BMJ Open

'Building on shaky ground'—challenges to and solutions for primary care guideline implementation in four provinces in South Africa: a qualitative study

Tamara Kredo ,[1,2] Sara Cooper ,[1,3] Amber Louise Abrams ,[1] Jocelyn Muller,[1] Bey-Marrié Schmidt,[1] Jimmy Volmink,[1,4] Salla Atkins[5,6]

To cite: Kredo T, Cooper S, Abrams AL, *et al*. 'Building on shaky ground'—challenges to and solutions for primary care guideline implementation in four provinces in South Africa: a qualitative study. *BMJ Open* 2020;**10**:e031468. doi:10.1136/bmjopen-2019-031468

► Prepublication history and additional material for this paper are available online. To view these files, please visit the journal online (http://dx.doi.org/10.1136/bmjopen-2019-031468).

Received 05 May 2019
Revised 24 March 2020
Accepted 03 April 2020

For numbered affiliations see end of article.

Correspondence to
Dr Tamara Kredo;
tamara.kredo@mrc.ac.za

ABSTRACT

Objectives Clinical guidelines support evidence-informed quality patient care. Our study explored perspectives of South African subnational health managers regarding barriers to and enablers for implementation for all available primary care guidelines.

Design We used qualitative research methods, including semistructured, individual interviews and an interpretative perspective. Thematic content analysis was used to develop data categories and themes.

Setting We conducted research in four of nine South African provinces with diverse geographic, economic and health system arrangements (Eastern Cape, Western Cape, KwaZulu-Natal, Limpopo). South Africa is a middle-income country with high levels of inequality. The settings represented public sector rural and peri-urban health facilities.

Participants Twenty-two participants with provincial and district health management roles, that comprised implementation and/or training on primary care guidelines, were included.

Results Participants recommended urgent consideration of health system challenges, particularly financial constraints, impacting on access to the guidelines themselves and to medical equipment and supplies necessary to adhere to guidelines. They suggested that overcoming service delivery gaps requires strengthening of leadership, clarification of roles and enhanced accountability. Participants suggested that inadequate numbers of skilled clinical staff hampered guideline use and, ultimately, patient care. Quality assurance of training programmes for clinicians—particularly nurses—interdisciplinary training, and strengthening post-training mentorship were recommended. Furthermore, fit-for-purpose guideline implementation necessitates considering the unique settings of facilities, including local culture and geography. This requires guideline development to include guideline end users.

Conclusions Guidelines are one of the policy tools to achieve evidence-informed, cost-effective and universal healthcare. But, if not effectively implemented, they have no impact. Subnational health managers in poorly resourced settings suggested that shortcomings in the health system, along with poor consultation with end users, affect implementation. Short-term improvements are possible through increasing access to and training on guidelines. However, health system strengthening and recognition of socio-cultural–geographic diversity are prerequisites for context-appropriate evidence-informed practice.

Strengths and limitations of this study

- The qualitative research methods used enabled us to explore in-depth perspectives of those involved with guideline implementation regarding what is working and what can be improved in a lower-income setting with high levels of inequality.
- We report interviews with provincial and district health managers in four culturally and geographically diverse South African provinces, that are likely to reflect settings in other low-income and middle-income countries.
- There are many primary care guidelines available in South Africa with different target users, further interviews may elucidate specific barriers to and enablers of guideline implementation.
- This health systems research addressed a knowledge gap important for effective guideline implementation.

BACKGROUND

Primary healthcare, often the first point of contact for people within a public health system, aims to provide comprehensive, accessible, quality, cost-effective care throughout a person's life.[1 2] A functioning primary healthcare system is considered indicative of a strong health system and a necessary precursor to achieving Universal Health Coverage (UHC).[2 3] Despite clear goals and many multinational agreements over several decades, a 2017 World Bank and WHO report measuring UHC success stated that at least

half of the global population does not yet access high-quality basic health services.[3]

Like many low-income and middle-income countries, South Africa has committed to enhancing and improving the quality of primary care for UHC.[4 5] However, despite the political will indicated by the White Paper for a National Health Insurance Scheme to fund UHC, the investment thus far has not been sufficient to overcome the challenges posed by colliding communicable and non-communicable epidemics alongside recognised health system deficiencies.[6–8] Health outcomes remain poor relative to other middle-income countries with similar health spend; and healthcare remains inequitably distributed within a two-tiered public and private system, where 40% of the health budget is consumed by the private sector, despite serving only 17% of the population.[9 10] Several strategic initiatives aim to address these deficiencies, including Primary health care (PHC) re-engineering, with an emphasis on strengthening district health managers, and advancing policy planning for National Health Insurance.[7 11] These initiatives place importance on clinical governance, with clinical practice guidelines (CPGs) as one named strategy for healthcare strengthening.

