

Measuring National Health Insurance: towards Universal Health Coverage in South Africa

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Quantification of UHC trends in South Africa suggests that significant progress was made overall between 1998 and 2019 in terms of increasing population coverage for most categories of health services. Inequity between groups has declined. However, improvement in service quality to provide effective coverage has been slow.

Universal Health Coverage (UHC) is concerned with removing finance as a barrier to healthcare access; it is also concerned with reducing poverty through ensuring that the vulnerable are not pushed more deeply into poverty after paying for health services.

South Africa is pursuing UHC through the implementation of National Health Insurance (NHI). NHI is defined as a health-financing system that pools funds to provide access to quality health services for all South Africans, based on their health needs and irrespective of their socio-economic status.

South Africa is currently in the second year of Phase 2 NHI implementation (2018 - 2022), which focuses on development of NHI legislation, a functional NHI Fund and its structures, and purchasing of personal healthcare services for vulnerable groups. The NHI Phase 1 Evaluation (2019) concluded that there were both successes and challenges, and lessons learnt were identified.

This chapter analyses UHC coverage trends, and identifies information gaps and implications for the future in South Africa.

According to the World Health Organization analytic framework, quantification of UHC trends in South Africa suggests that significant progress was made overall between 1998 and 2019 in terms of increasing population coverage for most categories of health services. In general, inequity between groups has declined. However, improvement in service quality to provide effective coverage (where it is possible to measure this) has been slow. It will be imperative to focus on outcomes at all levels of treatment cascades to ensure effective UHC in the future.

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Introduction

South Africa is pursuing Universal Health Coverage (UHC) through the implementation of National Health Insurance (NHI).^{1,2} NHI is defined as a health-financing system that pools funds to provide access to quality health services for all South Africans, based on their health needs and irrespective of their socio-economic status.³

The World Health Organization (WHO) defined UHC as “access to key promotive, preventive, curative and rehabilitative health interventions for all at an affordable cost, thereby achieving equity in access”.⁴ UHC is concerned with removing finance as a barrier to healthcare access; it is also concerned with reducing poverty through ensuring that the vulnerable are not pushed more deeply into poverty after paying for health services.

Access to health care is a fundamental human right, as enshrined in Chapter 2 of the Constitution (Act No. 108 of 1996) of the Republic of South Africa, which stipulates that “everyone has the right to have access to health care services, including reproductive health care”. Section 27(2) of the Constitution requires that “the state must take reasonable legislative and other measures, within its available resources, to achieve the progressive realisation of each of these rights”.⁵

South Africa is a signatory to the United Nations Sustainable Development Goals (SDGs) for 2030, and will be monitored and compared with other countries on progress made.⁶ Target 3.8 (within SDG 3 on health) aims to achieve UHC, including financial risk protection, access to quality essential healthcare services, and access to safe, effective, quality and affordable essential medicines and vaccines for all.

Measurement of UHC needs careful consideration since it includes several effective service-delivery coverage-tracer indicators, with data availability and quality varying globally as well as sub-nationally.⁷ The purpose of this chapter is to highlight progress made in the implementation of NHI towards UHC, identify current information gaps and the implications of these gaps for measurement of NHI in South Africa.

NHI implementation in context

Post 1994, the democratic government inherited a fragmented, inequitable, racially segregated, predominantly curative, and hospital-centric health system, with a quadruple burden of disease.⁸ Good progress has been made over the years on certain health status outcomes, such as life expectancy, and certain mortality rates have dropped. However, the high burden of disease, the persistent challenge of poor service quality, overstretched resources in the public sector, and rising costs of private healthcare services, medicines and

commodities, all compromise the NHI goal of increasing access to health care, especially among vulnerable populations.⁹⁻¹¹

NHI needs to deal with the escalating cost of health services and medicines. South Africa currently spends about 8.9% of Gross Domestic Product (GDP) inequitably between public and private health.¹² Public health expenditure is just under 50% of total health expenditure, for 82.6% of the population. Studies have shown higher overall utilisation among members of medical schemes and wealthier groups, as well as differences across rural and urban areas and between provinces.^{11,13,14} NHI implementation is expected to transform the service platform through ensuring access to both public- and private-sector facilities, a comprehensive package of care to citizens, NHI fund prepayment and purchasing of services for citizens, and elimination of out-of-pocket payments.³

The 2019 Competition Commission Health Market Inquiry (HMI) found that the South African market is still characterised by high and rising costs of health care and medical scheme cover, rising out-of-pocket payments, ineffective controls on increasing volumes of care, and poor regulation of the private sector. It also found that there are no measures to report on quality and health outcomes in the private practitioner markets, which is a great challenge given the perceived superiority of private health care.¹¹

Progress on NHI implementation

NHI implementation phases

Measurement of NHI will align with the planned incremental approach to implementation and service delivery coverage. The NHI phases are:³

- **Phase 1 (2012 - 2017)** focused on piloting various health-systems strengthening (HSS) interventions in preparation for the full implementation of NHI.
- **Current Phase 2 (2018 - 2022)** is focused on the development of NHI legislation and amendments to existing legislation, as well as a fully functional NHI Fund and its structures. It also involves purchasing personal healthcare services for vulnerable groups.
- **Phase 3 (2023 - 2026)** will focus on HSS activities to be implemented to full scale, and mobilisation of additional resources. Mandatory payment for NHI through NHI-specific taxes and contracting of accredited service providers will be implemented.

Policy development

It is envisaged that there will be substantive policy and legislative reform for NHI, including the National Health Act and regulation of the private sector, among others.¹⁵ The Green Paper on NHI¹⁶ was published in 2011, followed by the White Paper on NHI on 11 December 2015.³ The final White Paper on NHI Policy¹⁷ was published on

30 June 2017 following approval by Cabinet. The latter aimed to provide a policy framework for transforming the manner in which healthcare services are financed and purchased, as well as how these services are provided in both the public and private health sectors.

