to the provincial health departments by national government for ring-fenced areas of spending such as tertiary hospitals, HIV programmes, hospital revitalisation, forensic pathology, training and health infrastructure.

27). Expenditure on emergency health services and health facilities management doubled (in real terms) between 2005/06 and 2012/13. The distribution of expenditure varies according to the context of each province, with Northern Cape spending nearly twice the average proportion on administration and health facilities management compared with other provinces (Table 46). Provinces spent nearly R54 billion on district health services in 2012/13 (Table 47). Expenditure on district hospitals has increased by 37% in real terms since 2005/06, accounting for about 37% of district health services in 2012/13 (Figure 28). Spending on HIV/AIDS has increased by 262% over the same period.

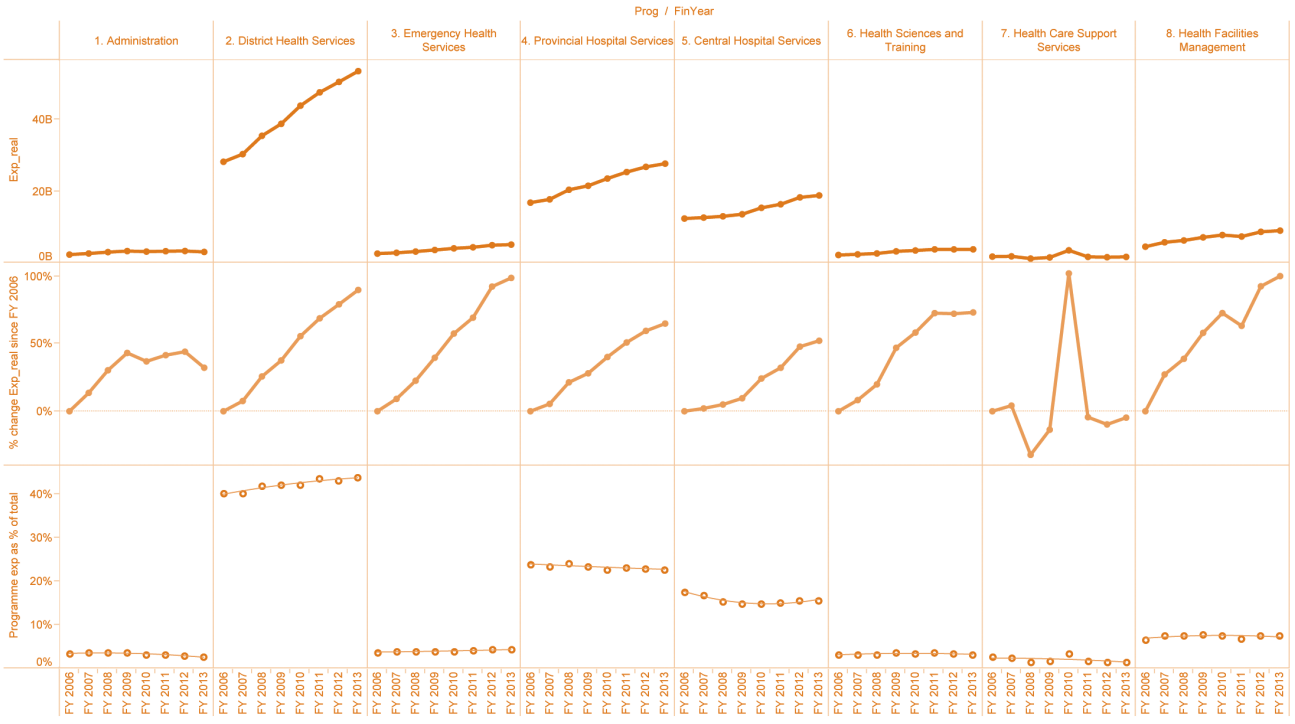
The Centre for Economic Governance and AIDS in Africa (CEGAA) provides a more in-depth assessment of HIV/AIDS budgeting and spending in South Africa.[378] The consolidated national and provincial health HIV and AIDS allocations grow from year to year, from 7.9% of health expenditure in 2012/13 to 10% in 2015/16. The comprehensive health AIDS grant accounts for 90% of total health HIV and AIDS allocations. The analysis shows increased spending efficiency in all provinces and high absorptive capacity, with overspending of R1.3 billion against actual receipts in 2012/13.

Table 45: Trends in overall provincial health expenditure by programme (Rand million, real 2012/13 prices), 2008/09–2012/13

	2008/09	2009/10	2010/11	2011/12	2012/13	Average annual growth rate
1. Administration	3 269	3 126	3 232	3 290	3 019	-2.0
2. District Health Services	38 857	43 935	47 662	50 580	53 592	8.4
3. Emergency Health Services	3 569	4 026	4 327	4 916	5 079	9.2
4. Provincial Hospital Services	21 532	23 557	25 372	26 812	27 720	6.5
5. Central Hospital Services	13 563	15 371	16 352	18 286	18 827	8.5
6. Health Sciences and Training	3 187	3 432	3 744	3 734	3 755	4.2
7. Health Care Support Services	1 487	3 478	1 646	1 554	1 640	2.5
8. Health Facilities Management	7 101	7 759	7 335	8 649	8 987	6.1
Other	-23	-42	-15	3	4	
Total	92 542	104 642	109 655	117 824	122 624	7.3

Source: National Treasury (BAS).

Figure 27: Trends in provincial health expenditure by programme (Rand billion, real 2012/13 prices), percentage change (real terms) since 2005/06 and programme expenditure as % of total, 2005/06–2012/13



Source: National Treasury (BAS).

Table 46: Provincial health expenditure by programme per province (Rand million), 2012/13

Programme	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA
1. Administration	541	247	501	450	240	205	153	237	445	3 019
2. District Health Services	7 954	2 959	8 556	11 993	7 194	4 446	1 328	3 648	5 513	53 592
3. Emergency Health Services	620	505	1 147	955	490	250	207	230	676	5 079
4. Provincial Hospital Services	3 979	1 749	6 582	7 887	1 640	898	895	1 789	2 300	27 720
5. Central Hospital Services	657	1 265	7 800	2 764	1 118	783	0	193	4 247	18 827
6. Health Sciences and Training	580	198	807	931	392	242	87	242	277	3 755
7. Health Care Support Services	84	109	197	48	650	97	24	106	325	1 640
8. Health Facilities Management	1 192	588	1 244	2 396	1 111	579	480	575	822	8 987
Other	0	0	4	0	0	0	0	0	0	4
Total	15 606	7 621	26 838	27 423	12 835	7 501	3 174	7 021	14 604	122 624

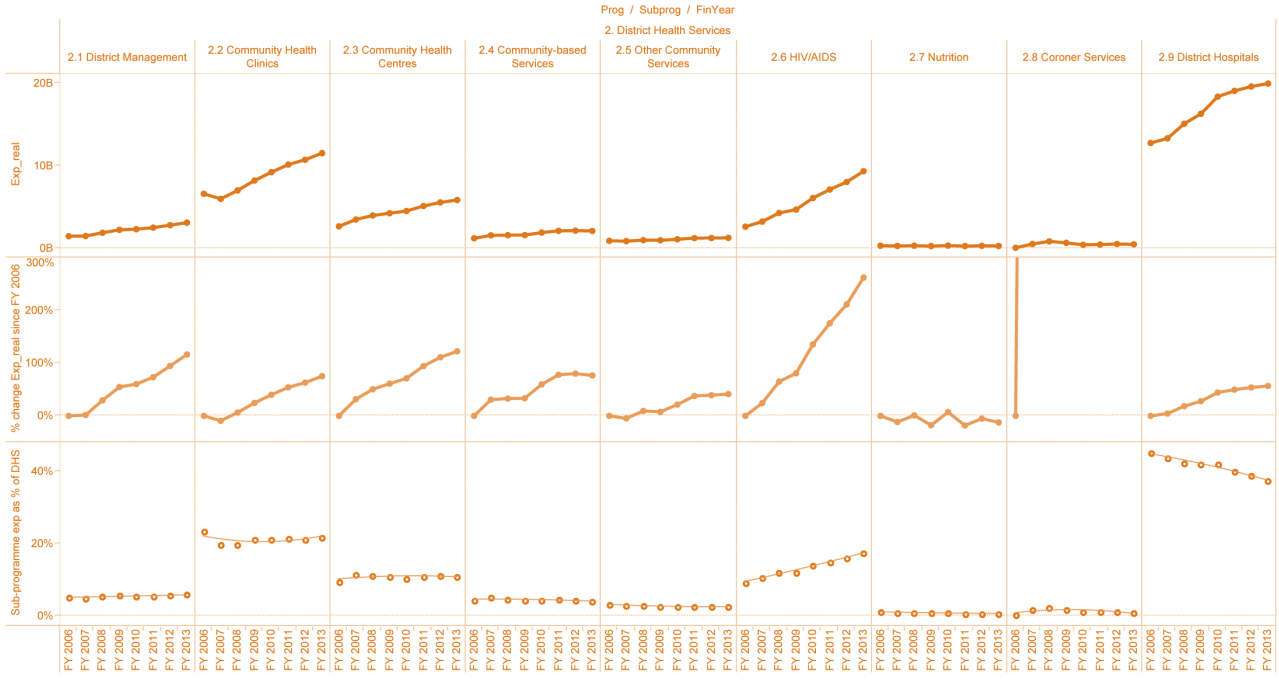
Source: National Treasury (BAS). These are preliminary outcome figures and may be adjusted once audited, or differ from figures published in other sources if extracted on a different date.

Table 47: Provincial health expenditure on district health services by sub-programme per province (Rand million), 2012/13

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA
2.1 District Management	565	103	512	245	521	387	121	346	257	3 057
2.2 Community Health Clinics	1 720	684	1 884	2 514	1 802	750	342	740	1 038	11 475
2.3 Community Health Centres	767	67	1 185	963	325	504	185	675	1 130	5 801
2.4 Community-based Services	433	355	919	1	110	63	0	5	163	2 050
2.5 Other Community Services	115	0	0	724	180	0	54	140	0	1 213
2.6 HIV/AIDS	1 046	673	2 134	2 393	692	653	232	731	738	9 291
2.7 Nutrition	62	7	49	44	7	18	3	12	29	232
2.8 Coroner Services	75	38	126	141	0	0	26	26	0	432
2.9 District Hospitals	3 171	1 033	1 745	4 969	3 556	2 070	365	973	2 018	19 901
2. Other*	0	0	0	0	0	0	0	0	140	140
Total (2. District Health Services)	7 954	2 959	8 556	11 993	7 194	4 446	1 328	3 648	5 513	53 592

Source: National Treasury (BAS). These are preliminary outcome figures and may be adjusted once audited, or differ from figures published in other sources if extracted on a different date.

Figure 28: Trends in provincial health expenditure on district health services by sub-programme (Rand billion, real 2012/13 prices), percentage change (real terms) since 2005/06 and sub-programme expenditure as % of DHS, 2005/06–2012/13



Source: National Treasury (BAS).

Table 48: Health financing indicators by province

	EC	FS	GP	KZN	LP	MP	NC	NW	WC	SA	Ref
Claims ratio (%)											
2010	-	-	-	-	-	-	-	-	-	87.3	a
2011	-	-	-	-	-	-	-	-	-	86.5	b
2012	-	-	-	-	-	-	-	-	-	87.7	c
Health as percentage of total expenditure											
2013 Budget	-	-	-	-	-	-	-	-	-	14.6	d
Health expenditure % of GDP											
2010 Private sector	-	-	-	-	-	-	-	-	-	4.7	d
2010 Public sector	-	-	-	-	-	-	-	-	-	4.1	d
2010 Total	-	-	-	-	-	-	-	-	-	8.8	d
2011 Private sector	-	-	-	-	-	-	-	-	-	4.6	d
2011 Public sector	-	-	-	-	-	-	-	-	-	4.2	d
2011 Total	-	-	-	-	-	-	-	-	-	8.8	d
2012 Private sector	-	-	-	-	-	-	-	-	-	4.4	d
2012 Public sector	-	-	-	-	-	-	-	-	-	4.2	d
2012 Total	-	-	-	-	-	-	-	-	-	8.6	d
2013 Private sector	-	-	-	-	-	-	-	-	-	4.3	d
2013 Public sector	-	-	-	-	-	-	-	-	-	4.0	d
2013 Total	-	-	-	-	-	-	-	-	-	8.3	d
Medical scheme beneficiaries											
2010	708 097	388 514	3 010 299	1 287 219	407 410	576 026	175 318	461 521	1 294 088	8 315 718	e
2011	714 768	396 912	3 088 425	1 309 211	436 391	582 639	181 683	501 489	1 306 453	8 526 409	f
2012	709 618	408 065	3 031 940	1 366 326	452 972	621 311	198 899	533 456	1 348 800	8 679 473	g
Medical scheme coverage (%)											
2010 GHS	12.1	16.8	26.5	15.7	8.6	14.6	13.6	14.7	24.4	17.6	h
2010 med schemes	10.5	13.8	26.9	12.1	7.5	15.9	15.9	14.4	24.8	16.6	i
2011 GHS	11.1	17.0	23.9	12.3	7.2	14.4	13.0	13.6	25.1	16.1	j
2011 med schemes	10.9	14.5	25.3	12.8	8.1	14.5	15.9	14.3	22.6	16.5	k
2012 GHS	10.9	18.1	29.0	12.3	8.0	14.5	18.9	14.1	25.2	17.9	l
2012 med schemes	10.8	14.8	24.3	13.2	8.3	15.2	17.2	15.0	22.8	16.6	m
Pensioner ratio (%)											
2010	-	-	-	-	-	-	-	-	-	6.5	a
2011	-	-	-	-	-	-	-	-	-	6.6	b
2012	-	-	-	-	-	-	-	-	-	7.1	c
Per capita expenditure (non-hospital PHC)											
2010 real 2012/13 prices	684	656	756	632	582	568	800	743	805	683	n
2011 real 2012/13 prices	682	705	803	694	622	603	870	755	842	722	n
2012 real 2012/13 prices	764	740	928	744	656	643	860	802	825	780	n
Per capita health expenditure											
2010 Private (med schemes)	-	-	-	-	-	-	-	-	-	10 279	o
2010 Public total	-	-	-	-	-	-	-	-	-	2 650	p
2010 Public (provincial)	2 241	2 565	2 490	2 304	2 114	2 113	2 691	2 094	3 138	2 384	q
2011 Private (med schemes)	-	-	-	-	-	-	-	-	-	11 084	r
2011 Public (provincial)	2 536	2 820	2 882	2 668	2 367	2 277	3 083	2 166	3 241	2 667	q
2012 Private (med schemes)	-	-	-	-	-	-	-	-	-	12 008	s
2012 Public (provincial)	2 659	3 386	3 033	3 022	2 559	2 153	3 394	2 305	3 307	2 857	q

Reference notes (indicator definitions from page 328 and bibliography of reference sources from page 335):

a Medical Schemes 2010–11.
b Medical Schemes 2011–12.
c Medical Schemes 2012–13.
d National Treasury. For 2010/11 to 2013/14 financial years.
e Medical Schemes 2010–11. SA total includes 7 226 beneficiaries outside SA. Provincial numbers are calculated primarily on the basis of the location of principal members.
f Medical Schemes 2011–12. SA total includes 8 438 beneficiaries outside SA. Provincial numbers are calculated primarily on the basis of the location of principal members.
g Medical Schemes 2012–13. SA total includes 8 086 beneficiaries outside SA. Provincial numbers are calculated primarily on the basis of the location of principal members.
h Stats SA GHS 2010.
i Medical Schemes 2010–11. Calculated from Medical Schemes beneficiaries per population from Stats SA mid-year estimates for 2010.
j Stats SA GHS 2011.
k Medical Schemes 2011–12. Calculated from Medical Schemes beneficiaries per population from Stats SA mid-year estimates for 2011 (updated in 2013).
l Stats SA GHS 2012.
m Medical Schemes 2012–13. Calculated from Medical Schemes beneficiaries per population from Stats SA mid-year estimates for 2012 (updated in 2013).
n DHB 2012/13. Data extracted June 2013. Data for financial year from April of the year to March of the following year (not calendar year).
o Medical Schemes 2010–11. Calculated from average benefits paid per beneficiary per month (R856.6) x 12.

p National Treasury. Total public sector health including NDoH, LG, Defence etc. For 2010/11 financial year.

q National Treasury. Calculated from provincial expenditure (National Treasury) per uninsured population. For 2010/11-2012/13 financial years in nominal prices.

r Medical Schemes 2011–12. Calculated from average benefits paid per beneficiary per month R923.70 x 12.

s Medical Schemes 2012–13. Average benefits paid per beneficiary per annum.