CPGs are recognised tools for health policy implementation and quality improvement.[12 13] Evidence-informed CPGs aim to recommend effective prevention, diagnostic and treatment interventions, while minimising harm, within the limits of what a health system can afford. Well conducted CPGs provide evidence-informed recommendations to guide patient care.[13] In South Africa, at least 175 CPGs have been developed since 2012, largely for the management of non-communicable diseases and mostly by the Department of Health.[14] While the number of CPGs available is substantial, they provide no benefit if inadequately implemented. Studies in South Africa and elsewhere have found potential implementation gaps, where despite the availability of CPGs, clinical care does not meet required standards.[15–18]

Evidence-to-practice gaps pose a substantial challenge in all healthcare settings and how best to overcome them has been a longstanding debate.[19 20] There are checklists available that outline potential approaches for best-practice CPG implementation.[21–23] However, which strategies work, under which conditions, remains a complex and evolving research field. Generally, tailored, multifaceted interventions addressing specific barriers are better, but the benefit to health or process outcomes is often modest at best and difficult to extrapolate to different contexts.[20 24 25] Increasingly, theory-informed approaches are used to design the complex interventions required to change behaviour, yet the cost of doing this relative to the benefit remains unclear.[26 27] In South Africa, several trials evaluating evidence-informed approaches for CPG implementation find a small, but consistent benefit from targeted strategies, yet, roll-out of these context-specific strategies remains a gap.[28]

Given the limited resources allocated to health, particularly in low-income and middle-income settings such as South Africa, knowing how best to intervene efficiently and effectively, resulting in best quality care, is paramount.[29] In this context, exploring the views of those involved with CPGs is a reasonable way to learn about local needs. The South African Guidelines Excellence (SAGE) project aimed to understand primary care CPG development, implementation and capacity needs. For the qualitative component of SAGE, we interviewed diverse role players involved in primary care CPG development, implementation and/or use. We have reported the findings from national CPG developers[30 31]; frontline healthcare workers who use CPGs[32]; as well as allied healthcare providers regarding CPG development and implementation.[33–36] In this paper, we build on this work but delve further into the area of health system and service governance to explore the perspectives of provincial and district health managers who have responsibility for CPG implementation. We aimed to explore the perspectives of these provincial and district managers regarding barriers to and enablers for primary care CPG implementation in four provinces in South Africa.

METHODS

Design

We used qualitative methods from an interpretative paradigm to understand the experiences and perspectives of provincial and district managers responsible for primary care guideline implementation. The methods and study context have been described in detail elsewhere,[32] and thus only a summary is provided here, together with a detailed description of the participants and analysis methods used.

Study settings

South Africa is an upper middle-income country with a population of 58.8 million in 2019[37];however, its population faces among the highest rates of inequality globally.[38] Over several decades, the national government has increased emphasis on PHC services managed through 44 district offices across nine provinces, ranging from 2 to 10 districts in each province.[7 37 39 40] Districts are administrative subsections of the province, usually run as part of local government. Legislation has recently been introduced that supports the implementation of UHC, through a National Health Insurance system.[41] In general, national government develops health strategies and CPGs; and provincial governments implement them through regional, district or community healthcare facilities and their providers.[9] Primary care providers include nurses, doctors, nutritionists, physiotherapists, dentists, occupational therapists and social workers. However, primary care clinics are largely nurse-run, with access to the additional providers intermittently or at larger district facilities. There are several primary care guidelines endorsed by the national government for public sector use. These include condition-specific guidelines (eg, basic antenatal care, HIV and tuberculosis) or

integrated guidelines (eg, Essential Medicines List, Adult Primary Care, Integrated Management of Childhood Illness).[42] Several programmes to strengthen district clinical governance have been introduced and are linked to CPG implementation: (1) The Ideal Clinic, defined as a 'clinic with good infrastructure, adequate staff, adequate medicine and supplies, good administrative processes and sufficient adequate bulk supplies', includes ensuring access to and use of CPGs[42]; and (2) 'primary healthcare re-engineering' which aims to strengthen district healthcare management through community health workers; school health programmes; and District Clinical Specialist Teams (DCSTs).[11] DCSTs include a family physician, primary healthcare nurse, obstetrician, advanced midwife, paediatrician, paediatric nurse and anaesthetist. The family physician and primary healthcare nurse are central to primary care CPG implementation through their clinical governance role, including ensuring the provision of training and mentorship to implement nationally endorsed CPGs. They have limited clinical roles, but rather take on management and supervision roles for the facilities they support.