The NHI Bill and Medical Schemes Amendment Bill were tabled before Cabinet, and subsequently published on 21 June 2018.^{18,19} The NHI Bill was released in July 2019 for public comment; the Bill seeks to establish the NHI Fund, its powers, functions and governance structures, and makes provision for mandatory prepayment for healthcare services in South Africa. The Medical Schemes Amendment Bill seeks to amend the Medical Schemes Act (No. 131 of 1998),¹⁹ to improve regulation of the medical schemes industry, and to ensure that beneficiaries are better protected, promoting better access to private health funding.

The proposed NHI legislation and policy changes form a highly contested terrain among various groups in the country, and extensive consultations will be necessary.

Piloting NHI

The following 10 priority innovative HSS interventions were implemented in the selected 11 NHI pilot districts during the first phase from 2012 - 2017.²⁰

1. Ward-Based Primary Healthcare Outreach Teams (WBPHCOTS), to provide promotive and preventive health care to households.
2. The Integrated School Health Programme (ISHP), to provide health promotion and preventive services to school-going children.
3. Contracting of General Practitioners (GPs) at primary health care (PHC) facilities, to improve quality of care.
4. The Ideal Clinic Realisation and Maintenance Model (ICRM), to increase quality of services through the establishment of minimum standards.
5. District Clinical Specialist Teams (DCSTs), to support clinical governance, clinical work, research and training.
6. Centralised Chronic Medicine Dispensing and Distribution (CCMDD), to provide chronic medication at designated pick-up points closer to communities.
7. The Health Patient Registration System (HPRS), to provide electronic patient registration in preparation for an electronic patient record.
8. The Stock Visibility System (SVS), to improve oversight of stock through an electronic stock-monitoring system, thereby reducing stockouts by facilitating appropriate and timely ordering.
9. Infrastructure projects, to improve access and quality of care.
10. Workload Indicator for Staffing Needs (WISN), a WHO planning tool for facility staff management.

NHI phase 1 evaluation

External evaluation was undertaken between November 2017 and December 2018, and aimed to evaluate progress and document successes, challenges and lessons learnt.²¹

The evaluation assessed individual intervention coverage and gauged the barriers and enhancers of health system performance.

The evaluation concluded that there were both successes and challenges during phase 1 of NHI implementation, and that lessons learnt should be used to strengthen interventions in phase 2. The main successes were increased coverage of new intervention services, such as 4 339 875 learners screened through the ISHP, and 504 803 of these referred for treatment; 330 GPs contracted to provide care in the public sector; 3 519 WBPHCOTs established, covering 12 816 152 households; 2 182 422 patients enrolled for CCMDD and collecting medicines at over 855 pick-up points; SVS implemented in 3 167 clinics and community health centres; and 20 700 149 people registered on the HPRS in 2 968 PHC facilities. The evaluation found that the success of interventions was driven by strong political will and adequate human and financial resources for implementation, and that strong champions holding the vision at all levels ensured robust implementation, good coordination and communication, and good monitoring systems in place at the time of implementation.

The challenges experienced included inadequate planning, lack of resources, inconsistent communication, silo implementation and lack of coordination, inadequate budgets, and a bureaucratic organisational culture unsupportive of problem solving and innovation.

The overall recommendations fundamental to measuring NHI going forward include a shared common vision for NHI explicitly articulated in a plan, better stakeholder communication, a well-defined results matrix, and strong monitoring and evaluation followed through with corrective action.

The main limitation with this evaluation was that it could only demonstrate short-term improvement in service coverage; more time is required to be able to demonstrate impact.

Measuring UHC

The WHO established the framework for the UHC service coverage index in order to measure progress towards target 3.8.1 of SDG 3.^{22,23} Although countries provide a wide range of services, it is not practical to monitor indicators for all these services, either at a global level, or

at sub-national levels within countries. Tracer indicators were therefore selected to capture the breadth of health services in a measurable way, grouped into four categories, according to documented criteria.²⁴ The index is calculated as the (unweighted) geometric means of the available indicators, firstly within each category and then across the four categories. The index was conceived in such a way as to be transparent, and computationally simple and easy for countries to adopt and adapt to local circumstances and data availability, with key measurement concepts to guide these adaptations.^{24,25}

- Indicators should cover the main health areas of health and disease burden (reproductive, maternal, newborn and child health (RMNCH); infectious diseases; non-communicable diseases (NCDs); and injuries).
- The index should include indicators spanning the types of services such as prevention, treatment, rehabilitation and palliation.
- Effective service coverage, defined as the proportion of people in need of services who receive services of sufficient quality to obtain potential health gains, is the preferred metric for the service coverage dimension. For example, antiretroviral therapy (ART) coverage is a measure of service coverage, whereas viral load suppression captures whether the treatment provided is effective. Quality of health services is critical to achieving improved health outcomes, yet has been much harder to achieve than scaling up coverage.²⁶⁻²⁸
- The index should be disaggregated by key inequality dimensions, and some authors have incorporated measures of inequality into the index construction.²⁹

In order to address major measurement gaps in the Framework, proxy indicators are used, correlated with the provision of services. The category on service capacity and access (including bed density, health worker density and access to medicines) represents the general availability or rate of use of services without providing information on the proportion of people in need of a particular service who actually receive it. These indicators are therefore difficult to interpret because optimum levels are unknown; in the index they are rescaled against a maximum threshold. UHC indicators are intended to reflect actual services received, rather than an entitlement to services,²⁹ a distinction that may be difficult to distinguish with service capacity indicators, and an issue particularly relevant to South Africa where the entire population will be entitled to free access to a basket of healthcare services, while in practice significant barriers to quality healthcare access remain, as reflected in the poor health outcomes.

Alternative UHC indexes have been constructed that use a different selection of indicators, different statistical methods to combine the components into a composite index, and a different principle for framing the component or variations to accommodate data availability or relevance in a country context.³⁰⁻³³ The WHO is also spearheading work to strengthen the use of health facility data and other routine sources in measurement of UHC to address some of the limitations of traditional population-based surveys.³³ These

methodological considerations are beyond the scope of this chapter but should be considered as South Africa seeks further adaptation of the UHC index.