Acknowledgements

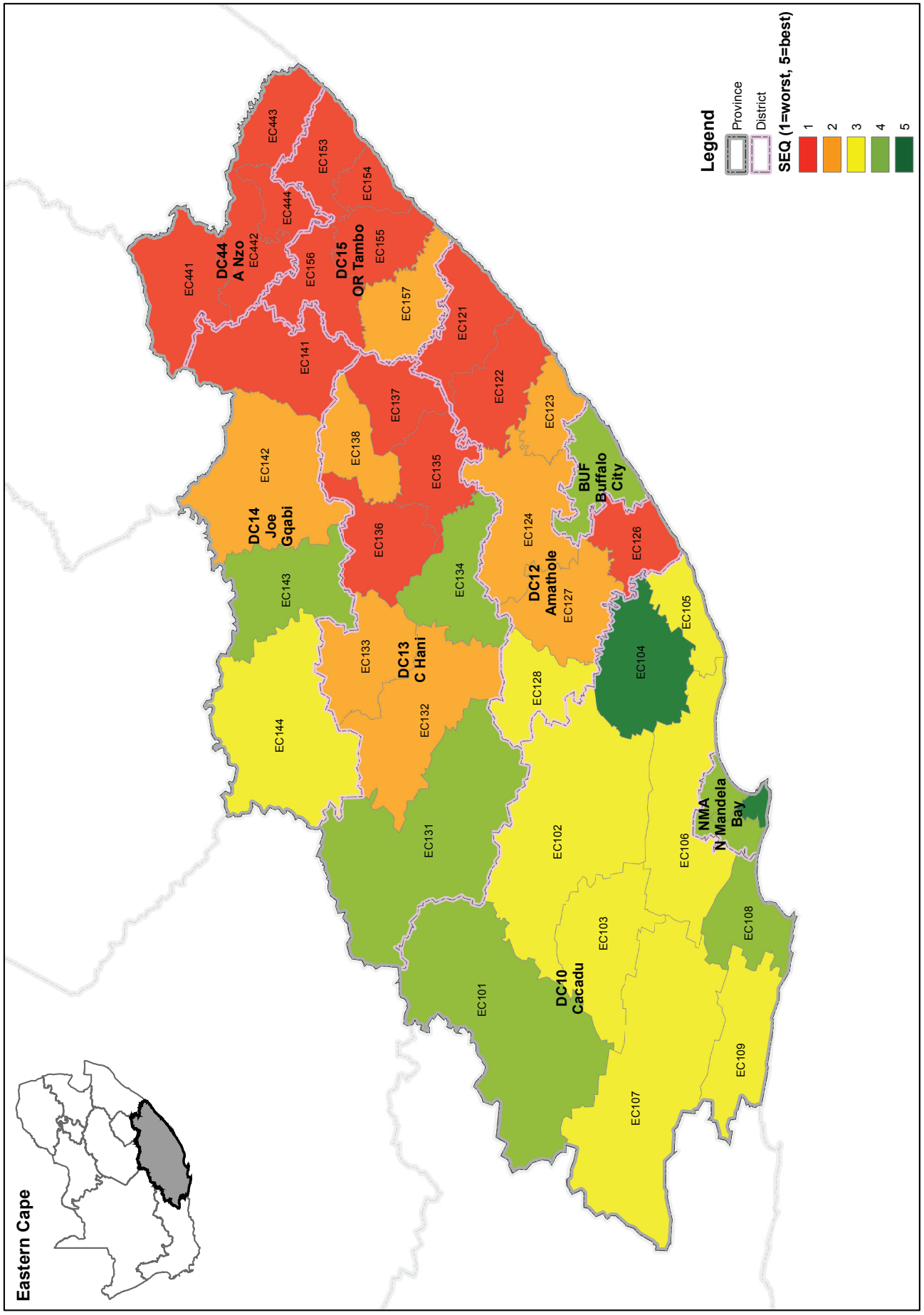
As in previous editions, this chapter is very much the product of collective efforts at all levels of the health system over many years. In particular, we acknowledge the National and Provincial Departments of Health for the use of data from the District Health Information System and various other databases and publications. Other people and institutions have also contributed significantly. Thanks are due to Algernon Africa for data capture. We also appreciate the perceptive review comments and strategic inputs of the team of reviewers (Peter Barron, Independent Public Health Consultant; and Shelley McGee, Health Economist, Priority Cost-Effective Lessons for Systems Strengthening (PRICELESS)).

Appendices

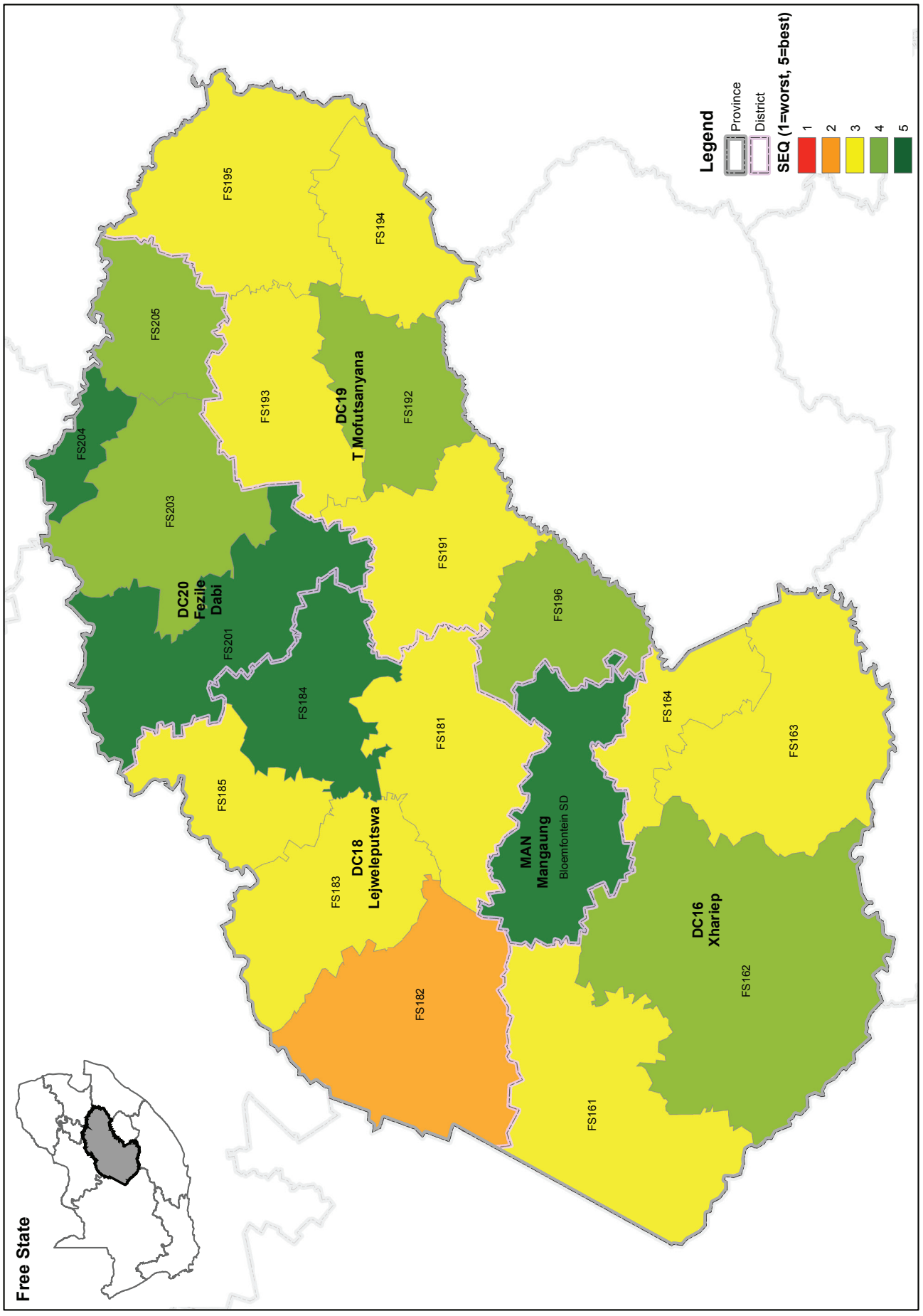
Provincial maps

The maps show the district and sub-district boundaries according to the demarcation that came into effect with the local government elections in May 2011. The boundaries of wards and districts are determined by the Municipal Demarcation Board (MDB). As at September 2010, the MDB demarcated 4 277 wards in 231 local municipalities within eight metropolitan councils and 45 districts. Wards are voting areas, as used by the Independent Electoral Commission, and have been identified in the PHC Re-engineering Strategy as the level of service delivery for PHC outreach teams. The socio-economic quintile of each municipality is shown according to the South African Index of Multiple Deprivation (SAIMD) 2011 (Maps 2–10).[379] Table 49 also reflects the Census 2011 population, population density per municipality and the SAIMD rank order.

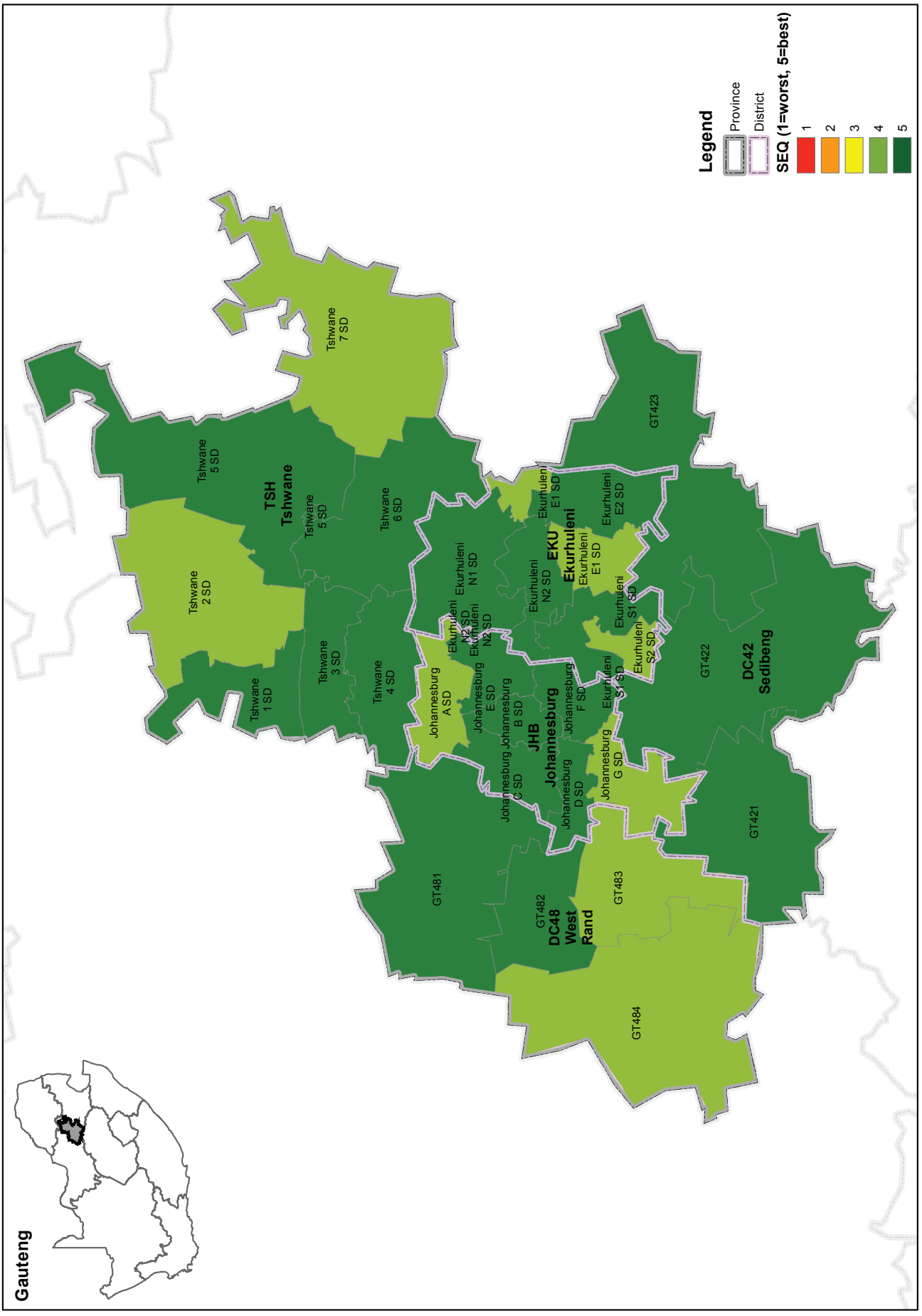
Map 2: Districts and municipalities of the Eastern Cape showing socio-economic quintiles (SAIMD 2011), 2011 boundaries



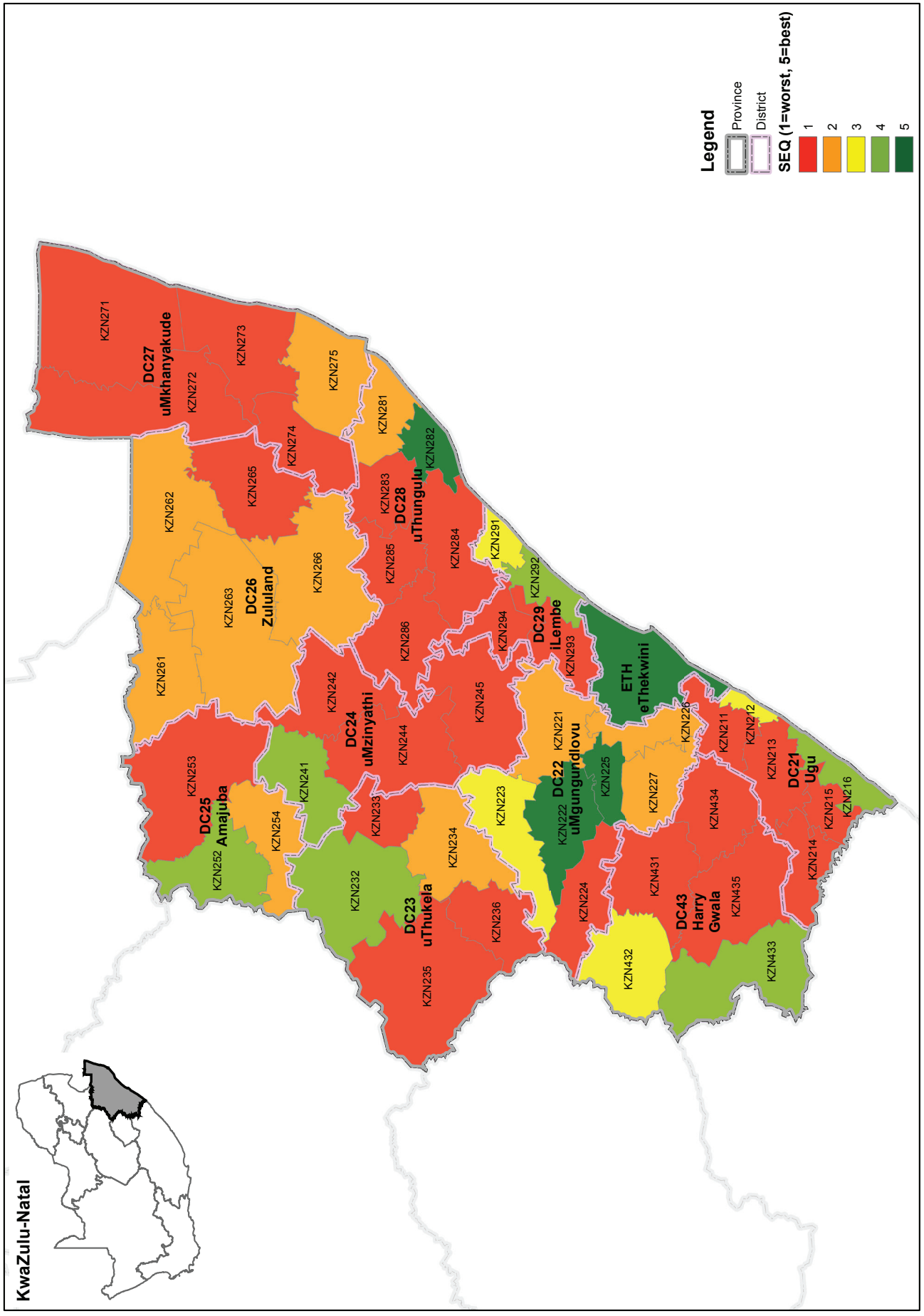
Map 3: Districts and municipalities of the Free State showing socio-economic quintiles (SAIMD 2011), 2011 boundaries



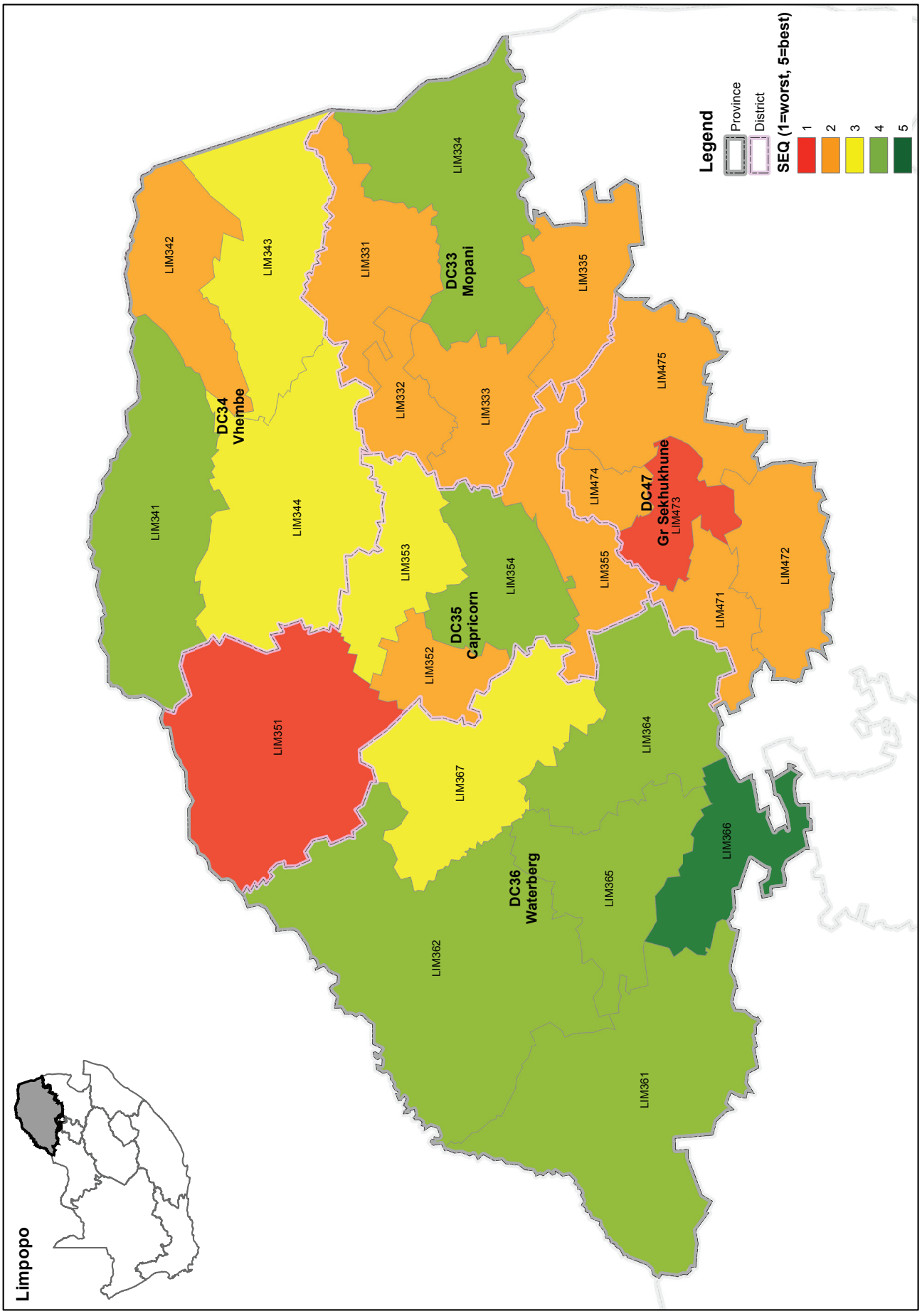
Map 4: Districts and municipalities of Gauteng showing socio-economic quintiles (SAIMD 2011), 2011 boundaries