As outlined in the Introduction section, this is a substudy of the larger SAGE Project that interviewed a range of role players in primary care guideline development, implementation and use in South Africa. In this substudy, we explore the views of provincial and district health managers responsible for guideline implementation. This includes provincial managers with oversight of programmes such as primary care and district managers with strictly management roles and those with clinical governance and support/training roles (eg, members of the DCSTs) or those responsible for training. All participants we interviewed have roles in primary care CPG implementation.

Sampling and recruitment

Sampling took place in four of the nine provinces in South Africa—Western Cape (WC), KwaZulu-Natal (KZN), Eastern Cape (EC) and Limpopo (LP)—chosen for their socio-economic, geographical and cultural diversity.[32 39] Within each province, we aimed to interview five participants from the provincial office and from two district offices in person at their place of work or a preferred venue. We obtained approval from Provincial Research Units prior to conducting interviews. In the EC, we were invited to present at a provincial research day, where we received buy-in for our planned research.[32] In the WC, we contacted known provincial managers involved with PHC CPGs. In the other provinces, we invited individuals recommended by the Provincial Research Units. Hence sampling was both purposive, as we sought to include individuals with specific experience in PHC CPG implementation; and, through convenience, when specific individuals, meeting our criteria, were recommended and available to be interviewed. Once access was negotiated, all those invited agreed to participate.

Data collection and management

Individual interviews were considered most appropriate to provide in-depth insights into people's lived experiences.[43] We used a semistructured interview guide (online supplementary file 1), asking about experiences of CPG adaptation and implementation processes, and about potential barriers to and enablers of successful implementation. The guide was adapted iteratively, drawing on insights from previous interviews and included open-ended questions to allow participants to direct the emphasis of the interview.[43] Interviewers received training in interviewing and two interviewers were present at all interviews.TK, a medical doctor with qualitative interview training, led most of the interviews, accompanied by AA, JM or other research team members. Interviews were conducted in English and lasted 60–90 min. There were no requests for translation despite the various first languages spoken in the provinces. All interviews were individual, with two exceptions in which colleagues joined the interview at the request of the invited participant. One interview took place telephonically at their request due to challenges with scheduling.

All interviews were recorded. After each interview, reflections and summaries were written to capture initial insights and identify points for further exploration in subsequent interviews. Interviews were transcribed verbatim, and reviewed for accuracy (TK, JM). Data were stored electronically on password-protected computers; and consent forms stored in a locked cabinet.

Analysis

We used an iterative, thematic content analysis approach.[43 44] Three researchers read initial transcripts (TK, ALA, SA) and agreed on the general meaning and main issues presented. One researcher (TK) then reread transcripts, performing open coding to explore barriers to and enablers of CPG implementation, extracting the relevant quotes/coding units. TK then used the quotes to explore the topics raised, unpack the meanings of statements made, while categorising the arising themes.[45] Categories and their related quotes were further examined (TK, SC, BMS, SA) to identify meaningful themes.[46] Following this, results were discussed with SA to develop the analysis further and then presented to all authors for input and verification prior to finalisation. The research team was interdisciplinary including public health, medical doctors and social scientists enabling various views to enrich the interpretation.

Trustworthiness

Several measures were undertaken to ensure that the research process was trustworthy, authentic and dependable in order that the findings would be a credible reflection of reality. Detailed capturing and rich description of our approaches, including that of sampling, data collection, data management and analysis, were conducted to enhance the dependability of our findings.[46] Quotations were included to provide readers the opportunity to

Table 1 Description of the research participants

Interview information (20 interviews with 22 participants)	KwaZulu-Natal Province	Limpopo Province	Eastern Cape Province	Western Cape Province
Total interviewed	4	5	7	6
Provincial office	1	2	3	5
District office	3	3	4	1

interpret data, establish confirmability and to show data richness. Complementary research competencies and experiences of the multidisciplinary team of researchers (social science, medical practice, CPG development and implementation) influenced data interpretation and strengthened study rigour. Transferability to a broader readership was demonstrated through information about the sample, setting and provision of a sufficiently detailed report to consider relevance to others. Reflexivity and the researchers' positionings were considered throughout the process of data collection and analysis, thus enhancing the comfirmability of the findings.