The UHC service coverage index in South Africa

The NHI White Paper outlines how NHI will be configured along the three dimensions described by the WHO for progressing towards UHC, namely population coverage, service coverage, and cost coverage:³⁴

1. Population coverage refers to the proportion of the population that has access to needed health services. NHI will determine comprehensive healthcare service packages of care for various age groups, including vulnerable groups.
2. Service coverage refers to the extent to which there is coverage for a range of quality health services necessary to address the health needs of the population. NHI will cover comprehensive healthcare services.
3. Cost coverage refers to the extent to which the population is protected from direct costs as well as from catastrophic health expenditure. For NHI, financial risk protection will be achieved by increasing government expenditure on health, reducing out-of-pocket payments, and supporting mechanisms for the poor.

Hogan et al. reported the 2015 baseline results based on the service coverage dimensions of the index for 183 countries (including South Africa) in 2018.²⁵ These results were updated by the WHO in 2019,² and Day et al. presented a national and provincial-level update for this index using the most updated and applicable nationally available data sources in 2018.³⁵

This first country effort to calculate the index produced a very similar result of 66.2 (on the scale of 0 - 100), where Hogan et al.²⁵ reported a score of 67. This was understandable since the South African Demographic and Health Survey (SADHS)¹³ was a common data source for several indicators in both calculations, and other indicators varied, but in opposite directions. The index showed relatively strong performance on RMNCH metrics (score of 85.4 nationally) and reasonable performance on capacity and access measures (69.9), but scores below 60 in the domains of infectious diseases and NCDs. Provincial variation in the overall index score ranged from 63.4 in Limpopo to 70.4 in the Western Cape. The real extent of variation may be somewhat masked by the choice of measures, as in the case of four indicators only a single national value was available.

In 2019, a thorough revision of the country UHC index was undertaken to consider trends over time, review alternative data sources, and choose the most suitable tracer indicators for sub-national time series analysis, as well as to incorporate the use of routine health facility data sources. The methodological

considerations and indicator definitions are described elsewhere in this Review and in global metadata reports.^{36,37} Based on the availability of suitable data (with equity stratifiers) between 1998 and 2019, a basket of 15 of the 16 indicators (omitting tracer 7 on malaria prevention) were selected for calculating the national index. The latest or closest data point for each time period was used. Timing of key household surveys was the main determinant in choosing the time periods.

Results

Available data for index and proxy indicators were collated from 1998 to 2019 (Table 1). Although somewhat infrequent, household surveys provide the longest time series for selected tracer indicators that align closely with the globally defined index. The index was thus calculated for five time periods between 1998 and 2018 (Table 2).

Using a combination of survey and routine data sources, South Africa has a reasonably comprehensive set of data available compared with other countries. The overall UHC service coverage index increased steadily from 24.3 in 1998 - 2002 (based on 10/16 indicators) to 61.8 in 2016 - 2018 (based on 15/16 indicators). The latest estimate of 61.8 is 4.4 units lower than the previous estimate of 66.2, mostly due to different

rescaling methods and indicators in the capacity category of the index. Revised calculation of the composite health worker density based on scaling medical practitioners, professional nurses and pharmacists per uninsured population against thresholds of 30, 100 and 5 per 10 000, resulted in a coverage score of 14.9, less than half that estimated using only medical professionals and the threshold suggested by Hogan of 9 per 10 000. The tracer medicine stock-out rate recorded in the District Health Information Software (DHIS) increased, with a concomitant decline in the inverse (which is the proportion of health facilities with essential medicines). Finally, in place of the International Health Regulations core capacity index (91), the Environmental Health Services compliance rate was reported as 62 in 2018/19. These results do not, therefore, suggest a decline in performance towards UHC since last year; trends should be assessed using comparable metrics over time as far as possible.

For the national index constructed here (Table 1), it is apparent that the best service coverage is in the RMNCH category, although service coverage has remained fairly consistent over the 20-year period, with the main increase in the pneumonia case fatality under 5 years index (rescaled according to the maximum observed value). In the infectious disease category, the roll out of ART was the main contributor to progress, while the broad socio-economic determinant of access to safe sanitation has increased steadily. Tuberculosis (TB) effective treatment coverage has stagnated. The relative paucity of

Table 1: Available index and proxy indicators for the UHC index, South Africa, 1998 - 2019

Indicator	1998	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Note	
Reproductive, maternal, newborn and child health	1 Demand for family planning satisfied with modern methods	79.0				81.3												75.7				1	
	Couple year protection rate (index)		25.3	23.4	24.3	24.4	26.0	27.1	29.9	30.1	31.3	32.5	33.5	34.7	41.6	49.3	63.0	66.6	70.1	59.2	61.0		2
	2 Births attended by skilled health personnel	84.4				91.2					94.3												3
	Antenatal 1st visit coverage before 20 weeks (index)			23.3	26.3	25.7	27.1	28.7	28.4	26.9	29.2	28.6	30.4	32.1	32.0	41.7	45.0	45.8	48.8	51.4	55.0		4
	Antenatal 1st visit coverage (index)			76.5	85.7	87.7	93.1	94.0	91.7	87.4	89.7	83.4	81.0	81.6	78.0	83.3	83.6	74.8	74.9	77.2	80.8		5
	Delivery in facility rate (index)		54.7	65.3	68.1	68.0	74.2	74.5	74.6	73.0	73.8	71.7	71.2	74.1	75.9	76.8	79.2	74.1	72.4	75.7	78.1		6
	3 DTP3 coverage					67.0					62.6											65.0	7
	Immunisation under 1 year coverage (index)	75.0	73.0	71.0	70.0	69.0	74.0	81.0	84.0	85.0	82.0	81.0	77.0	75.0	71.0	81.0	85.0	85.0	76.0	76.0	74.0		8
	4 Pneumonia case fatality under 5 years rate (rescaled)							82.4	83.6	82.8	83.0	87.0	88.6	91.8	92.4	93.0	94.2	95.4	96.0	95.2	96.2		10
	Percentage of children under 5 years of age with suspected pneumonia taken to a health facility							69.3	72.1	74.8	77.3	79.7	81.9	84.0	85.9	87.8	89.5	91.1	92.7	94.1	95.5		11
	5 Tuberculosis effective treatment coverage								44.8	44.7	50.6	52.8	51.7	56.6	51.8	53.0	52.5	55.1	55.6	51.9			13
	6 Antiretroviral effective coverage (PLHIV on ART and virally suppressed)																			31.9	40.6	42.5	14
	Antiretroviral coverage (2nd 90)												17.9					51.0					15
	Antiretroviral coverage (2nd 90)								28.0			37.0	55.0							61.0			16
	Antiretroviral coverage (2nd 90)		0.1	0.3	0.4	0.7	1.6	3.0	5.2	7.9	11.1	15.2	20.2	24.8	29.2	32.8	36.2	40.9	46.9	53.4	59.2		17
Antiretroviral coverage (2nd 90)																						18	
Antiretroviral coverage (2nd 90)		0.2	0.4	0.5	1.0	2.1	3.8	6.6	10.0	14.4	20.1	27.5	34.4	40.9	45.8	49.4	53.3	57.7	61.9	65.3		19	
8 Percentage of households with access to improved sanitation		58.5							64.4			68.9						75.6				20	
Percentage of households with access to improved sanitation				61.7		65.9		68.3		70.0		75.4		77.0		79.5	79.9	81.0	82.4	83.0		21	