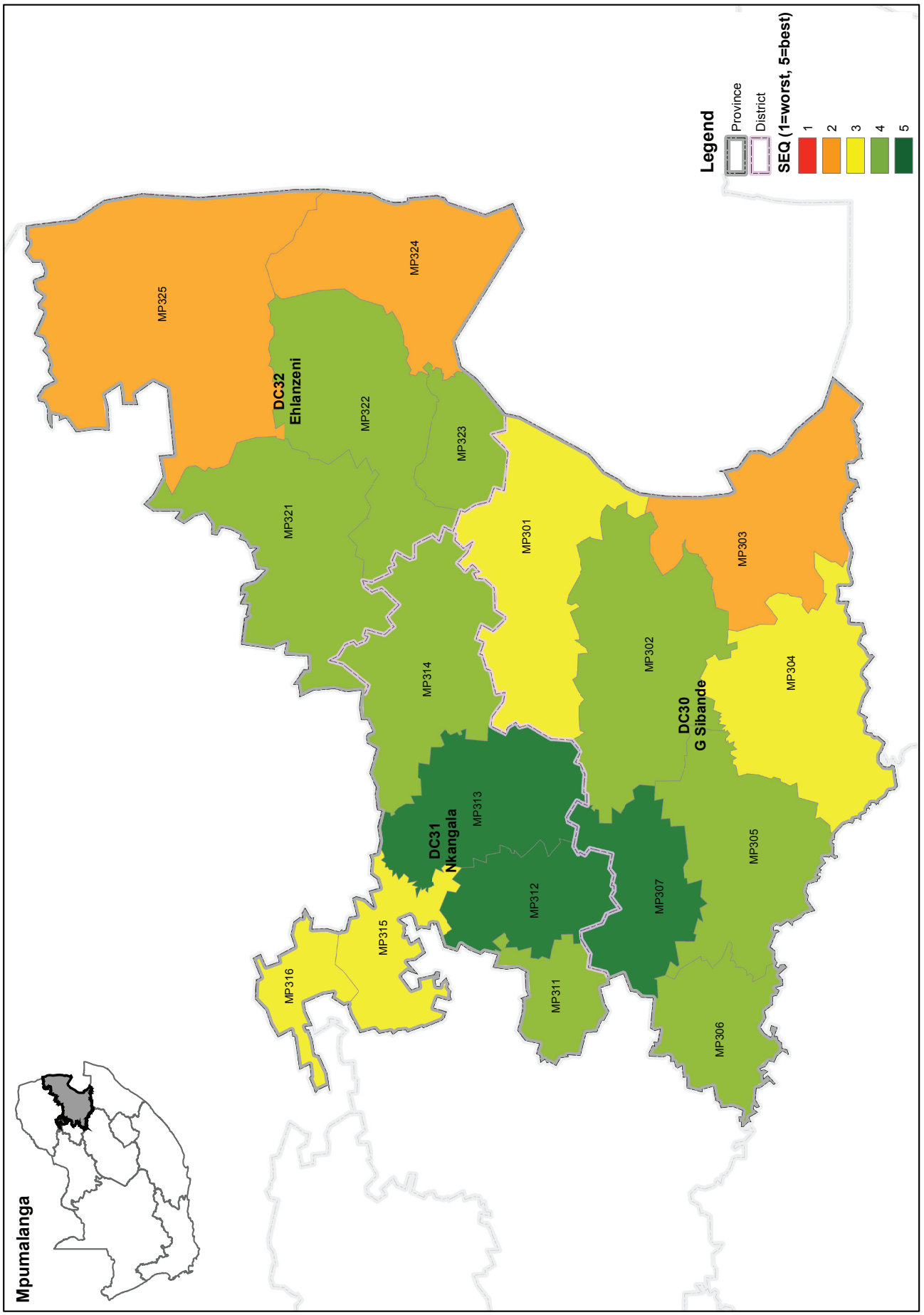
Map 5: Districts and municipalities of KwaZulu-Natal showing socio-economic quintiles (SAIMD 2011), 2011 boundaries



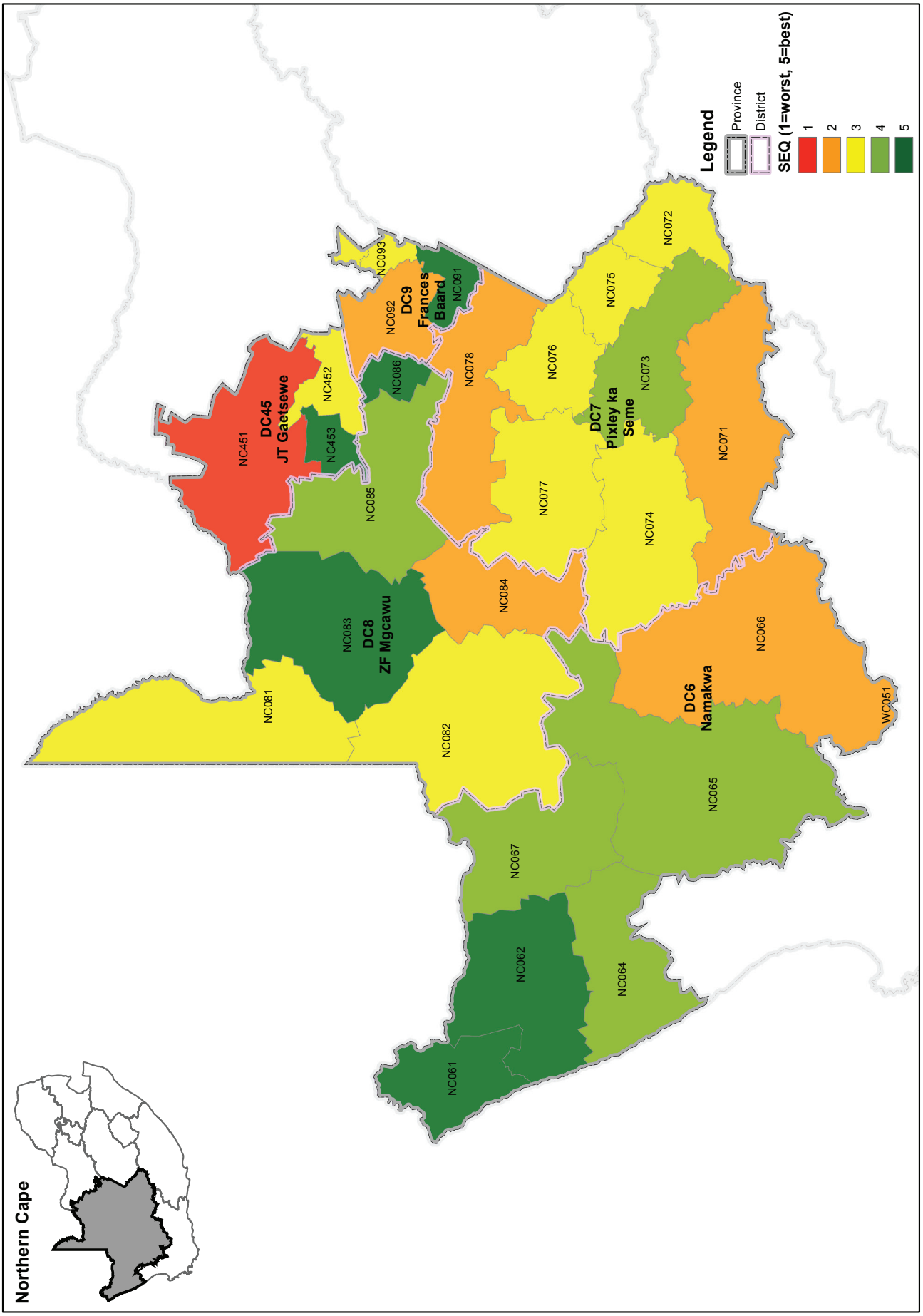
Map 6: Districts and municipalities of Limpopo showing socio-economic quintiles (SAIMD 2011), 2011 boundaries



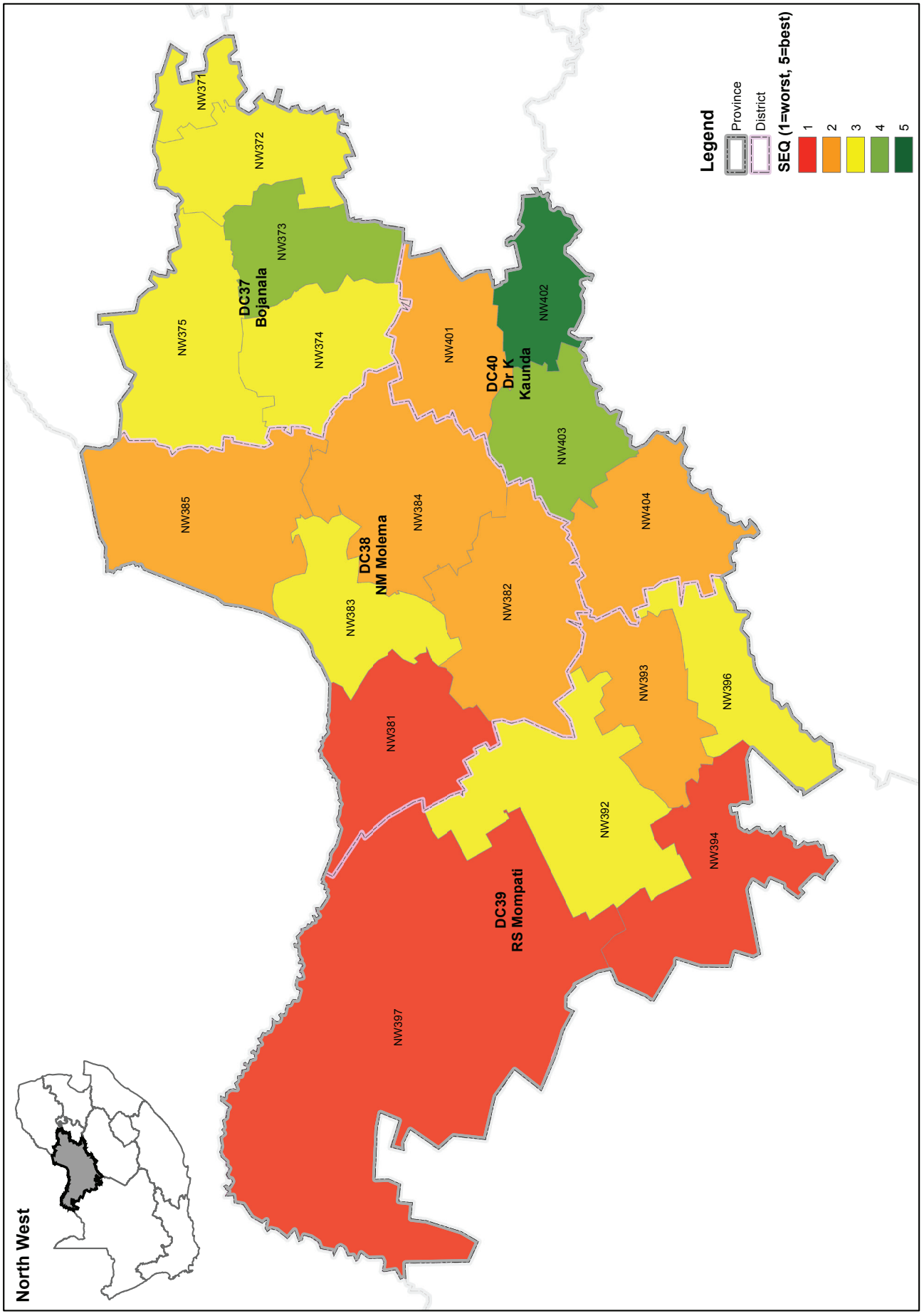
Map 7: Districts and municipalities of Mpumalanga showing socio-economic quintiles (SAIMD 2011), 2011 boundaries



Map 8: Districts and municipalities of the Northern Cape showing socio-economic quintiles (SAIMD 2011), 2011 boundaries



Map 9: Districts and municipalities of the North West showing socio-economic quintiles (SAIMD 2011), 2011 boundaries



Map 10: Districts and municipalities of the Western Cape showing socio-economic quintiles (SAIMD 2011), 2011 boundaries

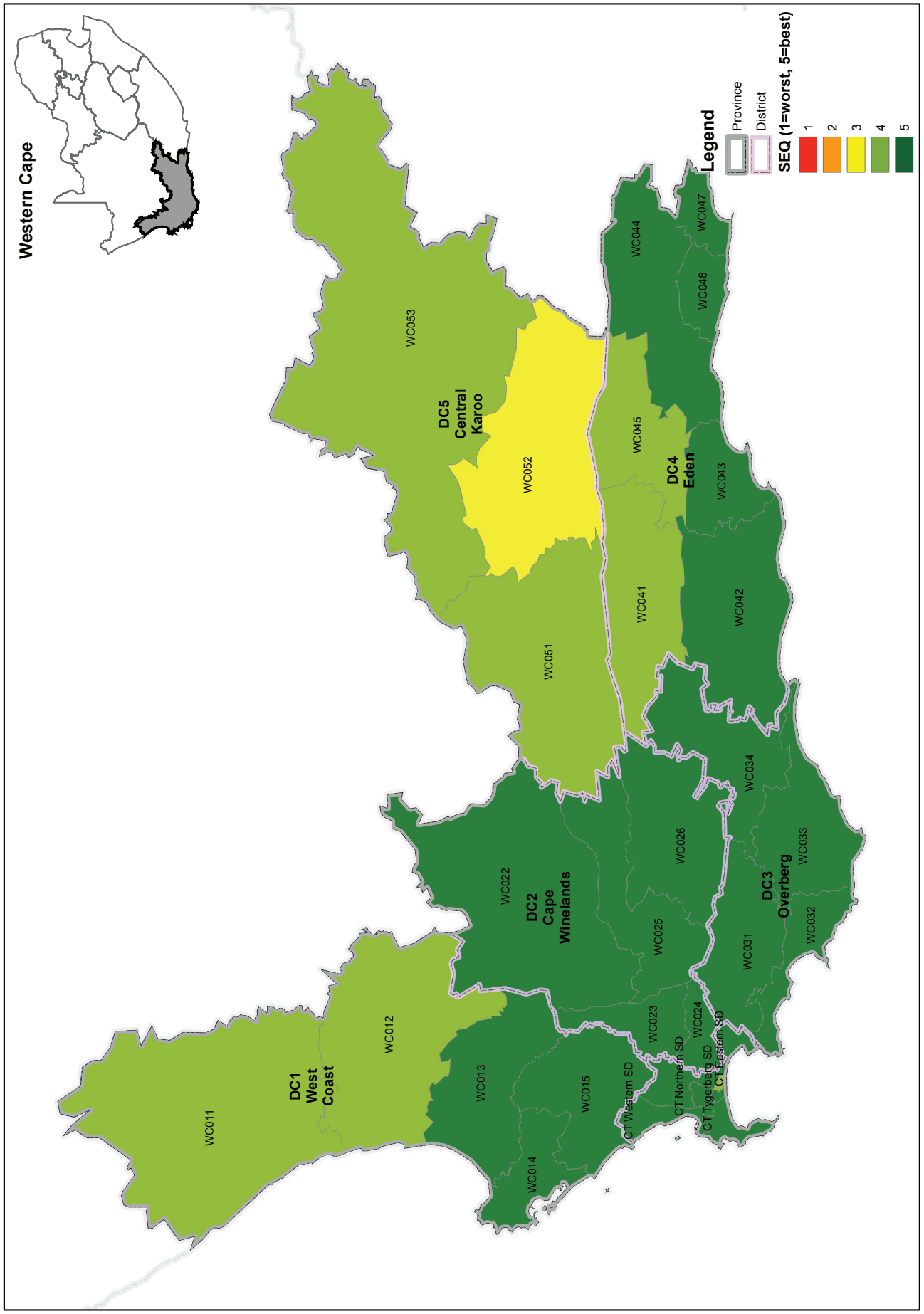


Table 49: Population and deprivation information per municipality based on Census 2011 according to the 2011 demarcation

Province	District	Municipality	Population (Census 2011)	Area (km²)	Population density	SEQ (SAIMD 2011)	Deprivation index rank (1=worst)
Eastern Cape	BUF: Buffalo City MM	BUF: Buffalo City MM	755 200	2 536	298	4	174
	DC10: Cacadu DM	EC101: Camdeboo LM	50 991	12 422	4	4	185
		EC102: Blue Crane Route LM	36 003	11 069	3	3	123
		EC103: Ikwezi LM	10 540	4 563	2	3	119
		EC104: Makana LM	80 390	4 376	18	5	188
		EC105: Ndlambe LM	61 175	1 841	33	3	115
		EC106: Sunday's River Valley LM	54 501	5 994	9	3	98
		EC107: Baviaans LM	17 760	11 668	2	3	129
		EC108: Kouga LM	98 557	2 670	37	4	181
		EC109: Kou-Kamma LM	40 664	3 642	11	3	136
	DC12: Amathole DM	EC121: Mbhashe LM	254 905	3 169	80	1	11
		EC122: Mnquma LM	252 392	3 270	77	1	34
		EC123: Great Kei LM	38 992	1 736	22	2	52
		EC124: Amahlathi LM	122 779	4 820	25	2	54
		EC126: Ngqushwa LM	72 192	2 241	32	1	39
		EC127: Nkonkobe LM	127 117	3 626	35	2	74
		EC128: Nxuba LM	24 263	2 732	9	3	113
	DC13: C Hani DM	EC131: Inxuba Yethemba LM	65 557	11 663	6	4	154
		EC132: Tsolwana LM	33 281	6 087	5	2	60
		EC133: Inkwanca LM	21 972	3 584	6	2	80
		EC134: Lukhanji LM	190 722	3 813	50	4	155
		EC135: Intsika Yethu LM	145 373	2 711	54	1	13
		EC136: Emalahleni LM	119 460	3 447	35	1	22
		EC137: Engcobo LM	155 514	2 484	63	1	9
		EC138: Sakhisizwe LM	63 579	2 355	27	2	55
	DC14: Joe Gqabi DM	EC141: Elundini LM	138 139	5 065	27	1	16
		EC142: Senqu LM	134 151	7 329	18	2	48
		EC143: Maletswai LM	43 802	4 358	10	4	156
		EC144: Gariep LM	33 677	8 911	4	3	103
	DC15: OR Tambo DM	EC153: Ngquza Hill LM	278 481	2 477	112	1	7
		EC154: Port St Johns LM	156 140	1 291	121	1	3
		EC155: Nyandeni LM	290 388	2 474	117	1	23
		EC156: Mhlontlo LM	188 228	2 826	67	1	17
		EC157: King Sabata Dalindyebo LM	451 710	3 027	149	2	68
	DC44: A Nzo DM	EC441: Matatiele LM	203 843	4 352	47	1	33
		EC442: Umzimvubu LM	191 623	2 577	74	1	24
		EC443: Mbizana LM	281 907	2 417	117	1	6
		EC444: Ntabankulu LM	123 977	1 385	90	1	2
	NMA: N Mandela Bay MM	NMA: N Mandela Bay MM	1 152 114	1 959	588	5	209
Free State	DC16: Xhariep DM	FS161: Letsemeng LM	38 626	9 829	4	3	111
		FS162: Kopanong LM	49 170	15 645	3	4	152
		FS163: Mohokare LM	34 147	8 776	4	3	96
		FS164: Naledi LM (fs)	24 315	3 424	7	3	124
	DC18: Lejweleputswa DM	FS181: Masilonyana LM	63 335	6 796	9	3	139
		FS182: Tokologo LM	28 986	9 326	3	2	64
		FS183: Tswelopele LM	47 626	6 524	7	3	117
		FS184: Matjhabeng LM	406 460	5 155	79	5	193
		FS185: Nala LM	81 221	4 129	20	3	125
	DC19: T Mofutsanyana DM	FS191: Setsoto LM	112 597	5 966	19	3	128
		FS192: Dihlabeng LM	128 702	4 880	26	4	176
		FS193: Nketoana LM	60 324	5 611	11	3	131
		FS194: Maluti a Phofung LM	335 785	4 338	77	3	134
		FS195: Phumelela LM	47 772	8 183	6	3	106
		FS196: Mantsopa LM	51 056	4 291	12	4	159
	DC20: Fezile Dabi DM	FS201: Moqhaka LM	160 530	7 925	20	5	195
		FS203: Ngwathe LM	120 519	7 055	17	4	165
		FS204: Metsimaholo LM	149 107	1 717	87	5	202
		FS205: Mafube LM	57 876	3 971	15	4	141
	MAN: Mangaung MM	MAN: Mangaung MM	747 433	6 284	119	5	212