Patient and public involvement

CPGs are tools that aim to directly impact patient care and guide clinician–patient engagement. In South Africa, there is little research evidence regarding patients' views about CPGs. The research question was developed with patients in mind, but we were seeking perspectives of provincial and district health managers in primary care, and neither patients nor the public were included. The results of the research will be shared with the participants.

RESULTS

Twenty semistructured interviews were held from September 2015 to August 2016 (table 1). Two interviews included more than one individual, at the request of the invited participant, and as such there were 22 included participants. Participants had previously worked in clinical positions as nurses (n=15), or doctors (n=7), but were currently occupying management positions. These provincial and district managers were responsible for health service delivery and worked in PHC generally or within specific clinical programmes (eg, HIV, non-communicable diseases), or in operational roles. Our final sample included provincial managers representing four provinces; district managers from two districts in each of the four provinces. District clinical specialists were included in LP, KZN and EC, however, the WC has not implemented the DCST programme.

Most participants considered CPGs credible sources to guide clinical practice and, importantly, believed that CPGs impact positively on patients' health. Some participants described that CPGs can 'save a life'. District managers with a medical background particularly shared views regarding the value of CPGs, stating that they are 'evidence-based and it works…mortality goes down when we do things properly'. Further sentiments supporting CPGs included 'harmonisation of practice', 'quality improvement' and 'rational' medicine use.

Despite widespread belief in the credibility and positive impact of CPGs, participants felt that CPG implementation is currently inadequate and described the multiple challenges they face in this regard. We have organised these into two main themes namely: (1) health system factors and (2) socio-cultural contextual issues.

Health system factors

Provincial managers experienced CPG implementation as challenging, under-resourced and sometimes insufficiently planned. They suggested that CPGs were not the issue, but rather that the capacity of the health systems to support implementation posed the greatest challenge. A provincial manager who had worked in several provinces explained: 'training and the guidelines are fine, but the bed rock on which we are building is not – we are building on shaky ground' (Provincial manager, WC).

Financial constraints

Financial constraints were recurring issues across provinces. Frustration was expressed by some that funding across different conditions was inequitable, with more funding for HIV and tuberculosis, 'but the other big killers' such as non-communicable diseases received little or 'no support'. This situation was often driven by international donor funding, which influenced which CPGs were prioritised for implementation.

Access to the right tools and equipment was perceived as a prerequisite for successful CPG implementation. However, all participants spoke about budgetary constraints, and a resulting lack of, or poorly serviced, clinic equipment and stocks with the associated impact on CPG implementation. A PHC district manager stated:

> Budgetary constraints are still a challenge, the systems are still a challenge, they are hindering the implementation of these guidelines. For you to get a blood-pressure machine, you have to wait for more than two months. If this scale is broken, you should follow a tender process for that scale to be repaired, so the systems are killing the implementation of guidelines also, the procurement and supply-chain systems. (District manager, EC)

Furthermore, the simple issue of limited access to CPG copies on site, due to budgetary constraints, was highlighted as an additional barrier for using CPGs. As reflected on by a district manager in rural EC 'I mean you are just lucky if you get them'.

Several district managers also mentioned that 'the challenge is about printing the guidelines' due to budget allocations from national government. Solutions were offered to overcome both the poor quality of, and poor

access to, CPG copies. A dominant view was that digital access would mitigate these issues and increase 'click and check' CPG access. Several managers suggested, however, that both the printed and digital versions are needed; for example, one rural district manager said: 'They [older healthcare providers] like the booklet, but the young ones like the app' (Provincial manager, LP).

Despite many participants highlighting the potential value of increasing digital CPG access, financial barriers were expressed in all provinces, as one manager suggested 'no computers, no internet, there's no connection' (District manager, KZN). This was repeated by others: 'I don't think you will find a single computer that's got any connection to anything' (District manager, KZN).

> In addition, a district manager in an urban context explained the dilemma of investing in digital solutions in the face of limited funding. She asked: 'Do you want to buy more computers, or do you want more medication? (District manager, WC)

Governance and leadership

Senior managers explained that effective CPG implementation required strong governance including clarity regarding responsibility, and how implementation should be delivered and monitored. '…it's an issue of governance, how is implementation of guidelines governed and whose responsibility is it and do we have enough capacity to manage governance' (Provincial manager 2, WC).