Indicator	1998	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Note	
Non-communicable diseases	9 Prevalence of nonraised blood pressure									73.2		73.2		73.3			78.5		78.8			22	
																		62.8					23
	Prevalence of nonraised blood pressure age-standardised (rescaled)										47.7		47.9		49.2			59.0		60.2			24
	Hypertension effective treatment coverage (% hypertensives controlled)														9.1				16.4				25
											35.0		33.2		38.0			46.7		44.7			26
	Hypertension treatment coverage														27.5				41.3				27
10 Percentage of people with diabetes receiving treatment										44.4	43.4	42.4	41.4	40.5	39.5	38.6	37.7	36.7	35.8			28	
														37.5								29	
														19.4								30	
Mean fasting plasma glucose rescaled (index)		75.0								70.0								69.5				31	
11 Cervical cancer screening effective coverage					23.2																	32	
																		37.2				33	
		3.6	6.5	9.4	10.5	13.6	19.8	30.0	34.1	43.2	45.0	49.7	52.2	52.0	55.9	56.7	58.3	63.6	60.8	65.1		34	
12 Tobacco non-smoking prevalence		76.0			77.35					79.1		82.2		80.5			79.6		80.7			35	
														83.8				77.5				36	
13 Hospital beds per 10 000 target population (index)				100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	99.5	37
																	3.6	9.2	29.8	43.5	55.3		38
14 Health worker density (index)		8.1	7.9	7.5	7.5		8.5	8.9	9.2	9.7	9.8	11.8	13.0	13.4	14.4	14.7	15.0	14.6	14.8	14.9	15.3	39	
																		61.0	60.6	61.0	61.3	40	
		24.3	22.0	21.1	21.7		24.0	25.7	26.8	28.9	29.5	30.4	32.2	32.2	34.8	34.3	33.7	33.4	33.9	33.6	35.6	41	
15 Proportion of health facilities with essential medicines		95.3	82.6	83.6	85.4	84.6	76.9	68.3	63.8	53.7	46.4	90.8	89.7	84.7	73.2	76.0	77.2	81.9	74.6	62.6		42	
16 Environmental health services compliance rate																		43.1	63.0	62.3		43	
																			91.0	66.0		44	
17 Universal health coverage: service coverage index		29.2					30.8					37.4						43.9	45.0	46.1	47.2	45	
																	67.0		69.1			46	
Count of data points	4	9	13	14	18	12	15	17	18	25	18	24	18	27	17	19	24	32	29	21	7		



Notes (Series, Age, Sex, Category, Reference)

- SADHS, 15-49 years, female, married or sexually active. SADHS reports.
- DHIS, both sexes. DHIS.
- SABSSM and SADHS, doctor or nurse/midwife. HIV Children 2008, SADHS reports.
- DHIS, female. DHIS.
- DHIS, female. DHIS.
- DHIS, female. DHIS.
- SABSSM and SADHS, both sexes. HIV Children 2008, SADHS reports.
- WHO/UNICEF, both sexes. Immunisation. 2019.
- DHIS, both sexes. DHIS.
- DHIS, <5 years, both sexes. DHIS.
- Smoothed, <5 years, both sexes. DHIS.
- SADHS, <5 years, both sexes. SADHS 2016 Full Report.
- ETR, both sexes. Electronic TB Register.
- DHIS-Tier, all ages, both sexes. DHIS.
- Global Report, all ages, both sexes. UNAIDS data, 2018.
- THEMBISA 4.2, all ages, both sexes. ThemBisa v4.2.
- GBD, all ages, both sexes. GBD 2015 HIV, GBD 2017 HIV.
- Global Report, all ages, both sexes. UNAIDS data 2018, Universal Access 2008, 2010, 2011.
- THEMBISA 4.2, all ages, both sexes. ThemBisa v4.2.
- Census and CS. Census 2001, 2011. Community Survey 2007, 2016 Provincial.
- GHS 2018, Stats SA GHS 2018.
- NiDS, 15+ years, both sexes. NiDS Wave 1-5 (latest).
- SADHS, 15+ years, both sexes. SADHS 2016 Full Report.
- NiDS, 15+ years, both sexes. NiDS Wave 1-5 (latest).
- SANHANES, SADHS, 15+ years, both sexes. Geldsetzer et al. 2019, SADHS 2016 Full Report.
- NiDS modelled, 15+ years, both sexes. NiDS Diabetes model.
- SANHANES, 15+ years, both sexes, age-standardised. Stokes et al. 2017.
- SANHANES, 15+ years, both sexes, age-standardised. Stokes et al. 2017.
- 25+ years, both sexes. Danaei et al. 2011b, Hogan et al. 2018.
- PLoS Med 2008 17;5(6).
- SADHS, 15+ years, female. SADHS 2016 Full Report.
- DHIS, 30+ years, female. DHIS.
- NiDS, 15+ years, both sexes. NiDS Wave 1-5 (latest).
- SADHS and SANHANES, 15+ years, both sexes. SANHANES, SADHS reports.
- DHIS, public sector. DHIS.
- Ideal Clinic System.
- Public sector, both sexes. PERSAL.
- Total, both sexes. GBD 2016 SDGs.
- Public sector, both sexes. PERSAL.
- DHIS.
- NDoH.
- WHO. World Health Statistics 2018, 2019.
- GBD 2016. Scaled. GBD 2016 SDGs.
- WHO. World Health Statistics 2019, UHC Global Monitoring 2019.