Province	District	Municipality	Population (Census 2011)	Area (km²)	Population density	SEQ (SAIMD 2011)	Deprivation index rank (1=worst)
Gauteng	DC42: Sedibeng DM	GT421: Emfuleni LM	721 664	966	747	5	224
		GT422: Midvaal LM	95 302	1 722	55	5	218
		GT423: Lesedi LM	99 524	1 484	67	5	210
	DC48: West Rand DM	GT481: Mogale City LM	362 422	1 342	270	5	214
		GT482: Randfontein LM	149 286	475	314	5	219
		GT483: Westonaria LM	111 769	640	175	4	144
		GT484: Merafong City LM	197 520	1 631	121	4	177
	EKU: Ekurhuleni MM	EKU: Ekurhuleni MM	3 178 472	1 975	1 609	5	217
	JHB: Johannesburg MM	JHB: Johannesburg MM	4 434 829	1 645	2 696	5	233
	TSH: Tshwane MM	TSH: Tshwane MM	2 921 490	6 298	464	5	228
KwaZulu-Natal	DC21: Ugu DM	KZN211: Vulamehlo LM	77 403	960	81	1	4
		KZN212: Umdoni LM	78 875	252	314	3	135
		KZN213: Umzumbe LM	160 974	1 259	128	1	20
		KZN214: uMuziwabantu LM	96 557	1 089	89	1	36
		KZN215: Ezinqoleni LM	52 541	648	81	1	47
		KZN216: Hibiscus Coast LM	256 136	839	305	4	145
	DC22: uMgungundlovu DM	KZN221: uMshwathi LM	106 374	1 818	59	2	63
		KZN222: uMngeni LM	92 709	1 567	59	5	196
		KZN223: Mooi Mpofana LM	38 102	1 820	21	3	107
		KZN224: Impendle LM	33 103	1 528	22	1	40
		KZN225: The Msunduzi LM	618 538	634	976	5	198
		KZN226: Mkhambathini LM	63 140	891	71	2	53
		KZN227: Richmond LM	65 794	1 256	52	2	73
	DC23: uThukela DM	KZN232: Emnambithi LM	237 438	2 965	80	4	143
		KZN233: Indaka LM	103 118	992	104	1	28
		KZN234: Umtshezi LM	83 158	1 972	42	2	88
		KZN235: Okhahlamba LM	132 070	3 971	33	1	43
		KZN236: Imbabazane LM	113 075	1 426	79	1	44
	DC24: uMzinyathi DM	KZN241: Endumeni LM	64 864	1 610	40	4	184
		KZN242: Nquthu LM	165 308	1 962	84	1	21
		KZN244: Msinga LM	177 580	2 501	71	1	1
		KZN245: Umvoti LM	103 096	2 516	41	1	41
	DC25: Amajuba DM	KZN252: Newcastle LM	363 234	1 855	196	4	164
		KZN253: Emadlangeni LM	34 442	3 539	10	1	46
		KZN254: Dannhauser LM	102 160	1 516	67	2	61
	DC26: Zululand DM	KZN261: eDumbe LM	82 050	1 943	42	2	51
		KZN262: uPhongolo LM	127 239	3 239	39	2	58
		KZN263: Abaqulusi LM	211 060	4 185	50	2	83
		KZN265: Nongoma LM	194 909	2 182	89	1	27
		KZN266: Ulundi LM	188 319	3 250	58	2	49
	DC27: uMkhanyakude DM	KZN271: Umhlabuyalingana LM	156 736	4 402	36	1	8
		KZN272: Jozini LM	186 503	3 442	54	1	15
		KZN273: The Big 5 LM	35 257	2 487	14	1	29
		KZN274: Hlabisa LM	71 924	1 555	46	1	25
		KZN275: Mtubatuba LM	175 425	1 970	89	2	56
	DC28: uThungulu DM	KZN281: Mbonambi LM	122 886	1 210	102	2	76
		KZN282: uMhlathuze LM	334 456	793	422	5	191
		KZN283: Ntambanana LM	74 335	1 083	69	1	32
		KZN284: uMlalazi LM	213 603	2 214	96	1	37
		KZN285: Mthonjaneni LM	47 820	1 086	44	1	35
		KZN286: Nkandla LM	114 416	1 828	63	1	10
	DC29: iLembe DM	KZN291: Mandeni LM	138 077	545	253	3	104
		KZN292: KwaDukuza LM	231 188	735	315	4	150
		KZN293: Ndwedwe LM	140 823	1 093	129	1	12
		KZN294: Maphumulo LM	96 726	896	108	1	5
	DC43: Harry Gwala DM	KZN431: Ingwe LM	100 548	1 976	51	1	19
		KZN432: Kwa Sani LM	12 896	1 852	7	3	95
		KZN433: Gr Kokstad LM	65 978	2 680	25	4	160
		KZN434: Ubuhlebezwe LM	101 690	1 604	63	1	31
		KZN435: Umzimkhulu LM	180 300	2 435	74	1	18
	ETH: eThekwini MM	ETH: eThekwini MM	3 442 360	2 291	1 502	5	207

Province	District	Municipality	Population (Census 2011)	Area (km²)	Population density	SEQ (SAIMD 2011)	Deprivation index rank (1=worst)
Limpopo	DC33: Mopani DM	LIM331: Greater Giyani LM	244 219	4 172	59	2	67
		LIM332: Greater Letaba LM	212 702	1 891	112	2	72
		LIM333: Greater Tzaneen LM	390 097	3 243	120	2	89
		LIM334: Ba-Phalaborwa LM	150 637	7 462	20	4	153
		LIM335: Maruleng LM	94 857	3 244	29	2	77
	DC34: Vhembe DM	LIM341: Musina LM	68 361	7 577	9	4	157
		LIM342: Mutale LM	91 870	3 886	24	2	79
		LIM343: Thulamela LM	618 464	5 834	106	3	93
		LIM344: Makhado LM	516 033	8 300	62	3	114
	DC35: Capricorn DM	LIM351: Blouberg LM	162 629	9 248	18	1	45
		LIM352: Aganang LM	131 164	1 881	70	2	85
		LIM353: Molemole LM	108 319	3 347	32	3	99
		LIM354: Polokwane LM	629 000	3 766	167	4	158
		LIM355: Lepelle-Nkumpi LM	230 348	3 463	67	2	90
	DC36: Waterberg DM	LIM361: Thabazimbi LM	85 233	11 190	8	4	172
		LIM362: Lephalale LM	115 769	13 784	8	4	168
		LIM364: Mookgophong LM	35 639	5 689	6	4	148
		LIM365: Modimolle LM	68 517	4 678	15	4	149
		LIM366: Bela-Bela LM	66 502	3 406	20	5	192
		LIM367: Mogalakwena LM	307 683	6 166	50	3	120
	DC47: Gr Sekhukhune DM	LIM471: Ephraim Mogale LM	123 649	2 011	61	2	57
		LIM472: E Motsoaledi LM	249 365	3 713	67	2	65
		LIM473: Makhuduthamaga LM	274 359	2 097	131	1	42
		LIM474: Fetakgomo LM	93 793	1 105	85	2	62
		LIM475: Gr Tubatse LM	335 675	4 602	73	2	69
Mpumalanga	DC30: G Sibande DM	MP301: Albert Luthuli LM	186 012	5 559	33	3	108
		MP302: Msukaligwa LM	149 378	6 016	25	4	163
		MP303: Mkhondo LM	171 983	4 882	35	2	75
		MP304: Pixley Ka Seme LM	83 237	5 227	16	3	112
		MP305: Lekwa LM	115 661	4 585	25	4	187
		MP306: Dipaleseng LM	42 388	2 617	16	4	147
		MP307: Govan Mbeki LM	294 537	2 955	100	5	204
	DC31: Nkangala DM	MP311: Victor Khanye LM	75 451	1 568	48	4	171
		MP312: Emalahleni LM	395 467	2 678	148	5	201
		MP313: Steve Tshwete LM	229 831	3 976	58	5	227
		MP314: Emakhazeni LM	47 217	4 736	10	4	183
		MP315: Thembisile Hani LM	310 457	2 384	130	3	138
		MP316: Dr JS Moroka LM	249 707	1 416	176	3	122
	DC32: Ehlanzeni DM	MP321: Thaba Chweu LM	98 386	5 719	17	4	162
		MP322: Mbombela LM	588 794	5 394	109	4	180
		MP323: Umjindi LM	69 575	1 745	40	4	182
		MP324: Nkomazi LM	390 611	4 787	82	2	84
		MP325: Bushbuckridge LM	541 248	10 250	53	2	78

Province	District	Municipality	Population (Census 2011)	Area (km^2)	Population density	SEQ (SAIMD 2011)	Deprivation index rank (1=worst)
North West	DC37: Bojanala DM	NW371: Moretele LM	186 947	1 379	136	3	121
		NW372: Madibeng LM	477 380	3 839	124	3	137
		NW373: Rustenburg LM	549 575	3 423	161	4	179
		NW374: Kgetleng Rivier LM	51 047	3 973	13	3	97
		NW375: Moses Kotane LM	242 552	5 719	42	3	118
	DC38: NM Molema DM	NW381: Ratlou LM	107 338	4 884	22	1	14
		NW382: Tswaing LM	124 213	5 966	21	2	50
		NW383: Mahikeng LM	291 527	3 698	79	3	126
		NW384: Ditsobotla LM	168 902	6 465	26	2	81
		NW385: R Moiloa LM	150 712	7 193	21	2	59
	DC39: RS Mompati DM	NW392: Naledi LM (nw)	66 781	6 941	10	3	130
		NW393: Mamusa LM	60 355	3 615	17	2	71
		NW394: Greater Taung LM	177 642	5 635	32	1	38
		NW396: Lekwa-Teemane LM	53 252	3 681	14	3	105
		NW397: Kagisano-Molopo LM	105 787	23 827	4	1	30
	DC40: Dr K Kaunda DM	NW401: Ventersdorp LM	56 700	3 764	15	2	70
		NW402: Tlokwe LM	162 759	2 674	61	5	216
		NW403: Matlosana LM	398 677	3 561	112	4	186
		NW404: Maquassi Hills LM	77 793	4 643	17	2	86
Northern Cape	DC6: Namakwa DM	NC061: Richtersveld LM	11 982	9 608	1	5	225
		NC062: Nama Khoi LM	47 043	17 989	3	5	222
		NC064: Kamiesberg LM	10 186	14 210	1	4	142
		NC065: Hantam LM	21 579	36 128	1	4	151
		NC066: Karoo Hoogland LM	12 588	32 274	0	2	91
		NC067: Khâi-Ma LM	12 463	16 628	1	4	170
	DC7: Pixley ka Seme DM	NC071: Ubuntu LM	18 602	20 389	1	2	92
		NC072: Umsobomvu LM	28 375	6 819	4	3	133
		NC073: Emthanjeni LM	42 353	13 472	3	4	169
		NC074: Kareeberg LM	11 670	17 702	1	3	101
		NC075: Renosterberg LM	10 979	5 527	2	3	109
		NC076: Thembelihle LM	15 699	8 023	2	3	94
		NC077: Siyathemba LM	21 588	14 725	1	3	127
		NC078: Siyancuma LM	37 074	16 753	2	2	87
	DC8: ZF Mgcawu DM	NC081: Mier LM	7 001	22 468	0	3	100
		NC082: Kai !Garib LM	65 871	26 358	2	3	110
		NC083: !Khara Hais LM	93 493	21 780	4	5	199
		NC084: !Kheis LM	16 637	11 108	1	2	66
		NC085: Tsantsabane LM	35 097	18 333	2	4	175
		NC086: Kgatelopele LM	18 690	2 478	8	5	189
	DC9: Frances Baard DM	NC091: Sol Plaatjie LM	248 040	3 145	79	5	203
		NC092: Dikgatlong LM	46 839	7 315	6	2	82
		NC093: Magareng LM	24 201	1 542	16	3	116
		NC094: Phokwane LM	63 000	834	76	3	102
	DC45: JT Gaetsewe DM	NC451: Joe Morolong LM	89 528	20 172	4	1	26
		NC452: Ga-Segonyana LM	93 656	4 492	21	3	132
		NC453: Gamagara LM	41 617	2 619	16	5	194

Province	District	Municipality	Population (Census 2011)	Area (km²)	Population density	SEQ (SAIMD 2011)	Deprivation index rank (1=worst)
Western Cape	CPT: Cape Town MM	CPT: Cape Town MM	3 740 024	2 440	1 533	5	234
	DC1: West Coast DM	WC011: Matzikama LM	67 147	12 981	5	4	173
		WC012: Cederberg LM	49 768	8 007	6	4	161
		WC013: Bergrivier LM	61 895	4 407	14	5	215
		WC014: Saldanha Bay LM	99 193	2 015	49	5	232
		WC015: Swartland LM	113 763	3 713	31	5	221
	DC2: Cape Winelands DM	WC022: Witzenberg LM	115 946	10 753	11	5	190
		WC023: Drakenstein LM	251 261	1 538	163	5	231
		WC024: Stellenbosch LM	155 732	831	187	5	230
		WC025: Breede Valley LM	166 828	3 834	44	5	213
		WC026: Langeberg LM	97 722	4 518	22	5	200
	DC3: Overberg DM	WC031: Theewaterskloof LM	108 792	3 232	34	5	206
		WC032: Overstrand LM	80 432	1 708	47	5	226
		WC033: Cape Agulhas LM	33 036	3 467	10	5	223
		WC034: Swellendam LM	35 915	3 835	9	5	197
	DC4: Eden DM	WC041: Kannaland LM	24 766	4 758	5	4	166
		WC042: Hessequa LM	52 643	5 733	9	5	220
		WC043: Mossel Bay LM	89 432	2 011	44	5	229
		WC044: George LM	193 671	5 191	37	5	211
		WC045: Oudtshoorn LM	95 933	3 537	27	4	178
		WC047: Bitou LM	49 159	992	50	5	205
		WC048: Knysna LM	68 657	1 109	62	5	208
	DC5: Central Karoo DM	WC051: Laingsburg LM	8 289	8 784	1	4	146
		WC052: Prince Albert LM	13 136	8 153	2	3	140
		WC053: Beaufort West LM	49 585	21 917	2	4	167
South Africa			51 770 576	1 220 813	42		

Source: Census 2011,[31] South African Index of Multiple Deprivation 2011.[50]

Note: Socio-economic quintiles (SEQ) based on rank order of average deprivation calculated by South African Index of Multiple Deprivation (SAIMD) based on selected Census 2011 variables.
Rank 1 = most deprived, rank 234 = least deprived. SEQ 1 = most deprived, SEQ 5 = least deprived.

National Indicator Data Set 2013 indicators, effective April 2013

The following indicators are included in the 2013 National Indicator Data Set (NIDS) to be collected from April 2013. The first financial year of data from this set will become available around June 2014.

Overview

Core Health Facility – Monthly	
Child Health	11
Chronic	12
EPI	15
HIV	8
Management Inpatients	5
Management PHC	8
Maternal & Women's Health	27
Nutrition	4
Oral	3
Quality	2
TB	6
TOTAL	**101**

Core Health Facility – Quarterly	
ART Baseline	22
ART 3 months – repeated at durations	8
ART 6 months – repeated at durations	4
Quality	1
TB	13
Total	**48**

Non-Facility Health Services – Monthly	
Environmental Health Services (EHS)	14
Emergency Medical Services (EMS)	8
Integrated School Health Programme (ISHP)	15
Ward-Based Outreach Team (WBOT)	15
Total	**52**

Count Indicators (listed under Data Elements)	
ART	6
HIV	1
TOTAL	**7**

NOTE:	
1	While all school health elements and indicators are essential for monitoring school health services at all levels, only four indicators will be extracted from the DHIS ISHP database at National Level for overall monitoring and reporting purposes.
2	While all ward-based PHC outreach team (WBOT) elements and indicators are essential for monitoring outreach services at all level, only seven indicators will be extracted from the DHIS WBOT database at National Level for overall monitoring and reporting purposes.