District management was perceived as demotivated because the volume of policies requiring implementation left them feeling 'completely bombarded and confused'. In addition, lack of support for implementation, or in some circumstances the punitive approach taken towards managers struggling with implementation within very challenging health systems, was perceived as demoralising. A senior manager, having worked in several provinces with differing infrastructure, described his experience:

> There are good people at ground level, but without a level of protection and support they kind of just get nailed. So every new policy is looked upon with dread because you are worried that at some point somebody is going to come and say you are not implementing it. (Provincial manager, WC)

Managers offered various solutions, explaining that it was not only the remit of public servants to lead CPG implementation. Community champions and leaders were suggested as additional enablers of CPG implementation. Within the health workforce, this included senior academics who inspired junior staff; while in the community it was community leaders, including traditional chiefs or religious leaders who endorsed local facilities and encouraged patients to follow guidance.

Further recommendations to support governance included developing relationships with non-governmental organisations (NGOs), known as 'partners'. Given the limited provincial budgets, partners were often perceived as the only means for providing training or developing materials for CPG dissemination. Partners were mentioned, particularly in the EC, both at the provincial and district level, as one district manager explained 'when the guideline is out, we need to call them [NGO partners] to be part of us'. However, this also raised the issue of sustainability as there was a risk that when NGO funding ended, services would be withdrawn, and local government lacked capacity to maintain the activities, potentially undermining care.

Accountability approaches

Several managers suggested accountability mechanisms to enhance implementation. For example, audits and feedback to measure CPG use was an accountability and quality-improvement approach cited by various participants. This approach was reportedly functioning better in certain provinces. A provincial manager in the WC described a constructive experience:

> (Based on the) situational analysis and audits…we pick up the gaps in quality and we start looking at what is our opportunity to, either tweak a guideline, develop a guideline or a tool or piece of stationary or an algorithm or flow chart that will close that gap. (Provincial manager, WC)

While accountability mechanisms were perceived by some as essential, most managers, on the contrary, described audits as punitive and obstructive, with potential negative consequences. This statement by one provincial manager is indicative of many similar statements by others: 'then comes the monitoring and evaluation people to monitor that thing, not in a nurturing way, but in a "why didn't you hit your targets kind of way" ' (Provincial manager, WC). This concept of punitive audits emerged from several provinces. One senior manager spoke about a 'compliance culture' in which focus was directed primarily to what is measurable, such as structural inputs like infrastructure, and the blame that ensues if these targets are unmet.

> …when it comes to focusing on clinical guidelines if no one is auditing that in the same way. So, the Auditor General is this big bogey man out there. If anything goes wrong, then, of course, the province gets into big trouble. So, there is a lot more gravitas or seriousness attached when the Auditor General says something… (Provincial manager, WC)

Another participant from the EC provided an analogous account:

> We will comply and complain later, if there is a time to complain. But what is emphasised, is compliance. There is that strict compliance. Compliance. If you don't comply, it means you are failing your district, or your sub-district, or your clinic or your people. There

is no time for complaining or reflecting, it is compliance. (District manager, EC)

The compliance culture and aversion to punitive action was thought to have negative effects on CPG implementation and patient care. Participants indicated how the compliance and audit systems 'just adds to the frustration', 'distracts' from the focus on clinical care and ultimately results in rushing ahead to meet targets, or as one manager put it: 'running around like a headless chicken' (District manager, EC).

Human resource constraints

Health workforce constraints were emphasised as pertinent to CPG implementation. Managers described the mismatch between the growing workload and unchanging staff numbers:

> We have this burden of disease that is growing. We have resources that are shrinking. So more of our health workers are being asked to do more with less resources. (Provincial manager, WC)

Health workforce barriers to CPG use were described as threefold: staff shortages, insufficient time and inappropriately qualified staff unable to fulfil required tasks. These issues resulted in staff being 'overstretched' and 'not coping'. It was suggested that staff experience considerable time pressures due to their heavy workloads, 'continuously dealing with patients' as well as pressure from patients wanting them to work 'fast, fast, fast'. As one provincial manager lamented:

> …they [nurses] have no time to look at guidelines, they have no time to do quality work to check the quality issues because they are continuously dealing with patients. (Provincial manager, LP)

Capacity gaps and opportunities

Linked with human resources is capacity building. Training was emphasised as the primary means by which CPGs are implemented. Participants generally agreed that to support implementation 'you can't just automatically know how to do things, you need to be trained'. Therefore, building skills and knowledge was understood as a prerequisite to changing practice.