services and information systems for NCDs is evident in the construction of the NCD category of the index. Analysis of the treatment cascades for hypertension and diabetes show poor treatment coverage and control of these highly prevalent conditions. Screening for cervical cancer has increased steadily, reflecting improvement in one aspect of cancer prevention. Within the capacity category, the threshold for hospital bed density suggests adequate coverage at national level for the entire period; however, health worker density is extremely low overall, when considering those working in the public sector per uninsured population.

Equity

It is not possible to calculate the overall index using any of the equity stratifiers (wealth quintile, race, sex, education level) since none of these are collected across all indicators, or they simply do not make sense for capacity measures of the health system. This section therefore presents equity results for selected component indicators only.

The most dramatic finding is the reduction in inequity by socio-economic quintile (SEQ) between 1998 and 2016 (Figure 1). Satisfied demand for family planning ranged from 55.7 (poorest

quintile) to 90.6 (wealthiest quintile) in 1998, but converged to around 78% for both quintiles in 2016. Similar trends were observed for skilled birth attendance. The different proxies for prevention of cardiovascular disease (CVD) give varied results by SEQ; the lowest prevalence of non-raised blood pressure (BP) is seen in the wealthiest quintile (males), despite hypertension effective treatment coverage being about double in the wealthiest quintile compared with the poorest. Diabetes is significantly concentrated among the rich, and Mutyambizi et al. reported that undiagnosed diabetes was pro-poor, although assessment of effective treatment coverage by wealth quintile was not published.³⁸ Cervical cancer screening still appears to be substantially higher in the wealthiest quintile (59.1% v. 22.4%). As expected, cervical cancer screening is higher in HIV-positive women, and in those with medical insurance (Figure 2) and in urban locations (Figure 3). The gap in service coverage for urban and non-urban areas has narrowed.

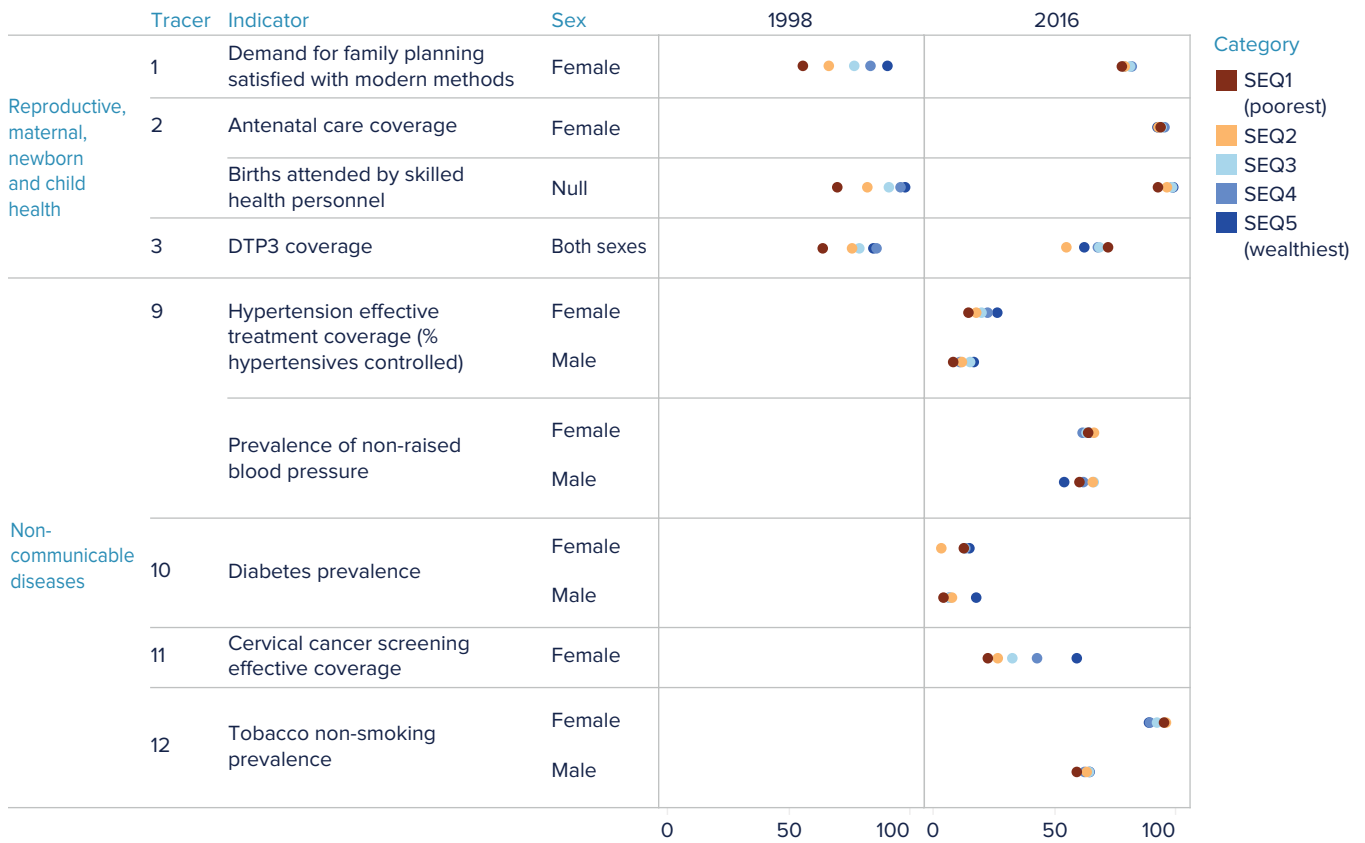
Immunisation coverage is similar for male and female infants, but for HIV and hypertension, treatment coverage is higher for females in most age groups. Diabetes prevalence is slightly higher in females than males, and non-smoking prevalence is substantially better in females (Figure 4).