	Indicator Name	Numerator	Denominator	Definition
ART at 3 months	Adult on second-line regimen (SLR) at 3 months rate	Adult on second-line regimen (SLR) at xx months	Adult First-line regimen + Second-line regimen + Stopped at intervals	Proportion of adults on second-line regimen after a period of time. This shows retention in care and if this percentage increases over time, it shows that clients may be building more resistance to first-line drug regimens.
	Adult percentage on ART after 3 months	Adult TOT minus cumulative LTF minus cumulative RIP minus cumulative TFO	Adult cumulative started ART minus cumulative TFO	Cumulative Proportion of adults on treatment after interval. This value will enable the programme to assess retention on treatment over time. * Note that the TFO, LTF and RIP used in the formula are the cumulative totals of all clients who left care to that point, as opposed to the total in the most recent interval.
	Adult percentage died after 3 months ART	Adult cumulative RIP	Adult cumulative started ART minus cumulative TFO	Cumulative Proportion of adults who died after interval. At different time intervals, the cumulative deaths can be analysed. * Note that the TFO, LTF and RIP used in the formula are the cumulative totals of all clients who left care to that point, as opposed to the total in the most recent interval.
	Adult percentage lost to follow-up after 3 months ART	Adult cumulative LTF	Adult cumulative started ART minus cumulative TFO	Cumulative Proportion of adults who were lost to follow-up after interval. At different time intervals, the cumulative deaths can be analysed. * Note that the TFO, LTF and RIP used in the formula are the cumulative totals of all clients who left care to that point, as opposed to the total in the most recent interval.
	Child on second-line regimen (SLR) at 3 months rate	Child under 15 years on second-line regimen (SLR) at 3 months	Child First-line regimen + Second-line regimen + Stopped at intervals	Proportion of children under 15 years on second-line regimen after a period of time. This shows retention in care and if this percentage increases over time, it shows that clients may be building more resistance to first-line drug regimens.
	Child under 15 years percentage on ART after 3 months	Child TOT minus cumulative LTF minus cumulative RIP minus cumulative TFO	Child under 15 years started ART minus cumulative TFO	Cumulative Proportion of children under 15 years on treatment after interval. This value will enable the programme to assess retention on treatment over time. * Note that the TFO, LTF and RIP used in the formula are the cumulative totals of all clients who left care to that point, as opposed to the total in the most recent interval.
	Child under 15 years percentage died after 3 months ART	Child cumulative RIP	Child under 15 years started ART minus cumulative TFO	Cumulative Proportion of children under 15 years who died after interval. At different time intervals, the cumulative deaths can be analysed. * Note that the TFO, LTF and RIP used in the formula are the cumulative totals of all clients who left care to that point, as opposed to the total in the most recent interval.
	Child under 15 years percentage lost to follow-up after 3 months ART	Child cumulative LTF	Child under 15 years started ART minus cumulative TFO	Cumulative Proportion of children under 15 years who were lost to follow-up after interval. This value shows the attrition of the programme of clients who have not attended services for longer than 90 days.* Note that the TFO, LTF and RIP used in the formula are the cumulative totals of all clients who left care to that point, as opposed to the total in the most recent interval.
ART at 6 months	Adult on second-line regimen (SLR) at 6 months rate	Adult on second-line regimen (SLR) at xx months	Adult First-line regimen + Second-line regimen + Stopped at intervals	Proportion of adults on second-line regimen after a period of time. This shows retention in care and if this percentage increases over time, it shows that clients may be building more resistance to first-line drug regimens.
	Adult percentage on ART after 6 months	Adult TOT minus cumulative LTF minus cumulative RIP minus cumulative TFO	Adult cumulative started ART minus cumulative TFO	Cumulative Proportion of adults on treatment after interval. This value will enable the programme to assess retention on treatment over time. * Note that the TFO, LTF and RIP used in the formula are the cumulative totals of all clients who left care to that point, as opposed to the total in the most recent interval cumulative totals of all clients who left care to that point.
	Adult percentage died after 6 months ART	Adult cumulative RIP	Adult cumulative started ART minus cumulative TFO	Cumulative Proportion of adults who died after interval. At different time intervals the cumulative deaths can be analysed. * Note that the TFO, LTF and RIP used in the formula are the cumulative totals of all clients who left care to that point, as opposed to the total in the most recent interval.
	Adult percentage lost to follow-up after 6 months ART	Adult cumulative LTF	Adult cumulative started ART minus cumulative TFO	Cumulative Proportion of adults who were lost to follow-up after interval. This value shows the attrition of the programme of clients who have not attended services for longer than 90 days.* Note that the TFO, LTF and RIP used in the formula are the cumulative totals of all clients who left care to that point, as opposed to the total in the most recent interval.
	Adult with Viral load completion rate at 6 months	Adult viral load done (VLD) at xx months	Adult first line regimen + Adult second line regimen at intervals	Proportion of adults still on treatment who had a viral load test done at specific time intervals. This is a programme quality indicator.
	Adult with Viral load suppressed rate at 6 months	Adult viral load under 400 copies/mL (VLS) at xx months	Adult viral load done (VLD) at intervals	Proportion of adults with a viral load suppressed at different time intervals. This indicates the population-level immunological impact of clients on ART.
	Child on second-line regimen (SLR) at 6 months rate	Child under 15 years on second-line regimen (SLR) at xx months	Child First-line regimen + Second-line regimen + Stopped at intervals	Proportion of children under 15 years on second-line regimen after a period of time. This shows retention in care and if this percentage increases over time, it shows that clients may be building more resistance to first-line drug regimens.
	Child under 15 years percentage on ART after 6 months	Child TOT minus cumulative LTF minus cumulative RIP minus cumulative TFO	Child under 15 years started ART minus cumulative TFO	Cumulative Proportion of children under 15 years on treatment after interval. This value will enable the programme to assess retention on treatment over time. * Note that the TFO, LTF and RIP used in the formula are the cumulative totals of all clients who left care to that point, as opposed to the total in the most recent interval.
	Child under 15 years percentage died after 6 months ART	Child cumulative RIP	Child under 15 years started ART minus cumulative TFO	Cumulative Proportion of children under 15 years who died after interval. At different time intervals, the cumulative deaths can be analysed. * Note that the TFO, LTF and RIP used in the formula are the cumulative totals of all clients who left care to that point, as opposed to the total in the most recent interval.
ART baseline	Adult male start ART rate	Adult male started ART	Adult started on ART	Proportion of adult males who started ART. Treatment-experienced clients are excluded.

	Indicator Name	Numerator	Denominator	Definition
	Adult screened for TB at ART start rate	Adult not on TB treatment screened for TB at start of ART	Adult started on ART minus adults on TB treatment at start of ART	Proportion of adults not on tuberculosis (TB) treatment who were screened for tuberculosis at start of ART.
	Adult on TB treatment at ART start rate	Adult on TB treatment at start of ART	Adult started ART	Proportion of adults who were on tuberculosis (TB) treatment at start of ART.
	Adult on IPT at ART start rate	Adult on INH prevention therapy (IPT) at start of ART	Adult started ART	Proportion of adults who were on INH prevention therapy at start of ART.
	Adult on CPT at ART start rate	Adult on Co-trimoxazole prevention therapy (CPT) at start of ART	Adult started ART	Proportion of adults who were on Co-trimoxazole prevention therapy at start of ART.
	Pregnant female at ART start rate	Pregnant female at start of ART	Adult female started ART	Proportion of adult females who were pregnant at start of ART.
	Adult CD4 done at ART start rate	Adult CD4 done at start of ART	Adult naïve started ART	Proportion of adults who had a baseline CD4 count (BCDD) done before they started on ART.
	Adult CD4 200 to 350 cls/µl at ART start rate	Adult CD4 200 to 350 cls/µl at start of ART	Adult CD4 done at start of ART	Proportion of adults with CD4 between 200-350 cells/µl at baseline.
	Adult CD4 below 100 cls/µl at ART start rate	Adult CD4 below 100 cls/µl at start of ART	Adult CD4 done at start of ART	Proportion of adults with CD4 count below 100 cells/µl at baseline. Shows the proportion of clients starting ART who are severely immunologically compromised. If the value changes over time, the programme will be able to assess the impact of the intervention.
	Adult CD4 100 to 199 cls/µl at ART start rate	Adult CD4 100 to 199 cls/µl at start of ART	Adult CD4 done at start of ART	Proportion of adults with CD4 between 100-199 cells/µl at baseline.
	ART-experienced at ART start rate	ART-experienced (adult + child)	Adult and Child under 15 years started on ART	Proportion of clients with treatment experience at ART start.
	Child under 1 year start ART rate	Child under 1 year started ART	Child under 15 years started ART	Proportion of children under 1 year who started ART. Treatment-experienced clients are excluded.
	Child 1 to under 5 years start ART rate	Child 1-<5 years started ART	Child under 15 years started ART	Proportion of children 1-5 years who started ART. Treatment-experienced clients are excluded.
	Child 5 to under 15 years start ART rate	Child 5-<15 years started ART	Child under 15 years started ART	Proportion of children 5-15 years who started ART. Treatment-experienced clients are excluded.
	Child under 15 years screened for TB at ART start rate	Child under 15 years not on TB treatment screened for TB at start of ART	Child under 15 years started on ART minus children on TB treatment at start of ART	Proportion of children under 15 years not on tuberculosis (TB) treatment who were screened for Tuberculosis at start of ART.
	Child on TB treatment at ART start rate	Child under 15 years on TB treatment at start of ART	Child under 15 years started ART	Proportion of children under 15 years who were on TB treatment at start of ART.
	Child on IPT at ART start rate	Child under 15 years on INH prevention therapy (IPT) at start of ART	Child under 15 years started ART	Proportion of children under 15 years who were on INH prevention therapy at start of ART.
	Child under 15 years on CPT at ART start rate	Child under 15 years on Co-trimoxazole prevention therapy (CPT) at start of ART	Child under 15 years started ART	Proportion of children under 15 years who were on Co-trimoxazole prevention therapy at start of ART.
	Child under 15 years CD4 done at ART start rate	Child under 15 years CD4 done at start of ART	Child under 15 years CD4 done at start of ART	Proportion of children under 15 years who had a baseline CD4 count (BCDD) done before they started on ART.
	Child under 15 years CD4 TLC below 15pc or 100 cls/µl at ART start rate	Child under 15 years CD4 TLC below 15pc or 100 cls/µl at start of ART	Child under 15 years CD4 done at start of ART	Proportion of children under 5 years with a CD4 Total Lymphocyte Count (TLC) below 15 percent (pc) and children 5 to 15 years with a CD4 count of less than 100 cells/µl at the time of starting ART. This shows the proportion of clients starting ART who are severely immunologically compromised. If the value changes over time, the programme will be able to assess the impact of the intervention.
	Child under 15 years CD4 TLC 15-19pc or 100-199 cls/µl at ART start rate	Child under 15 years CD4 TLC 15-19pc or 100-199 cls/µl at start of ART	Child under 15 years CD4 done at start of ART	Proportion of children under 5 years with a CD4 Total Lymphocyte Count (TLC) between 15 and 19 percent (pc) and children 5 to 15 years with a CD4 count between 100 and 199 cells/µl at the time of starting ART. This shows the proportion of clients starting ART who are severely immunologically compromised. If the value changes over time, the programme will be able to assess the impact of the intervention.
	Child under 15 years CD4 TLC 20-25pc or 100-199 cls/µl at ART start rate	Child under 15 years CD4 TLC 20-25pc or 200-350 cls/µl at start of ART	Child under 15 years CD4 done at start of ART	Proportion of children under 5 years with a CD4 Total Lymphocyte Count (TLC) between 20 and 25 percent (pc) and children 5 to 15 years with a CD4 count between 100 and 199 cells/µl at the time of starting ART. This shows the proportion of clients starting ART who are severely immunologically compromised. If the value changes over time, the programme will be able to assess the impact of the intervention.
Chronic	Diabetes new client under 18 years detection rate (annualised)	Diabetes client under 18 years new	Population under 18 years	Newly diagnosed diabetes clients (put on treatment) under 18 years as a proportion of the population under 18 years.
	Diabetes new client 18 years and older detection rate (annualised)	Diabetes client 18 years and older new	Population 18 years and older	Newly diagnosed diabetes clients (put on treatment) 18 years and older as a proportion of the population 18 years and older.
	Hypertension incidence (annualised)	Hypertension client treatment new	Population 40 years and older	Newly diagnosed hypertension clients initiated on treatment per 1 000 population 40 years and older.
	Diabetes incidence (annualised)	Diabetes client treatment new	Population total	Newly diagnosed diabetes clients initiated on treatment per 1 000 population.

	Indicator Name	Numerator	Denominator	Definition
	Wheelchair issued rate	Wheelchair issued – new	Wheelchair applications	Wheelchairs issued as proportion of applications received and clients added on register for requiring wheelchairs.
Delivery	Delivery by caesarean section rate	Delivery by caesarean section	Delivery in facility total	Delivery by Caesarean section as a proportion of total deliveries in health facilities.
	Delivery in facility rate (annualised)	Delivery in facility total	Population estimated deliveries	Deliveries in health facilities as a proportion of expected deliveries in the population. Expected deliveries are estimated as population under 1 year multiplied by 1.07 to compensate for still births and infant mortality.
	Delivery in facility under 18 years rate	Delivery in facility to woman under 18 years	Delivery in facility total	Deliveries to women under the age of 18 years as a proportion of total deliveries in health facilities.
	Live birth under 2500g in facility rate	Live birth under 2500g in facility	Live birth in facility	Infants born alive weighing less than 2500g as proportion of total Infants born alive in health facilities (Low birth weight).
	Stillbirth in facility rate	Stillbirth in facility	Total births in facility	Infants born still as proportion of total infants born in health facilities.
	Inpatient early neonatal death rate	Inpatient death early neonatal	Live birth in facility	Early neonatal deaths as proportion of Infants who were born alive in health facilities.
	Perinatal mortality in facility rate (annualised)	Still births in facility plus Inpatient deaths early neonatal	Population estimated live births	Stillbirths and inpatient deaths within the first seven days of life (END) per 1 000 estimated live births. Estimated live births in population is calculated by multiplying estimated population under 1 year by 1.03 to compensate for infant mortality.
	Neonatal mortality in facility rate (annualised)	Inpatient death early neonatal	Population estimated live births	Inpatient deaths within the first 28 days of life per 1 000 estimated live births. Estimated live births in population is calculated by multiplying estimated population under 1 year by 1.03 to compensate for infant mortality.
	Inpatient neonatal death rate	Inpatient death neonatal	Live birth in facility	Proportion of children 28 days admitted/separated who died during their stay in the facility as a proportion of Live birth in facility.
	Maternal mortality in facility ratio (annualised)	Maternal death in facility	Live birth in facility	Women who died in hospital as a result of childbearing, during pregnancy or within 42 days of delivery or termination of pregnancy, per 100 000 live births in facility.
	Mother postnatal visit within 6 days rate	Mother postnatal visit within 6 days after delivery	Delivery in facility total	Mothers who received postnatal care within six days after delivery as proportion of deliveries in health facilities.
EMS	EMS call transport rate	EMS call client transported	EMS calls total	Proportion EMS calls which resulted in clients being transported.
	EMS inter-facility transfer rate	EMS inter-facility transfer	EMS clients total	Inter-facility (from one inpatient facility to another inpatient facility) transfers as proportion of total EMS clients transported.
	EMS obstetric client transport rate	EMS obstetric client	EMS clients total	Obstetric clients as a proportion of total EMS clients transported.
	EMS operational ambulance coverage (annualised)	EMS operational ambulances	Population total	Number of operational ambulances per 10 000 population.
	EMS operational Obstetric Emergency Unit coverage	EMS operational Obstetric Emergency Units	Population total	The number of operational obstetric units available for transporting obstetric cases per 10 000 population.
	EMS P1 call response under 60 minutes rate	EMS P1 response under 60 minutes	EMS P1 calls total	Proportion of all P1 calls with response times under 60 minutes.
	EMS P1 rural response under 40 minutes rate	EMS P1 rural response under 40 minutes	EMS P1 rural calls	Proportion P1 calls in rural locations with response times under 40 minutes
	EMS P1 urban response under 15 minutes rate	EMS P1 urban response under 15 minutes	EMS P1 urban calls	Proportion P1 calls in urban locations with response times under 15 minutes.
Environmental Health	EH Domestic water sample compliance rate	EH Domestic water samples compliant	EH Domestic water samples collected	Proportion of routine domestic water samples taken for a Water Services Authority and Non-Water Services Authority that conforms to the standards set out in SANS 241.
	EH Flour mills compliance rate	EH Milling establishment compliant	EH Milling establishments inspected	Proportion of operational flour milling establishments that were compliant with regulations.
	EH Food sample bacteriological compliance rate	EH Food sample bacteriologically compliant	EH Food sample bacteriological analysis	Proportion of food samples bacteriologically tested that complied to the Foodstuffs, Cosmetics and Disinfectants Act 54 0f 1972.
	EH Food sample chemical compliance rate	EH Food samples chemically compliant	EH Food samples chemical analysis	Proportion of food samples chemically tested that complied to the Foodstuffs, Cosmetics and Disinfectants Act 54 0f 1972.
	EH Hazardous substance dealers compliance rate	EH Hazardous substance dealer compliant	EH Hazardous substance dealer inspected	Proportion of hazardous substances dealers that complied with the regulations for hazardous substances
	EH Health care waste generator compliance rate	EH Health care waste generator compliant	EH Health care waste generators inspected	Proportion of inspected healthcare waste generators that complied with minimum standards according to SANS 10248.
	EH International conveyance inspection rate	EH International conveyance inspected at first point of entry	EH International conveyance arrivals at first point of entry	Proportion of international conveyance at arrival inspected for compliance with International Health standards.
	EH International imported consignment compliance rate	EH International imported consignment inspected	EH International imported consignment arrivals at first point of entry	Proportion of international imported consignments that complied with International Health standards, compliant in terms of the National Port Health Standard Operating Procedures (revised SOPs) and International Health Regulations (IHR, 2005).
	EH Notifiable disease investigation rate	EH Notifiable medical conditions investigated new	EH Notifiable medical conditions reported to District Health Office	Proportion of notifiable medical conditions reported to the District Health Office that were investigated by EHP officers.
	EH Premises tobacco compliance rate	EH Premises tobacco legislation compliant	EH Premises tobacco legislation inspected	Proportion of inspected premises that were compliant with Tobacco Act.