Table 2: Trends in UHC service coverage index for South Africa, 1998 - 2018

	Tracer	Indicator	1998-2002	2003-2007	2008-2011	2012-2015	2016-2018	Source
RMNCH	1	Demand for family planning satisfied with modern methods	79.0	81.3	81.3	81.3	75.7	SADHS
	2	Births attended by skilled health personnel	84.4	91.2	94.3	94.3	96.7	SABSSM & SADHS
	3	Immunisation under 1 year coverage (index)	70.8	73.4	76.9	79.4	81.9	DHIS
	4	Pneumonia case fatality under 5 years rate (rescaled)		74.8	84.0	91.1	95.5	DHIS smoothed
Infectious diseases	5	Tuberculosis effective treatment coverage		44.7	56.6	55.1	51.9	ETR
	6	Antiretroviral effective coverage (PLHIV on ART and virally suppressed)	0.3	5.2	20.2	36.2	53.4	Thembisa
	7	Percentage of population sleeping under insecticide-treated nets	ND	ND	ND	ND	ND	No data
	8	Percentage of households with access to improved sanitation	58.5	64.4	68.9	75.6	75.6	Census & CS
NCDs	9	Prevalence of nonraised blood pressure age-standardised (rescaled)		47.7	47.9	59.0	60.2	NiDS, age-std, rescaled
	10	Percentage of people with diabetes receiving treatment		44.4	41.4	37.7	35.8	NiDS modelled
	11	Cervical cancer screening coverage (index)	9.4	34.1	52.2	58.3	65.1	DHIS
	12	Tobacco non-smoking prevalence	76.0	77.4	83.8	83.8	77.5	SADHS & SANHANES
Service capacity and access	13	Hospital beds per 10 000 target population (index)	100.0	100.0	100.0	100.0	100.0	DHIS
	14	Health worker density (index)	7.5	9.2	13.0	15.0	14.9	PERSAL
	15	Proportion of health facilities with essential medicines	83.6	63.8	84.7	77.2	62.6	DHIS
	16	Environmental health services compliance rate				43.1	63.0	NDoH
		RMNCH	77.9	79.9	83.9	86.3	87.0	
		Infectious	4.2	24.6	42.9	53.2	59.4	
		NCDs	26.7	48.6	54.3	57.4	57.4	
		Capacity	39.7	38.8	48.0	47.2	49.2	
		UHC Index	24.3	43.9	55.3	59.4	61.8	

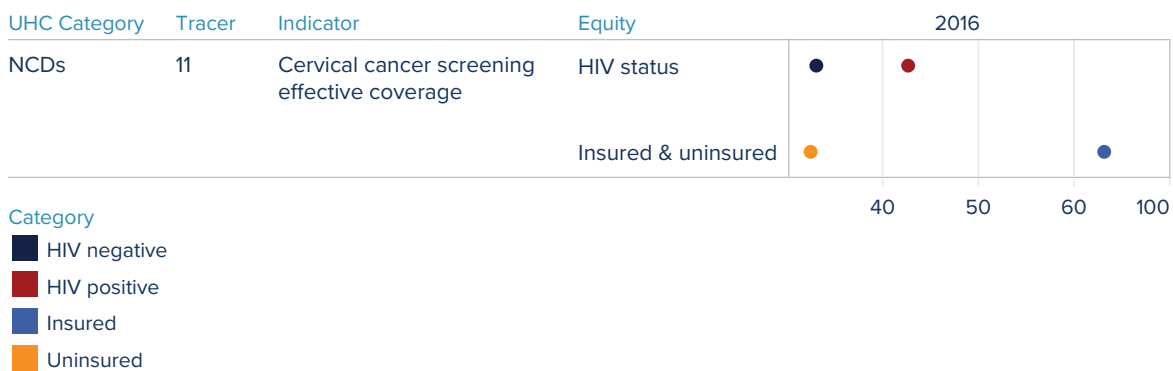
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Figure 1: Selected UHC indicators by wealth quintile, 1998 and 2016



Source: SADHS

Figure 2: Cervical cancer screening by HIV status and insurance coverage



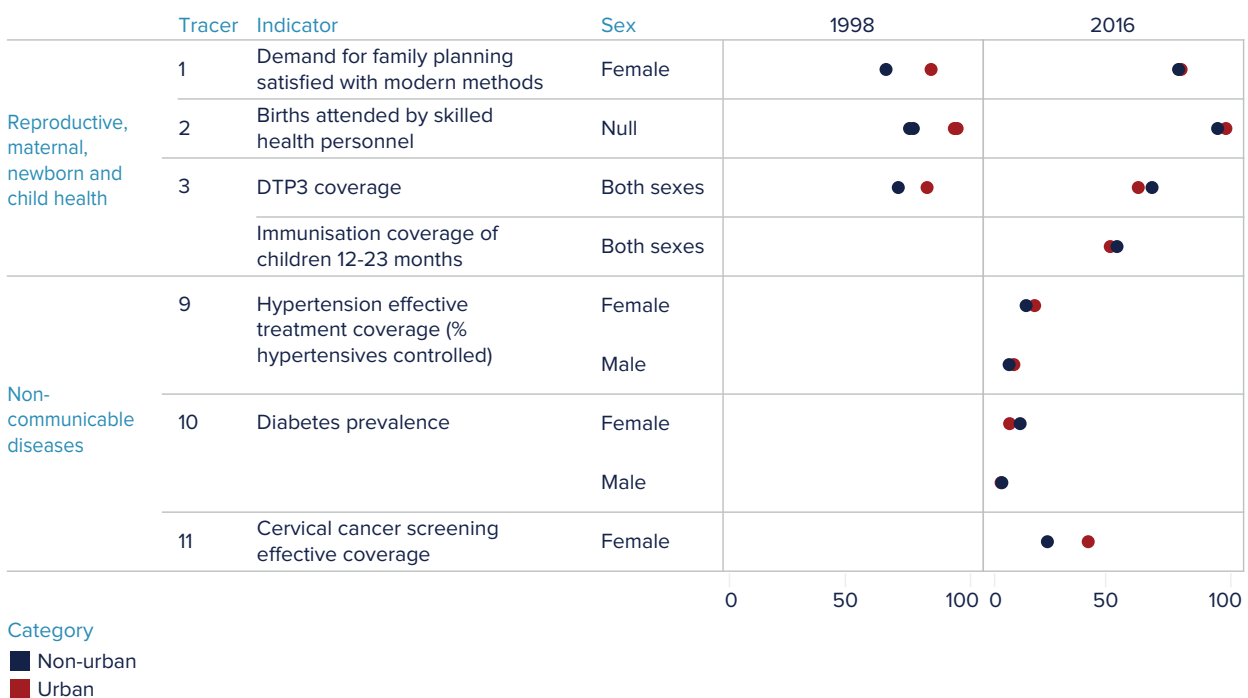
Source: SADHS

Implications for future measurement

Some gaps and implications for future measurement that can be drawn from this work include:

- The global index is heavily dependent on survey data sources such as the Demographic and Health Surveys. These cannot be disaggregated below provincial level to enable progress assessment of the district health system, and they are conducted infrequently. The National Income Dynamics Study (NiDS) has filled some of these gaps, with five waves between 2008 and 2017, but as a broad household survey, it has limited health biomarkers. It has been noted that the country has multiple surveys collecting overlapping elements of interest that are not optimally harmonised or are not conducted at the necessary disaggregation or frequency.^{39,40}
- No sub-national information is available for the TB case detection rate, which is used to adjust the treatment success rate for the 'missing patients' who are never diagnosed and started on treatment.^{41,42}
- Diabetes biomarkers have not been collected as widely as biomarkers for hypertension status, and to our knowledge only the South African National Health and Nutrition Examination Survey (SANHANES) has published estimates of effective treatment coverage at national level, despite 'strikingly high levels of unmet need across several key indicators of diabetes diagnosis and care'.^{43,44} A machine learning model was used to estimate the percentage of people with diabetes receiving treatment in order to leverage available data across multiple sources; these techniques are being used increasingly to address data gaps and should be evaluated more comprehensively and systematically to enable the country to monitor progress for hard-to-measure health services at a sub-national level.
- In some cases, South Africa has data available for the preferred effective coverage indicators (which incorporate a measure of quality of service); these are not available in enough countries for inclusion in the global index, for example ART effective coverage (including viral suppression). Generally, these more stringent indicators will result in a lower estimate for the index and divergence between the global and country-generated estimates.
- The International Health Regulations (IHR) core capacity index is a global metric only available at national level. The environmental health services compliance rate has been developed as a sub-national audit of compliance with these regulations and is a proxy available for the country-developed index.⁴⁵

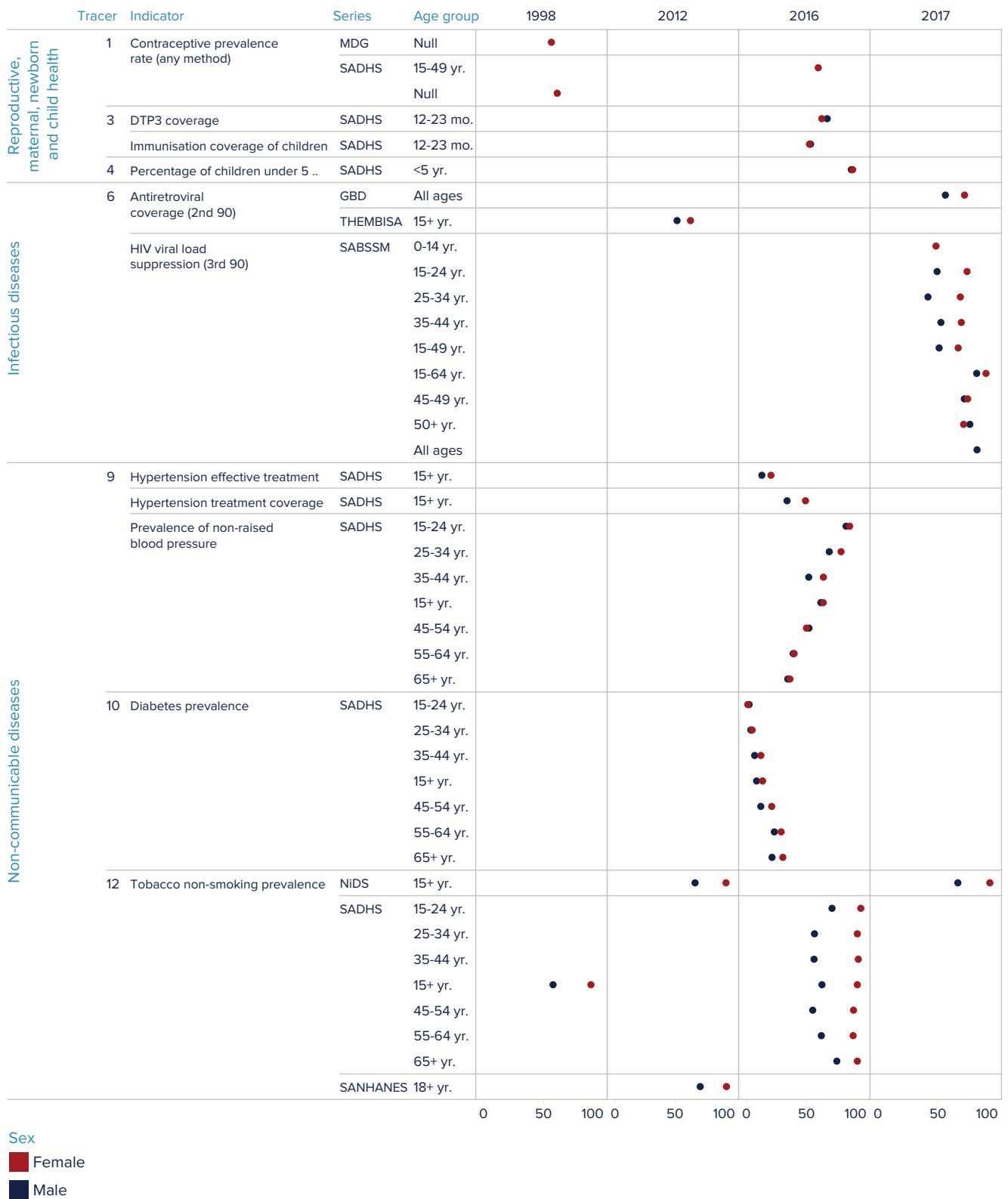
Figure 3: Selected UHC indicators by urban/rural location, 1998 and 2016



Source: SADHS

Note: Diabetes prevalence and cervical cancer screening were not reported in the 1998 DHS.