	Indicator Name	Numerator	Denominator	Definition
	EH Reported Food poisoning incidence (annualised)	EH Food poisoning reported new	Population total	New cases of food poisoning reported to EHS per 100 000 people in population.
EPI	BCG dose coverage (annualised)	BCG dose	Population under 1 year	Proportion of children under 1 year who received BCG, normally given just after birth.
	OPV 1st dose coverage (annualised)	OPV 1st dose	Population under 1 year	Proportion of children under 1 year who received OPV 1st dose, normally at six weeks.
	DTaP-IPV/Hib 1st dose coverage (annualised)	DTaP-IPV/Hib 1st dose	Population under 1 year	Proportion of children under 1 year who received DTaP-IPV/Hib (Pentaxim) 1st dose, normally at six weeks.
	PCV 2nd dose coverage (annualised)	PCV 2nd dose	Population under 1 year	Proportion of children under 1 year who received PCV 2nd dose, normally at 14 weeks.
	DTaP-IPV/Hib 3rd dose coverage (annualised)	DTaP-IPV/Hib 3rd dose	Population under 1 year	Proportion of children under 1 year who received DTaP-IPV/Hib (Pentaxim) 3rd dose, normally at 14 weeks.
	PCV 3rd dose coverage (annualised)	PCV 3rd dose	Population under 1 year	Proportion of children under 1 year who received PCV 3rd dose, normally at nine months.
	RV 2nd dose coverage (annualised)	RV 2nd dose	Population under 1 year	Proportion of children under 1 year who received RV 2nd dose, normally at 14 weeks but NOT later than 24 weeks.
	DTaP-IPV/Hib 4th dose coverage (annualised)	DTaP-IPV/Hib 4th dose	Population 1 year	Proportion of children aged 1 year who received DTaP-IPV/Hib (Pentaxim) 4th dose, normally at 18 months.
	HepB 3rd dose coverage (annualised)	HepB 3rd dose	Population under 1 year	Proportion of children under 1 year who received HepB 3rd dose, normally at 14 weeks.
	Measles 1st dose under 1 year coverage (annualised)	Measles 1st dose under 1 year	Population under 1 year	Proportion of children under 1 year who received measles 1st dose, normally at nine months.
	Immunisation coverage under 1 year (annualised)	Immunised fully under 1 year new	Population under 1 year	Proportion of children under 1 year who completed their primary course of immunisation.
	DTaP-IPV/Hib 3 - Measles 1st dose drop-out rate	DTaP-IPV/ Hib3 to Measles1st dose drop-out	DTaP-IPV/ Hib 3rd dose	Proportion of children who dropped out of the immunisation schedule between DTaP-IPV/IPV Hib 3rd dose, normally at 14 weeks and measles 1st dose, normally at nine months.
	Measles 2nd dose coverage (annualised)	Measles 2nd dose	Population 1 year	Proportion of children 1 year (12-23 months) who received measles 2nd dose, normally at 18 months.
	Immunisation at 6 weeks consistency ratio	Immunisation at 6 weeks with identical OPV1 and DTaP-IPV/Hib1 values	Count of facilities giving 6 weeks immunisations	Immunisation at six weeks data with identical values for OPV1 and DTaP-IPV/Hib1 as a proportion of all facilities reporting one or both vaccines given. NOTE: The numerator formula is to be expanded with an IIF function that returns 1 when the two data element values are consistent and a 0 otherwise.
	Immunisation at 9 month consistency ratio	Immunisation at 9 month with identical measles1 and PCV3 values	Count of facilities giving 9 month immunisations	Immunisation at nine months data with identical values for measles 1 and PCV3 as a proportion of all facilities reporting one or both vaccines given. NOTE: The numerator formula is to be expanded with an IIF function that returns 1 when the two data element values are consistent and a 0 otherwise.
	Td dose coverage at 6 years (annualised)	Td dose at 6 years	Population 6 years	Proportion of children 6 years of age who received Td booster dose.
Eye care	Cataract surgery rate (annualised)	Cataract surgery total	Population uninsured total	Clients who had cataract surgery per 1 million population.
HIV	Female condom distribution coverage (annualised)	Female condoms distributed	Population 15 years and older female	The number of female condoms distributed per female 15 years and older via the facility or via factories, offices, restaurants, NGOs or other outlets.
	HIV-positive patients screened for TB rate	HIV-positive new patients screened for TB	HIV-positive clients	The proportion of all HIV-positive clients who were screened for TB.
	Male condom distribution coverage (annualised)	Male condoms distributed	Population 15 years and older male	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.
	HIV positive new client initiated on IPT rate	HIV positive client initiated on IPT	HIV positive client eligible for IPT	Proportion of eligible clients initiated on IPT.
	HIV testing coverage (annualised)	HIV test client 15-49 years	Population 15-49 years	Clients HIV-tested as proportion of population 15-49 years.
	HIV prevalence amongst client tested 15-49 years rate	HIV test positive client 15-49 years	HIV test client 15-49 years	Proportion of clients on whom an HIV test was done who tested positive for the first time.
	TB/HIV co-infected client initiated on ART rate	HIV/TB co-infected client started on ART	HIV/TB co-infected client total	Proportion of TB/HIV co-infected clients initiated on ART.
	TB/HIV co-infected client initiated on CPT rate	TB/HIV co-infected client initiated on CPT	TB/HIV co-infected client – total	Proportion of TB/HIV co-infected clients initiated on Co-trimoxazole prophylaxis therapy (CPT).
	Sexual assault prophylaxis rate	Sexual assault prophylaxis new	Sexual assault cases new	Proportion of sexual assault cases who received post-exposure prophylaxis.
IMCI	Child under 5 years diarrhoea with dehydration incidence (annualised)	Child under 5 years diarrhoea with dehydration new	Population under 5 years	Children under 5 years newly diagnosed with diarrhoea with dehydration per 1 000 children under five years in the population.
	Child under 5 years pneumonia incidence (annualised)	Child under 5 years with pneumonia new	Population under 5 years	Children under 5 years newly diagnosed with pneumonia per 1 000 children under five years in the population.
	Child under 5 years severe acute malnutrition incidence (annualised)	Child under 5 years with severe acute malnutrition new	Population under 5 years	Children under 5 years newly diagnosed with severe acute malnutrition per 1 000 children under five years in the population.

	Indicator Name	Numerator	Denominator	Definition
	Child under 5 years diarrhoea case fatality rate	Child under 5 years with diarrhoea death	Child under 5 years with diarrhoea admitted	Proportion of children under 5 years admitted with diarrhoea who died.
	Child under 5 years pneumonia case fatality rate	Child under 5 years pneumonia death	Child under 5 years pneumonia admitted	Proportion of children under 5 years admitted with pneumonia who died.
	Child under 1 year mortality in facility rate (annualised)	Inpatient death under 1 year	Population estimated live births	Admitted children under 1 year of age who died per estimated 1 000 live births. Estimated live births in population is calculated by multiplying estimated population under 1 year by 1.03 to compensate for infant mortality.
	Child under 5 years severe acute malnutrition case fatality rate	Child under 5 years severe acute malnutrition death	Child under 5 years severe acute malnutrition admitted	Proportion of children under 5 years admitted with severe acute malnutrition who died.
	Deworming dose 12-59 months coverage (annualised)	Deworming dose 12-59 months	Population 12-59 months (multiplied by 2)	Proportion of children 12-59 months who received deworming medication, preferably every six months.
Management Inpatients	OPD new client not referred rate	OPD headcount not referred new	OPD new clients – total	Proportion of new OPD clients without a referral letter.
	Expenditure per PDE	Expenditure total	Patient day equivalent	Average cost per patient day equivalent (PDE). PDE is the Inpatient days total + Day Patients * 0.5 + (Emergency headcount + OPD headcount total) * 0.33333333
	Average length of stay – total	Inpatient days + 1/2 Day clients	Inpatient separations	The average number of client days an admitted client spends in hospital before separation. Inpatient separation is the total of Inpatient discharges, Inpatient deaths and Inpatient transfer outs.
	Inpatient bed utilisation rate – total	Inpatient days + 1/2 Day clients	Inpatient bed days available	Inpatient bed days used as proportion of maximum Inpatient bed days available. (Number of Inpatient beds X days in period.)
	Inpatient crude death rate	Inpatient deaths – total	Inpatient separations	Proportion of admitted clients/separations who died during hospital stay. Inpatient separations is the total of Inpatient discharges, Inpatient deaths and Inpatient transfer outs.
	Inpatient death under 1 year rate	Inpatient death under 1 year	Inpatient separations under 1 year	Proportion of children under 1 year admitted/separated who died during their stay in the facility. Inpatient separations under 1 year is the total of inpatient discharges, inpatient deaths and inpatient transfer outs.
	Inpatient death under 5 year rate	Inpatient death under 5 years	Inpatient separations under 5 years	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.
Management PHC	PHC utilisation rate (annualised)	PHC headcount total	Population total	Average number of PHC visits per person per year in the population.
	PHC utilisation rate under 5 years (annualised)	PHC headcount under 5	Population under 5 years	Average number of PHC visits per year per person under 5 years of age in the population.
	PHC uninsured population utilisation rate (annualised)	PHC total headcount	Population uninsured total	Average number of PHC visits per person per year in the uninsured population.
	PHC professional nurse clinical work load	PHC clients seen by professional nurse	PHC professional nurse clinical work days	Average number of clients seen per professional nurse per professional nurse clinical work day.
	PHC doctor clinical work load	PHC clients seen by doctor	PHC doctor clinical work days	Average number of clients seen per doctor per clinical work day. This includes doctors employed in the public and private sector.
	PHC private doctor clinical work load	PHC clients seen by private doctor	PHC private doctor clinical work days	Average number of clients seen per private doctor per clinical work day. This includes doctors employed in the public and private sector. Monitors the extent of effective utilisation of private doctors appointed on contract to consult clients in public sector facilities in accordance with NHI objectives to increase doctor coverage.
	PHC supervisor visit rate (fixed clinic/CHC/CDC)	PHC supervisor visit (fixed clinic/CHC/CDC)	Fixed clinics plus fixed CHCs/CDCs	Proportion fixed clinics, CHCs and CDCs visited by a dedicated supervisor according to the PHC Supervision Manual.
	Tracer items stock-out rate (fixed clinic/CHC/CDC)	Any tracer item drug stock-out	Fixed clinics plus fixed CHCs/CDCs	The proportion of all fixed clinics, CHCs and CDCs that had stock-out of ANY tracer item for any period.
Mental Health	Mental health case load	Mental health clients total	PHC headcount total	Mental health care clients as proportion of total PHC headcount.
	Mental health visit 18 years and older rate	Mental health client 18 years and older	Mental health clients total	Mental health care client 18 years and older as proportion of total mental health care clients.
	Mental health admission rate	Mental health admissions total	Inpatient separations total	Proportion of clients admitted/separated for mental health problems. Inpatient separations is the total of day clients, inpatient discharges, inpatient deaths and inpatient transfer outs.
	Mental health admission 18 years and older rate	Mental health admission 18 years and older	Mental health admissions total	Client 18 years and older admitted for mental health problems as proportion of total mental health clients admitted.
	Mental health involuntary admission rate	Mental health admission involuntary	Mental health admissions total	Involuntary admissions as proportion of all mental health admissions.
Nutrition	Vitamin A dose 12-59 months coverage (annualised)	Vitamin A dose 12-59 months	Population 12-59 months (multiplied by 2)	Proportion of children 12-59 months who received vitamin A 200,000 units, preferably every six months.
	Child under 2 years underweight for age incidence (annualised)	Child under 2 years underweight – new (weight between -2 SD and -3 SD new)	Population under 2 years	Children under 2 years newly diagnosed as underweight (weight between -2 and -3 Standard Deviations) per 1 000 children under 2 years in the population.
	Child under 5 years food supplementation coverage (annualised)	Child under 5 years on food supplementation new	Population under 5 years	Children under 5 newly started on food supplementation as proportion of population under 5 years.

	Indicator Name	Numerator	Denominator	Definition
	Infant exclusively breastfed at HepB 3rd dose rate	Infant exclusively breastfed at HepB 3rd dose	HepB 3rd dose	Proportion infants reported exclusively breastfed at 14 weeks Hepatitis B 3rd dose vaccination.
Oral Health	Dental utilisation rate (annualised)	Dental headcount total	Population uninsured total	Dental visits per 1 000 uninsured population.
	Dental extraction to restoration ratio	Tooth extraction	Tooth restoration	The ratio between the number of teeth extracted and the number of teeth restored.
PHC WBOT	OHH registration visit rate	OHH registration visit	OHH visits total	Outreach household (OHH) registration visits as a proportion of households allocated to ward-based PHC outreach teams.
	OHH follow-up visit rate	OHH follow-up visit	OHH visits total	Outreach household follow-up visits as a proportion of households visited by ward-based PHC outreach household (OHH) teams.
	OHH supervised visit rate	OHH supervised visit	OHH visits total	Outreach household (OHH) visits accompanied by a supervisor as a proportion of households visited by ward-based PHC outreach teams.
	OHH with pregnancy care rate	OHH with pregnancy care	OHH visits total	Outreach households (OHH) visits during which antenatal care was provided to pregnant women as proportion of households visited by the outreach team.
	OHH with postnatal care rate	OHH with postnatal care	OHH visits total	Outreach households (OHH) with postnatal care provided to a mother and/or neonate within six days after delivery as a proportion of households visited by the outreach team.
	OHH with child under 5 years care rate	OHH with child under 5yrs care	OHH visits total	Outreach households (OHH) with basic health care provided to children under 5 years as a proportion of households visited by the outreach team.
	OHH with adherence support rate	OHH with adherence support	OHH visits total	Outreach households (OHH) with adherence support provided as a proportion of households visited by the outreach team.
	OHH with home-based care rate	OHH with home-based care	OHH visits total	Outreach households (OHH) with home based support provided as a proportion of households visited by the outreach team.
	OHH back-referral forms rate	OHH back referral forms	OHH client refer clinic	Outreach household (OHH) back referral forms received from PHC facilities as proportion of all households with referrals to PHC facility done the PHC outreach team
	OHH client referred to facility rate	OHH client refer facility	OHH headcount total	Proportion of outreach household clients referred to health facilities.
	OHH client referred to social services rate	OHH client referred to social services	OHH headcount total	Outreach households (OHH) clients referred to social services as a proportion of the total number of clients supported (total headcount) during outreach team visits.
	OHH client referred to home based care rate	OHH client referred to home based care	OHH headcount total	Outreach households (OHH) clients referred to home-based care as a proportion of the total number of clients supported (total headcount) during outreach team visits.
	OHH registration visit coverage (annualised)	OHH registration visit	OHH allocated to team	Proportion of households in the population covered by ward-based PHC outreach teams.
	OHH headcount under 5 years coverage (annualised)	OHH headcount < 5yrs	Target population 5 years and older	Proportion of children under 5 years in the population who received care during ward-based PHC outreach household (OHH) team visits.
	OHH headcount 5 years and older coverage (annualised)	OHH headcount >= 5yrs	Target population 5 years and older	Proportion of people 5 years and older in the population who received care during ward-based PHC outreach house hold (OHH) team visits.
PMTCT	Antenatal 1st visit before 20 weeks rate	Antenatal 1st visit before 20 weeks	Antenatal 1st visit total	Women who have a booking visit (first visit) before they are 20 weeks into their pregnancy as a proportion of all antenatal 1st visits.
	Antenatal 1st visit coverage (annualised)	Antenatal 1st visit total	Population estimated pregnant women (at ~10 weeks)	The proportion of potential antenatal clients coming for at least one (booking) antenatal visit. The census number of children under one year factorised by 1.15 is used as a proxy denominator – the extra 0.15 (15%) is a rough estimate to cater for late miscarriages (~10 to 26 w), stillbirths (after 26 weeks gestation) and infant mortality. Pregnant women are regarded as potential antenatal clients from around 10 weeks gestation, i.e. spontaneous abortions before that as well as TOP cases are excluded.
	Antenatal client HIV 1st test positive rate	Antenatal client HIV 1st test positive	Antenatal client HIV 1st test	Antenatal clients tested HIV-positive as a proportion of antenatal clients HIV-tested for the first time during current pregnancy.
	Antenatal client HIV re-test rate	Antenatal client HIV re-test	Antenatal client HIV 1st test negative	Antenatal clients re-tested for HIV as a proportion of antenatal clients tested negative for 1st HIV tests done during current pregnancy.
	Antenatal client HIV re-test positive rate	Antenatal client HIV re-test positive	Antenatal client HIV re-test	Antenatal clients re-tested positive for HIV as a proportion of antenatal clients re-tested for HIV.
	Antenatal client initiated on ART rate	Antenatal client initiated on ART	Antenatal client eligible for ART	Antenatal clients on ART as a proportion of the total number of antenatal clients who are HIV-positive and not previously on ART.
	Infant given NVP within 72 hours after birth uptake rate	Infant given NVP within 72 hours after birth	Live birth to HIV-positive woman	Infants given Nevirapine (NVP) within 72 hours of birth as a proportion of live births to HIV-positive women.
	Infant rapid HIV test around 18 months uptake rate	Infant rapid HIV test around 18 months	Live birth to HIV positive woman	Infant rapid HIV test around 18 months after birth as a proportion of infants under 18 months. The denominator is collected 18 months before the numerator, thus the indicator formula uses Live birth to HIV-positive woman recorded 18 months ago in order to provide reliable output.
	Infant initiated on CPT around 6 weeks uptake rate	Infant initiated on CPT around 6 weeks	Live birth to HIV-positive woman	Infants initiated on Co-trimoxazole (CPT) around six weeks after birth (to prevent opportunistic infections) as a proportion of live births to HIV-positive women.
	Infant 1st PCR test around 6 weeks uptake rate	Infant 1st PCR test around 6 weeks	Live birth to HIV positive woman	Infants PCR tested for the first time around six weeks after birth as a proportion of live births to HIV-positive women.