Figure 4: Selected UHC indicators by sex



- The WHO supports country use of health facility data and is developing guidance documents.³³ The UHC index presented here made use of data from the DHIS for immunisation coverage, pneumonia care, cervical cancer screening, hospital bed density and access to medicines. There are many advantages to using routine data, including the regular availability of a consistent time series that can be disaggregated geographically. Numerous caveats are also generally applicable, and other caveats specific to the individual indicator of interest. Most importantly, facility-based indicators only represent the subset of the population who have sought health care in a facility, and the private sector is still largely omitted from this channel of reporting. Data-quality challenges are numerous and estimation of accurate and valid denominators of the population in need of services based on time-series population estimates is an ongoing challenge. Immunisation coverage is a common example of how the methodological and quality challenges of both survey and routine data sources lead to divergent estimates.⁴⁶
- The use of routine data to measure capacity indicators is also challenging due to the separate public and private sectors and the lack of consolidated and consistently classified information.⁴⁷ The personnel administration system (PERSAL) does not enable identification of specialist categories as required for the UHC index, therefore only the density of medical practitioners was included, and psychiatrist and surgeon density were omitted in the WHO formulation of the health worker density indicator. Although the General Household Surveys⁴⁸ indicate that there is use of the public sector by insured patients and vice versa, the uninsured population was used as the best approximation for the denominator.³⁵ This approach will be even more important when extending the UHC index to sub-national levels, since medical scheme coverage varies widely at district level.
- Availability of equity stratifiers is based primarily on the type of data source, with none being available or meaningful across all the component indicators. Inequities may therefore need to be considered per indicator, or by applying an inequality adjustment.²⁹ More work is required to apply this concept to metrics not derived from household surveys, such as use of an index of multiple deprivation by small areas, as demonstrated in the *District Health Barometer*.⁴⁹
- Very limited assessment of the UHC financial risk-protection measures has been published for South Africa,⁵⁰ and the Income and Expenditure survey data source is infrequent and provides limited disaggregation. Work is needed to develop regular, meaningful measures at sub-national level before this can be included in the overall UHC index.

Quality

Quality is a cross-cutting imperative within the UHC service coverage index, embedded wherever possible in the use of effective coverage indicators. Kruk et al. noted that “poor quality was a larger driver of mortality than non-utilisation of services in 14 of 17 geographic regions and 115 of 137 countries”.²⁷ This is particularly relevant to South Africa, where health outcomes are widely acknowledged to be lower than expected based on socio-demographic status, levels of input, and generally high coverage of health services.^{10,30,51}

The Ideal Clinic framework provides a set of standards for PHC facilities to deliver good-quality health services. Structured assessment linked to programmes for improvement and maintenance represent a major initiative from 2013 to address quality systematically across the health system, focusing initially on PHC.^{52,53} The percentage of ideal clinics, a summary indicator of achievement across multiple components of infrastructure, resourcing and processes, may be an appropriate indicator to include in the capacity category of the UHC index.

Recommendations

- Balance the imperative for a stable baseline and consistent, regular time series with the need to harmonise country assessments with updates in global thinking, advances in technical methods, and availability of new indicators that are useful for inclusion in the index.
- Continue to consult with stakeholders within government and in other sectors to further refine methodological choices, information systems to collect the required data, and analytical techniques to address any limitations in measurement. Key issues requiring development are to:
 - Align the National Indicator Data Set (NIDS) with the requirements for reporting on the SDGs, as well as other national and global reporting commitments.
 - Attempt to collect data elements or variables at small area levels to facilitate sub-national assessment and enable targeting of interventions.
 - Provide leadership and guidance around the harmonisation of surveys so that current duplication and deficiencies can be reduced. Surveys need to be conducted regularly, preferably to district level, and quality data need to be collected, for example on key biomarkers for high burden conditions and financial risk.
 - Continue to expand and develop routine information systems (health facility data, financing, human resources, medicine supply, and electronic patient records) to include all service providers and both the public and private sectors, and improve quality and relevance. Publishing the innovations and challenges in information-systems development should be encouraged to inform global initiatives, and to guide analysis and use of health facility data.³³

- Facilitate the linkage between disparate information systems (such as for human resources for health (HRH)) to enable a holistic view of the actual health worker density by occupation and speciality.
 - Attempt to generate a population view of performance by aligning reporting requirements across the public and private sectors and addressing any other 'missing' population measurements.
 - Develop analytic techniques to capture quality metrics and adjust for measurement limitations, including techniques to combine survey and routine data, regression methods to fill in gaps, and proxy measures where direct measurement is not available.
 - Strengthen systems for patient-level data, including patient registrations and ability to code the reasons for healthcare engagements (Diagnostic Related Groups) to measure outcomes more accurately and comprehensively.
- Consider alternative health priorities for inclusion in the UHC index, for example to replace the malaria tracer indicator.
 - Assess which vulnerable groups or equity dimensions are applicable to each aspect of health services and ensure that data collected can be disaggregated by these stratifiers.
 - Develop a publicly accessible platform to provide interactive access to this consolidated evidence of progress towards UHC.

Conclusion

South Africa has done reasonably well in increasing population coverage – expanding access to the number of services and reaching more of the population, with a general reduction in inequity. However, quality and implementation challenges have persisted. Information systems have improved steadily in scope and data quality over the period, although much more is required to support the realisation of UHC.

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