	Indicator Name	Numerator	Denominator	Definition
	Infant 1st PCR test positive around 6 weeks rate	Infant 1st PCR test positive around 6 weeks	Infant 1st PCR test around 6 weeks	Infants tested PCR-positive for the first time around six weeks after birth as a proportion of Infants PCR tested around six weeks.
	ART prophylaxis discontinued within 12 months after delivery rate	ART prophylaxis discontinued within 12 months after delivery	Antenatal client initiated on ART	ART prophylaxis discontinued within 12 months as a proportion of antenatal clients initiated on ART.
	Infant rapid HIV test around 18 months positive rate	Infant rapid HIV test positive around 18 months	Infant rapid HIV test around 18 months	Infants tested positive for HIV antibodies around 18 months after birth as a proportion of Infants tested for HIV antibodies around 18 months.
Quality	Complaint resolution rate	Complaint resolved	Complaint received	Proportion of complaints resolved out of all complaints received.
	Complaint resolution within 25 working days rate	Complaint resolved within 25 working days	Complaint resolved	Proportion of complaints resolved within 25 working days out of all complaints resolved.
Reproductive Health	Cervical cancer screening coverage (annualised)	Cervical cancer screening in woman 30 years and older	Population 30 years and older female / 10	Cervical smears in women 30 years and older as a proportion of 10% of the female population 30 years and older.
	Couple year protection rate (annualised)	Contraceptive years dispensed	Population 15-49 years females	Women protected against pregnancy by using modern contraceptive methods, including sterilisations, as a proportion of female population 15-49 years. Contraceptive years are the total of (Oral pill cycles / 13) + (Medroxyprogesterone injection / 4) + (Norethisterone enanthate injection / 6) + (IUCD x 4) +)Male condoms distributed / 200) + (Male sterilisation x 20) + (Female sterilisation x 10).
	Termination of pregnancy rate (annualised)	Termination of pregnancy performed	Population estimated pregnant women (at ~10 weeks)	Pregnancies terminated in health facilities as a proportion of all expected pregnancies in population. Expected pregnancies in population is calculated by multiplying estimated population under 1 year by 1.15 to compensate for still births and infant mortality.
School Health	School ISHP coverage (annualised)	Schools with any learner screened	Schools – total	Proportion of schools in which the ISHP service package was provided.
	School learner screening coverage (annualised)	School learners screened	School learners – total	Proportion of all learners screened by a nurse in line with the ISHP service package.
	School Grade 1 screening coverage (annualised)	School Grade 1 learners screened	School Grade 1 learners – total	Proportion of Grade 1 learners screened by a nurse in line with the ISHP service package.
	School Grade 4 screening coverage (annualised)	School Grade 4 learners screened	School Grade 4 learners – total	Proportion of Grade 4 learners screened by a nurse in line with the ISHP service package.
	School Grade 8 screening coverage (annualised)	School Grade 8 learners screened	School Grade 8 learners – total	Proportion of Grade 8 learners screened by a nurse in line with the ISHP service package.
	School Grade 10 screening coverage (annualised)	School Grade 10 learners screened	School Grade 10 learners – total	Proportion of Grade 10 learners screened by a nurse in line with the ISHP service package.
	School learner underweight rate	School learners underweight	School learners screened – total	Proportion of learners screened by a nurse in line with the ISHP service package diagnosed as underweight (below -2SD but above -3SD).
	School learner overweight rate	School learners overweight	School learners screened – total	Proportion of learners screened by a nurse in line with the ISHP service package diagnosed as overweight (above +2SD).
	School learner referred for Oral Health rate	School learner referred for Oral Health	School learners screened – total	Proportion of learners screened by a nurse in line with the ISHP service package and referred for Oral Health.
	School learner referred for Eye Care rate	School learner referred for Eye Care	School learners screened – total	Proportion of learners screened by a nurse in line with the ISHP service package and referred for Eye Care.
	School learner referred for Hearing problems rate	School learner referred for Hearing problems	School learners screened – total	Proportion of learners screened by a nurse in line with the ISHP service package and referred for Hearing problems.
	School learner referred for Speech problems rate	School learner referred for Speech problems	School learners screened – total	Proportion of learners screened by a nurse in line with the ISHP service package and referred for Speech problems.
	School learner referred for Suspected TB rate	School learner referred for Suspected TB	School learners screened – total	Proportion of learners screened by a nurse in line with the ISHP service package and referred for Suspected TB.
	School learner immunised rate	School learner immunised	School learners screened – total	Proportion of learners screened by a nurse in line with the ISHP service package and given immunisation.
	School learner deworming rate	School learner dewormed	School learners screened – total	Proportion of learners screened by a nurse in line with the ISHP service package and given deworming tablets.
STI	STI treated new episode incidence (annualised)	STI treated new episode	Population 15 years and older	Proportion of people 15 years and older treated for a new episode of STI (annualised).
	Male Urethritis Syndrome rate	Male Urethritis Syndrome treated – new episodes	STI treated – new episodes	Male Urethritis Syndrome cases as a percentage of all new STI episodes treated.
TB	TB AFB sputum result turn-around time under 48 hours rate	TB AFB sputum result received within 48 hours	TB AFB sputum sample sent	Proportion of TB Acid Fast Bacilli (AFB) results received within 48 hours.
	TB suspect smear positive rate	TB suspect 5 years and older test positive	TB suspect 5 years and older sputum sent	Proportion of TB suspects with smear-positive sputum results.
	TB suspect sputum test rate	TB suspect 5 years and older sputum sent	TB suspect 5 years and older identified	Proportion of TB suspects with sputum sent to the laboratory for testing.
	TB suspect treatment initiation rate	TB suspect 5 years and older initiated on treatment	TB suspect 5 years and older test positive	Proportion of smear-positive TB suspects initiated on treatment.
	Child contact under 5 years IPT uptake rate	TB contact under 5 years initiated on IPT	TB asymptomatic contact under 5 years	Proportion of asymptomatic TB contacts under 5 years initiated on INH/ Isoniazid Preventive therapy (IPT).

	Indicator Name	Numerator	Denominator	Definition
	TB (pulmonary) case finding index	TB suspect 5 years and older sputum sent	PHC headcount 5 years and older	Proportion of clients 5 years and older, who were identified as TB suspects and for whom sputum was sent to the laboratory.
	TB treatment initiation rate (annualised)	TB client initiated on treatment	Population total	Proportion of TB-positive clients initiated on treatment. Also referred to as TB registration rate.
	TB/HIV co-infected patient on ART at completion of TB treatment rate	TB client on ART at completion of treatment	TB client infected with HIV	Proportion of TB/HIV co-infected clients on ART at completion of TB treatment.
	TB client HIV positive rate	TB client infected with HIV	TB clients initiated on TB treatment	Proportion of TB clients who were identified as HIV-positive while on TB treatment.
	TB (new pulmonary) cure rate	TB (new pulmonary) client cured	TB (new pulmonary) client initiated on treatment	Proportion of new TB smear-positive and culture-positive (pulmonary TB) clients cured.
	TB (new pulmonary) defaulter rate	TB (new pulmonary) treatment defaulter	TB (new pulmonary) client initiated on treatment	Proportion new smear-positive (pulmonary) TB clients who defaulted on treatment.
	TB MDR confirmed treatment initiation rate	TB MDR confirmed client initiated on treatment	TB MDR confirmed new client	Proportion of confirmed new MDR-TB patients initiated on treatment.
	TB MDR death rate	TB MDR client death during treatment	TB MDR confirmed client initiated on treatment	Proportion of MDR-TB patients who died during treatment period.
	TB MDR treatment success rate	TB MDR client successfully treated	TB MDR confirmed client initiated on treatment	Proportion of MDR-TB patients successfully treated (cured and completed treatment).
	TB XDR confirmed treatment initiation rate	TB XDR confirmed client initiated on treatment	TB XDR confirmed new client	Proportion of confirmed new XDR-TB patients initiated on treatment.
	TB XDR death rate	TB XDR client death during treatment	TB XDR confirmed client initiated on treatment	Proportion of XDR-TB patients who died during treatment period.
	TB XDR treatment success rate	TB XDR client successfully treated	TB XDR confirmed client initiated on treatment	Proportion of XDR-TB patients successfully treated (cured and completed treatment).
	TB new client treatment success rate	TB client cured OR completed treatment	TB (new pulmonary) client initiated on treatment	Proportion of TB clients (ALL types of TB) cured plus those who completed treatment.
	TB death rate	TB client death during treatment	TB (new pulmonary) client initiated on treatment	Proportion of TB clients who died during treatment period.
Yearly	Total population	Mid-year estimate of total catchment population		

Indicator definitions for data tables presented in this chapter

Type	Indicator	Definition
Demographic	Age dependency ratio	The ratio of the combined child population (0-14 years) and the aged population (65 years and over) – persons in the dependent ages – to every 100 people of the intermediate age population (15-65 years) – economically active ages. Where more detailed data are lacking, the age-dependency ratio is often used as an indicator of the economic burden the productive portion of a population must carry – even though some persons defined as dependent are producers and some persons in the productive ages are economically dependent.
	Ageing index	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)	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	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 1000 population)	Number of deaths in a year per 1 000 population.
	Population	Total number of people.
	Population % by province	Proportion of South African population in each province (calculated from population per province and population for whole of South Africa).
	Population % by ethnic group	Proportion of South African population in each ethnic group (calculated from population per ethnic group and population for whole of South Africa).
	Population % composition	Percentage of the population by various categories – e.g. Percentage of South African population under age of 15 years Percentage of South African population over age of 60 years Percentage of South African population female.
	Population density (people per km2)	Number of people per square kilometre.
	Public sector dependent population	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	The average number of children to whom a woman gives birth in her lifetime, assuming that the prevailing rates remain unchanged.
Socio-Economic	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.
	Education level: percentage of population 20 years and older with no schooling	Percentage of people in a given age group who have received a particular level of education.
	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 no toilet / bucket toilet	Percentage of households that have no toilet, or were using a bucket toilet.
	Percentage of households with refuse removal	Percentage of households that have refuse removal by the local authority at least once a week.
	Percentage of households with telephone (telephone in dwelling or cell phone)	Percentage of households with a telephone in the dwelling or a cellular telephone.
	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.
	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 seven 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 four weeks prior to the interview. Note that the censuses produce lower estimates of labour force participation because there are fewer prompts to identify employed people, and the Labour Force Survey provides the official labour market statistics.
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 60th birthday).
	Life expectancy at birth	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 (most commonly cited as life expectancy at birth).

Type	Indicator	Definition
Disability	Cataract surgery rate	Cataract operations per million of the total population.
	Prevalence of disability (%)	Percentage of people reporting moderate to severe disability in a survey where disability is defined as a limitation in one or more activities of daily living (seeing, hearing, communication, moving, getting around, daily life activities, learning, intellectual and emotional). In the Community Survey 2007 and Census 2001, disability is defined as a physical or mental handicap which has lasted for six months or more, or is expected to last at least six months, which prevents the person from carrying out daily activities independently, or from participating fully in educational, economic or social activities. The definition of disability used in Census 2001 is not comparable with that used in Census 1996. More 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". Since the 2009 GHS (revised in 2011), StatsSA have also excluded data on children under five years old, since it was thought that these are often categorised as being unable to do the various activities, when this is in fact due to their level of development rather than to any innate disabilities.
	Prevalence of hearing disability (%)	In the Census questionnaire, respondents were asked to indicate whether or not there were any people with serious visual, hearing, physical or mental disabilities in the household. The seriousness of the disability was not clearly defined. Rather, the respondent's perceptions of seriousness were relied on.
Infectious Disease	Reported cases of (disease)	The number of cases of (disease) 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.
	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.
	Reported cases of malaria	The number of cases of malaria reported to the Department of Health.
	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 deaths from malaria	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 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.
	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.
	Treatment success rate (%)	The proportion of new smear-positive TB cases registered under DOTS in a given year that successfully completed treatment, whether with bacteriologic evidence of success ("cured") or without ("treatment completed"). At the end of treatment, each patient is assigned one of the following six mutually exclusive treatment outcomes: cured; completed; died; failed; defaulted; and transferred out with outcome unknown. The proportions of cases assigned to these outcomes, plus any additional cases registered for treatment but not assigned to an outcome, add up to 100% of cases registered.
	Tuberculosis death rate per 100 000 (excluding HIV)	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.
Case finding	Bacteriological coverage rate (%)	The bacteriological coverage rate reflects the percentage of cases of PTB for which sputum microscopy results were available. As such, it reflects both the availability of laboratory services and compliance with the national TB guidelines which stress the use of sputum microscopy in the diagnosis of PTB.
	Proportion of extra-pulmonary TB	Number of extra-pulmonary TB cases divided by total number of TB cases. HIV-infected individuals are more likely to suffer from extra-pulmonary TB. The rising proportion of extra-pulmonary TB reflects the effect of the HIV epidemic on patterns of TB infection.
	Reported cases of MDR-TB	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)	Number of cases of tuberculosis (all types) reported to the Department of Health for the year.
	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).
	Reported cases of TB (PTB new Sm+)	Number of cases of tuberculosis (new smear-positive) reported to the Department of Health for the year.
	Reported cases of TB (PTB new Sm+) (per 100 000)	Number of cases of tuberculosis (pulmonary TB, new smear-positive cases) reported to the Department of Health per 100 000 population (for the year).
	Reported cases of TB (PTB)	Number of cases of tuberculosis (pulmonary TB) reported to the Department of Health for the year.
	Reported cases of XDR-TB	Number of laboratory-diagnosed cases of XDR-TB. XDR-TB is defined as resistance to rifampicin, isoniazid, any fluoroquinolone and resistance to one or more of the following injectable anti-TB drugs: kanamycin, amikacin, and capreomycin.
	Retreatment ratio	Number of Sm+ retreatment cases divided by the number of Sm+ cases (new + retreatment) expressed as a percentage. High interruption rates contribute to high retreatment ratios.
	Smear positivity (percentage of PTB cases which are new Sm+)	Number of new smear-positive PTB cases divided by number of PTB cases.

Type	Indicator	Definition
Case holding	Case fatality rate (MDR-TB) (%)	The percentage of registered MDR-TB patients who die while on treatment.
	Cure rate (new Sm+ cases) (%)	Percentage of patients who are proven to be cured using smear microscopy at the end of treatment. The cure rate for new smear-positive patients is regarded as the key indicator in high-burden countries. South Africa is working towards achieving the accepted WHO target of an 85% cure rate for new smear-positive cases.
	Defaulter (interruption) rate (new Sm+ cases) (%)	Percentage of patients who do not complete their course of treatment (of new smear-positive patients). Also called percentage of patients who defaulted on treatment.
	Defaulter rate (MDR-TB) (%)	Percentage of patients who defaulted on treatment.
	Failed treatment rate (MDR-TB) (%)	Percentage of patients who failed treatment.
	MDR-TB started on treatment	Number of MDR-TB patients who started treatment
	Smear conversion rate (new Sm+ cases) (%)	Percentage of new smear-positive PTB cases who are smear-negative after two months of anti-TB treatment and are therefore no longer infectious. Numerator: Number of new PTB cases who were Sm+ before starting treatment but show a Sm- after 2 months treatment. Denominator: Total number of new Sm+ cases registered during specified time.
	Successful completion rate (MDR-TB) (%)	Percentage of patients who successfully complete treatment.
	Successful completion rate (new Sm+) (%)	Percentage of patients who are cured plus those who complete treatment but without laboratory proof of cure (of new smear-positive patients).
	XDR-TB started on treatment	Number of XDR-TB patients who started treatment.
HIV Prevalence	AIDS sick (number of people with AIDS-defining conditions)	Number of people estimated to be living with AIDS-defining conditions.
	Antenatal client HIV 1st test positive rate (%)	Antenatal clients tested HIV-positive as a proportion of antenatal clients tested for HIV for the first time during the current pregnancy. Similar to HIV prevalence (antenatal), except that as more people may already know their status, over time it does not necessarily provide a representative value for all antenatal clients.
	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 12 months. It refers to the annual diagnosis rate, or the number of new cases of HIV diagnosed each year. (The term “prevalence” refers to the estimated population of people who have HIV at any given time.)
	HIV prevalence (%) (age 15-49)	Percentage of population (age 15-49) estimated to be HIV-positive.
	HIV prevalence (%) (antenatal)	Percentage of women surveyed testing positive for HIV.
	HIV prevalence (%) (total population)	Percentage of population estimated to be HIV-positive.
	People living with HIV	The number of people who are HIV-positive.
HIV and AIDS	AIDS orphans (maternal orphans <18 years)	Number of children under 18 years who have lost either a mother (maternal orphan), a father (paternal orphan) or both parents (a double orphan) due to HIV/AIDS.
	Antiretroviral coverage (%)	The number of patients receiving ART, divided by the number needing treatment.
	Antiretroviral treatment exposure (%)	Percentage of people living with HIV on ART.
	Baby PCR test around 6 weeks uptake rate (%)	Babies PCR-tested 6 weeks after birth as the proportion of live births to HIV-positive women (DHIS – National Indicator Data Set). This indicator is a proxy for the coverage of early infant diagnosis.
	Baby PCR test positive around 6 weeks rate (%)	Babies tested PCR-positive six weeks after birth as the proportion of babies PCR-tested at six weeks (DHIS). The percentage positivity of PCR tests in infants two months old and younger is a proxy for early vertical transmission rates in those infants that access early diagnosis. (NHLS)
	Early infant diagnosis coverage	The numerator is the number of PCR tests performed by the National Laboratory Service for infants two months old or less, as a proxy for the first PCR test. The estimated number of HIV-exposed infants (denominator) is calculated by multiplying antenatal maternal HIV prevalence rates by the number of live births.
	Mother-to-child transmission rate of HIV <2 months of age	This indicator measures the proportion of HIV-exposed infants who received a PCR test under two months of age who tested positive.
	Number of patients receiving ART	Number of patients receiving ART.
	Percentage of deaths due to AIDS	Percentage of total deaths attributed to AIDS-related causes.
	Proportion of ANC clients tested for HIV	Proportion of women coming for their first antenatal visit who are tested for HIV.
Contraception and sexual behaviour	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.
	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.
	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	The rate at which couples (specifically women) are protected against pregnancy using modern contraceptive methods INCLUDING sterilisations. (previously Women year protection rate). Numerator: Contraceptive years equivalent Denominator: Target population 15-44 years (couples using females as proxy)

Type	Indicator	Definition
	Ever had sex (%)	Percentage of people who report that they have ever had sexual intercourse.
	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 circumcision (% of men who are circumcised)	The percentage of men (15-59 years, unless otherwise specified) who have been circumcised.
	Male condom distribution rate	The number of male condoms distributed (to patients at the facility or through other channels) per male 15 years and older. Numerator: Male condoms distributed Denominator: Male target population 15 years and older.
	Male condoms distributed (thousands)	Number of male condoms distributed.
	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 sub-category 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. For MDG monitoring, unmet need is expressed as a percentage based on women who are married or in a consensual union.
STIs	STI partner treatment rate (%)	Number of STI partners treated new divided by number of STI treated new episode, expressed as a percentage.
	STI treated new episode incidence	The percentage of people 15 years and older that have been treated for a new episode of an STI (annualised).
Termination of Pregnancy	ToP facilities functioning (%)	Percentage of designated Termination of Pregnancy (ToP) facilities that are functioning. Numerator: Number of designated facilities providing termination of pregnancy services. Denominator: Total number of designated ToP facilities.
	ToP rate (%)	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)	The number of terminations of pregnancy.
Maternal health	ANC coverage (%)	Proportion of pregnant women receiving some antenatal care. DHIS data source: Estimated from the number of first ANC visits divided by the expected number of pregnant women.
	ANC visits per client	The total number of antenatal visits over the number of first antenatal visits (equivalent to number of antenatal clients).
	Births assisted by trained health personnel (%)	Percentage of women who gave birth in the five years preceding the survey who reported receiving medical assistance at delivery from either a doctor, a nurse or a midwife.
	Caesarean section rate (%)	Percentage of deliveries by Caesarean section.
	Delivery rate in facility (%)	The percentage of deliveries taking place in health facilities under supervision of trained personnel. (The number of children under one year, factorised by 1.07 due to infant mortality, is used as an estimated proxy denominator for expected deliveries.)
	Maternal mortality ratio (MMR)	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)	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. Refers only to institutional/facility-based deaths, not representing the entire population.
	Number of maternal deaths	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.
	PMDF (proportion maternal among deaths of females of reproductive age)	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.
Child Health	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 under 5 years weighing rate	The proportion of PHC headcount under five years that were weighed. Monitoring whether the policy of weighing all children seen at least once a month is being adhered to.
	Diarrhoea incidence under 5 years (per 1 000)	The number of children under five years with diarrhoea per 1 000 population under five years per year. Diarrhoea is formally defined as three or more watery stools in 24 hours, but any episode diagnosed and/or treated as diarrhoea after an interview with the adult accompanying the child should be counted.

Type	Indicator	Definition
	Not gaining weight under 5 years rate (%)	The proportion of children weighed who had an episode of growth faltering/failure during the period. Note that WC uses a "tighter" definition of not gaining weight.
	Number of orphans	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.
	Pneumonia incidence rate under 5 years (per 1 000)	The number of children under five years diagnosed with pneumonia, per 1 000 children in the catchment population. This indicator was called Lower Respiratory Tract Infection (LRTI) incidence rate, due to incorrect interpretation of LRTI.
	Severe malnutrition under 5 years incidence (per 1 000)	The number of children who weigh below 60% expected weight for age (new cases that month) per 1 000 children in the target population.
Child mortality and related	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.
	Low birth weight rate (% live births <2500g)	Percentage of live births under 2 500g.
	Neonatal death rate (NNDR) (deaths <28 days old 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. Also called Neonatal Mortality Rate (NNMR).
	Number of under-5 deaths	The estimated number of deaths in children younger than five years.
	Perinatal care index (perinatal MR / LBWR)	Perinatal mortality rate divided by the Low birth weight rate. The Perinatal Care Index is a quality of care index that has been validated as a true measure of the quality of care; the higher the index, the poorer the care. The values should be below 1 for CHCs and below 2 for all hospitals.
	Perinatal mortality rate (deaths <8 days old 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 seventh day after delivery. Perinatal deaths are the sum of stillbirths plus early neonatal deaths. These are divided by total births (live births plus stillbirths). Note that the current WHO definition of PNMR is different from the definition used in South Africa, being the number of deaths from 24 weeks gestation/500g to 28 days neonatal life. As from the Saving Babies 2003-2005 report, reporting has been brought into line with the international standard of reporting according to all births =>500g. The PNMR is the most sensitive indicator of obstetric care. For developed countries, the rate for babies over 1 000g is usually less than 6/1000 births, whereas for developing countries PNMR ranges from 30-200.
	Stillbirth rate (per 1 000 total births)	Number of stillbirths per 1 000 total births.
	Under 5 mortality rate (deaths under 5 years per 1 000 live births)	The number of children under five 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 one year of age (note: usually given immediately after birth).
	DTP3 coverage (%)	The proportion of children who received their third DTP-Hib doses (normally at 14 weeks). From approximately 2009, when the immunisation schedule changed, this is defined as: The proportion of children under 1 year who received their DTaP-IPV/Hib (Pentaxim) 3rd dose, normally at 14 weeks – annualised.
	Immunisation coverage of children <1 year (%)	Proportion of children under one year who are fully immunised. Calculated from the number of children fully immunised (defined as first visit where all required vaccinations are completed) divided by the population <1 year. A primary course currently includes BCG, OPV1, DTaP-IPV/Hib 1, 2, 3, HepB 1, 2, 3, PCV 1,2,3, RV 1,2 and measles 1.
	Immunisation drop out rate (measles 1 to 2)	The proportion of children who dropped out of the immunisation schedule between the first (normally at nine months) and second (normally at 18 months) measles dose.
	Measles 1st dose coverage (%)	The proportion of children who received their first measles dose (normally at nine months) – annualised.
	OPV 1 coverage (%)	The proportion of children under one year immunised with OPV dose 1.
	PCV7 3rd dose coverage (%)	The proportion of children who received their third PCV7 dose (around nine months) – annualised.
	RV 2nd dose coverage (%)	The proportion of children who received their second RV dose (around 14 weeks) – annualised.
Nutrition	Anaemia prevalence (%)	Proportion of children with Hb <11g/dl.
	Iron deficiency anaemia prevalence (%)	Proportion of children with Hb <11g/dl and ferritin <12mcg/l.
	Iron deficiency prevalence (%)	Proportion of children with ferritin <12mcg/l.
	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.

Type	Indicator	Definition
	Vitamin A coverage children 12-59 months (%)	Proportion of children 12-60 months receiving vitamin A 200 000 units twice a year. The denominator is thus the target population 1-4 years multiplied by 2. For surveys, this indicator is usually given as the percentage of children who received vitamin A supplements in the preceding six months.
	Vitamin A coverage infants 6-11 months (%)	Proportion of infants 6-11 months receiving vitamin A 100 000 units.
	Vitamin A deficiency (%)	Proportion of children with serum retinol <20mcg/dl.
	Waist-hip ratio (WHR) above cut-off (%)	Proportion of people with the ratio of waist/hip circumference >= 1.0 (for men) or >=0.85 (for women). Body Mass Index does provide an index for obesity, but has limitations in predicting risk for cardiovascular events. Research has indicated that measurement of WHR enables prediction of cardiovascular risk (Am Heart J 2005 Jan 149: 54-60.)
	Wasting (%)	Proportion of children with weight for height under 2 standard deviations from the norm (reference population median).
Chronic Diseases	Cervical cancer screening coverage	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. The denominator is 10% of the female target population 30 years and older.
	Diabetes prevalence (%)	Percentage of people with diabetes. Defined in SANHANES as those with HbA1c > 6.5%
	Hypertension prevalence (%)	Percentage of people with hypertension, where hypertension is usually defined as individuals with systolic blood pressure =>140 mm Hg and/or diastolic blood pressure =>90 mm Hg and/or who reported the current use of antihypertensive medication.
	Prevalence of abnormal lipid profiles (%)	Percentage of people with raised cholesterol or other abnormal lipid profiles.
	Prevalence of mental disorders	Percentage of the population suffering from any common mental disorders.
	Prevalence of raised blood pressure (%)	Percentage of people with systolic blood pressure >= 140 mmHg or diastolic blood pressure >= 90 mmHg.
Behaviour & Awareness	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 criticising 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.
	Ever smoked cigarettes (%)	Proportion of people who have ever smoked a cigarette, even one or two puffs.
	Ever used drugs (%)	Proportion of people who have ever used drugs.
	Frequent smokers (%)	Proportion of people who smoked (cigarettes) on 20 or more days of the past 30 days.
	Number of admissions for alcohol and other drug abuse	Number of patients admitted for treatment by treatment centres who are part of the SACENDU Project sentinel surveillance system.
	Percentage participating in insufficient physical activity	Proportion of those surveyed who did not participate in either vigorous or moderate physical activity that would have been sufficient to gain any health benefit, in the seven days preceding the survey. Vigorous activity is defined as activities for 20 or more minutes on three or more of the seven days preceding the survey such as soccer, netball, rugby or basketball. Moderate activity is defined as 30 or more minutes on five or more of the seven days preceding the survey such as fast walking, slow bicycling, skating, mopping or sweeping floors.
	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.
	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. Note that poly-substance abuse is high.
	Smoking age of initiation <10 years (%)	Proportion of people who first smoked cigarettes before age 10 years (of those who have ever smoked).
	Watch TV more than 3 hours per day (%)	Proportion of those surveyed (who have access to a TV, video or computer games) who spent three hours or more watching TV or playing video/computer games during an average school day.
Injuries	Road accident fatalities per 100 000 population	Number of fatalities due to road accidents per 100 000 population.
Health Services	Percentage of users of private health services highly 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 highly satisfied with the service received	Percentage of users of public health services highly satisfied with the service received.
Health Facilities	Average length of stay (ALOS)	Average duration of patient stay in health facility. Numerator: Inpatient days + 1/2 Day patients Denominator: Discharges + Deaths + Transfers out + Day patients
	Usable bed utilisation (occupancy) rate (BUR)	Measure of the occupancy of the beds available for use. Numerator: (Inpatient days + 1/2 Day patients) x 100 Denominator: Usable beds x days in period.
	Usable beds per 1 000 population	The number of usable beds divided by the population x 1 000. Where this is calculated for public health sector beds, the population used is the public sector dependent (uninsured) population.

Type	Indicator	Definition
	Utilisation rate PHC	Number of visits per person to PHC health facilities per year. Calculated from PHC headcount divided by total population.
	Utilisation rate PHC <5 years	Number of visits per person <5 years to PHC health facilities per year. Calculated from PHC headcount <5 years divided by population <5 years.
Health Personnel	(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.
	Number of (health professionals)	Number of this category of health professional working in the specified sector.
	Number of (health professionals) registered	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. Description of selected categories: • An enrolled nurse (EN) or sometimes called a staff nurse is an individual who has completed a two-year programme usually at a nursing college or exited after completing two years of the four-year university programme. This person is educated and competent to practise basic nursing. • An enrolled nursing auxiliary (ENA) or sometimes called an assistant nurse (AN) is an individual who has completed a year programme or a similar course at college or exited after completing the first year of the four-year university programme. This person is educated and competent to practise elementary nursing. • A professional nurse (PN) or registered nurse (RN) (and sometimes called a sister), is an individual who has completed a four-year programme at university or a nursing college. This person is educated and competent to practise comprehensive nursing and midwifery. • A pupil auxiliary is an individual on one-year or similar nursing course at a public or private nursing institution. • A pupil nurse is an individual on a two-year nursing programme at a public or private nursing institution. • A student nurse is a person who is in the process of training either on a four-year nursing programme at a nursing college or university.
	Number of CS (health professionals)	Number of community service (health professionals). For each cadre.
	Total number of health professional posts	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 include environmental health professionals, and from 2009 clinical associates were added. 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.
Health Financing	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.
	Health as percentage of total expenditure	Proportion of total (government) expenditure on health. Provinces with central hospitals have a higher share.
	Health expenditure % of GDP	Proportion of national Gross Domestic Product that is spent on health care.
	Medical scheme beneficiaries	Number of medical scheme beneficiaries, as reported by the Medical Schemes Council.
	Medical scheme coverage (%)	Proportion of population covered by medical schemes. From the 2002 GHS, StatsSA exclude missing values and unknown values from the totals used as denominators for the calculation of percentages (revised data released in 2010 with GHS 2009).
	Pensioner ratio (%)	Proportion of members of medical schemes who are 65 years or older, in registered medical schemes.
	Per capita expenditure (non-hospital PHC)	Amount spent on non-hospital PHC services by the public sector per person without medical aid coverage (in Rand). Includes provincial expenditure from sub-programmes 2.2–2.7 (clinics, community health centres, community-based services and other community services, nutrition and HIV) under District Health Services, plus net local government expenditure on health services. Expenditure is divided by the population without medical scheme coverage. Expenditure may be given in nominal terms (prices for the year of expenditure) or real terms (inflation-adjusted prices to a particular base year).
	Per capita health expenditure	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.

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Abbreviations

A	
AHS	Annual Health Statistics
ART	Antiretroviral Therapy
ASSA	Actuarial Society of South Africa
B	
BAS	Basic Accounting System
C	
CARMMA	Campaign for Accelerated Reduction of Maternal and Child Mortality
CCMA	Commission for Conciliation, Mediation and Arbitration
CD4	Cluster of Differentiation 4
CDC	Centers for Disease Control and Prevention
CEO	Chief Executive Officer
CFW	Child and Family Wellness
CHAPS	Centre for HIV/AIDS Prevention Studies
CHW	Community Health Worker
CMS	Council for Medical Schemes
COHSASA	Council for Health Service Accreditation of Southern Africa
CPIP	Child Problem Identification Programme
CQI	Continuous Quality Improvement
CSIR	Council for Scientific and Industrial Research
CSTL	Care and Support for Teaching and Learning
CToP	Choice on Termination of Pregnancy
D	
DAH	Development Assistance for Health
DALY	Disability-Adjusted Life Years
DAS	Disability Assessment Scale
DBE	Department of Basic Education
DBSA	Development Bank of South Africa
DCST	District Clinical Specialist Team
DEVTA	Deworming and Enhanced Vitamin A
DFID	Department for International Development
DHIS	District Health Information System
DHP	District Health Plan
DHS	District Health System
DM	District Manager
DMT	District Management Teams
DoH	Department of Health
DPME	Department of Performance Monitoring and Evaluation
DRG	Diagnosis-Related Groups
DSD	Department of Social Development
E	
EC	Eastern Cape
EFA	World Education Forum Agenda of Education for All
EHP	Environmental Health Practitioner
EHR	Electronic Health Record
EHS	Environmental Health Services
EMS	Emergency Medical Services
EPI	Extended Programme on Immunisation
EPTB	Extrapulmonary TB
ESMOE	Emergency Steps in the Management of Obstetric Emergencies
ETR.Net	TB Electronic Database
F	
FAO	Food and Agriculture Organization
FAS	Foetal Alcohol Syndrome
FDC	Fixed-Dose Combination
FIT	Facility Improvement Teams
FPL	Food Poverty Line
FS	Free State

G	
GBD 2013	Global Burden of Diseases, Injuries and Risk Factors Study 2013
GBD	Global Burden of Disease Study
GDP	Gross Domestic Product
GEMS	Government Employees Medical Scheme
GERMS-SA	Group for Enteric, Respiratory and Meningeal Disease Surveillance in South Africa
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
GPs	General Practitioners
GP	Gauteng Province
GPP	Good Pharmacy Practice
GYTS	Global Youth Tobacco Survey
H	
HAI	Health Action International
HCT	HIV Counselling and Testing
HCV	Hepatitis C
HDACC	Health Data Advisory and Co-ordination Committee
HEARD	Health Economics and HIV and AIDS Research Division
HIA	Health Impact Assessment
HIS	Health Information System
HIV	Human Immunodeficiency Virus
HPCSA	Health Professions Council of South Africa
HPS	Health-Promoting Schools
HPV	Human Papillomavirus
HSS	Health Systems Strengthening
HST	Health Systems Trust
HSV-2	Herpes Simplex Virus Type 2
I	
ICSM	Integrated Clinical Services Management
ICT	Information Communications Technology
IDP	Integrated Development Programme
iERG	Independent Expert Review Group
IES	Income and Expenditure Survey
IFAD	International Fund for Agricultural Development
IHME	Institute for Health Metrics and Evaluation
ILO	International Labour Organization
iMMR	Institutional Maternal Mortality Ratio
IMR	Infant Mortality Rate
IMSA	Innovative Medicines South Africa
IRS	Indoor Residual Spraying
ISA	Inter-Sectoral Action
ISHP	Integrated School Health Programme
ITU	International Telecommunications Union
K	
KZN	KwaZulu-Natal
L	
LBPL	Lower-Bound Poverty Line
LCS	Living Conditions Survey
LP	Limpopo Province
M	
M&E	Monitoring and Evaluation
MC	Male Circumcision
MCH	Maternal and Child Health
MDB	Municipal Demarcation Board
MDG	Millennium Development Goal
MDMS	Malaria Data Management System
MDR-TB	Multi-Drug-Resistant Tuberculosis
mHealth	Mobile Health
MHS	Municipal Health Services
MICS	Multiple Indicator Cluster Surveys
MIS	Malaria Information Systems
MIOS	Minimum Information Interoperability Standards
MMC	Medical Male Circumcision

MNCWH	Maternal, Newborn, Child and Women's Health
MP	Mpumalanga Province
MOHCW	Ministry of Health and Child Welfare
MOU	Midwife Obstetric Unit
MOVE	Model for Optimising Volume and Efficiency
MRC	Medical Research Council of South Africa
MSSA	Marie Stopes South Africa
MSI	Marie Stopes International
MTT	Ministerial Task Team
N	
NC	Northern Cape
NCCEMD	National Committee for Confidential Enquiries into Maternal Deaths in South Africa
NCR	National Cancer Registry
NCS	National Core Standards
NDoH	National Department of Health
NGO	Non-Governmental Organisation
NHA	National Health Act
NHI	National Health Insurance
NHIS	National Health Information System
NHISSA	National Health Information System of South Africa
NICD	National Institute for Communicable Diseases
NiDS	National Income Dynamics Study
NIDS	National Indicator Data Set
NMR	Neonatal Mortality Rate
NSDA	Negotiated Service Delivery Agreement
NSH	New Somerset Hospital
NSP	National Strategic Plan
NTP	National TB Programme
NVA:VA	Non-Value Add:Value-Add
NW	North West
O	
OECD	Economic Co-operation and Development
OHSC	Office of Health Standards Compliance
OOPD	Orthopaedics Outpatient Department
OPD	Outpatient Department
ORS	Oral Rehydration Solution
OSC	Office of Standards Compliance
P	
PAYE	Pay-As-You-Earn
PDCA	Plan-Do-Check-Act
PDSA	Plan-Do-Study-Act
PEPFAR	United States President's Emergency Plan for AIDS Relief
PHC	Primary Health Care
PHCIS	Primary Health Care Information System
PMBs	Prescribed Minimum Benefits
PMTCT	Prevention of Mother-To-Child Transmission of HIV
PPIP	Perinatal Problem Identification Programme
Q	
QALYs	Quality- Adjusted Life Years
QI	Quality Improvement
QLFS	Quarterly Labour Force Survey
R	
RBF	Results-Based Financing
RCT	Randomised Controlled Trial
RDT	Rapid Diagnostic Tests
REF	Risk Equalisation Fund
RMCH	Reducing Maternal and Child Mortality through Strengthening Primary Health Care Programme
RMS	Rapid Mortality Surveillance
RTMC	Road Traffic Management Corporation

S	
SACENDU	South African Community Epidemiology Network on Drug Use
SAD	Staff-Related Access Deficit Indicator
SAGE	Study on Global AGEing and Adult Health
SAHPRA	South African Health Products Regulatory Authority
SAIMD	South African Index of Multiple Deprivation
SALGA	South African Local Government Association
SANA	Situational Analysis and Needs Assessment
SANC	South African Nursing Council
SANHANES-1	South African National Health and Nutrition Examination Survey
SAPC	South African Pharmacy Council
SAPS	South African Police Service
SARB	South African Reserve Bank
SARI	Severe Acute Respiratory Infections
SDG	Sustainable Development Goals
SOP	Standard Operating Procedure
STI	Sexually Transmitted Infection
T	
TA	Technical Assistance
TAC-NHC	Technical Advisory Committee of the National Health Council
TasP	Treatment as Prevention
TB	Tuberculosis
TRIPS	Trade-Related Aspects of Intellectual Property Rights
U	
U5MR	Under 5 Mortality Rate
UBPL	Upper-Bound Poverty Line
UHC	Universal Health Coverage
UK	United Kingdom
UKZN	University of KwaZulu-Natal
UN	United Nations
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNDP	United Nations Development Programme
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
UN-IGME	UN Inter-agency Group for Child Mortality Estimation
UNODC	United National Office on Drugs and Crime
USAID	United States Agency for International Development
V	
VAD	Vitamin A Deficiency
VAT	Value Added Tax
VMMC	Voluntary Medical Male Circumcision
VOCS	Victims of Crime Survey
W	
WBOT	Ward-Based Outreach Team
WC	Western Cape
WCDoH	Western Cape Department of Health
WFP	World Food Programme
WHA	World Health Assembly
WHO	World Health Organization
X	
X-DR TB	Extensively Drug-Resistant TB
Y	
YLL	Years of Life Lost

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