Primary care nurse training gaps

An issue raised mostly by nurse managers was the poor state of professional training of PHC nurses. Nurses were described as 'not skilled' and the nurse training syllabuses 'outdated', raising concerns that nurses entering practice were inadequately prepared. In the most extreme example, a provincial manager suggested that 'student nurses come out blank…they are the ones that are causing all these deaths'.

Several suggestions were made for optimising training and support through: (1) training delivery approaches and (2) post-training clinical support.

Considerations during training

Regarding training itself, access to workshops and ensuring adequate coverage of staff was identified as a significant challenge. Various participants indicated that 'onsite training is the best one', as when training was delivered offsite, fewer staff could attend, and disseminating learning when back at facilities was ineffective: 'they [the nurses] don't cascade the information'. However, 'lack of time' and 'budgetary constraints' to provide training in every facility was their reality. Therefore, finding contextually appropriate training approaches were suggested, such as 'training local people to be trainers' and working with NGOs that have more training resources. Furthermore, ensuring that DCSTs are maximally used to provide training was considered key. As a district manager in LP suggested:

> DCST staff are now doing the training per facility, no more calling people to a centralised place…and also [doing] the support visit in the facility. (District manager, LP)

Several participants recommended that training should be interactive, not didactic. Many commended the practical skills training, so-called 'fire drills', used for maternal health training. This training requires staff to demonstrate a response to an emergency during the training, but also subsequently onsite at unexpected intervals.

Despite many challenges identified regarding nurse training, nurses were still considered to have better access to training than doctors, resulting in outdated practices by doctors. It was reported that doctors are excluded from training. Participants recommended that training should be interdisciplinary, bringing all clinical disciplines onto the same level. As a senior manager with a medical background suggested, 'the nurse now knows more than the doctor. So you have to train everybody at the same time' (District clinician, KZN).

Post-training recommendations

Following training, a critical gap raised repeatedly was the absence of 'clinical support' and 'mentoring'. As a district clinician suggested, 'we desperately, desperately need mentors'. It was emphasised that even with access to up-to-date, high-quality CPGs, when post-training support is poor, implementation gaps were likely, as captured by the following quote:

> On-site facility mentoring, it's a problem…without that, we can have much, much guidelines, good guidelines, but if there's no on-site mentoring, we are just wasting the government's money. (District clinician, KZN)

Socio-cultural and geographic challenges to CPG implementation

In addition to health system factors, socio-cultural and geographic factors were raised by most participants, particularly those in district settings presumably closer to

the day-to-day requirements of health service delivery. The explanation given was that there is a mismatch between what is recommended in CPGs and what was acceptable due to culture or feasible in rural settings.

Acceptability and cultural considerations

Several specific CPGs that posed challenges to implementation were mentioned. For example, the CPG recommending voluntary male medical circumcision was emphasised as being at odds with cultural beliefs and norms in settings where traditional circumcision required specific rituals. As one female manager with a nursing background described:

> …male circumcision, it is a taboo for me to talk about circumcision. Now you tell people go and do the medical male circumcision. It is as now you are insulting their culture. (District manager, EC)

Another example related to when mothers with newborns require follow-up clinic visits after delivery, whereas, in some traditional cultures, leaving home for a specified period postdelivery is frowned on:

> After birth, she must stay at home until 10 days. (District manager, EC)

Geographic barriers

Geography also posed barriers to CPG implementation. The distance and difficult environmental circumstances under which many patients must travel to attend clinic appointments make the implementation of certain CPG recommendations unfeasible:

> A woman in the Eastern Cape will have to travel 5 kilometres or even more to reach the clinic, so how would you ensure that you reach the clinic 6 days after birth? Those are things that, at times, are impossible when you look at the guidelines. (District manager, EC)

> …in rural areas, people are scattered, and there are rivers when it is raining, they can't go to that facility… there was rain for the whole month and then there were floods, and maybe the bridges are then just swept away with the floods. And then people who can't go to that clinic to go and fetch their treatment for diabetes and hypertension. (Provincial manager, EC)

One-size-fits-all approach to CPG development

Critically, the disparity between CPG recommendations and their feasibility was perceived to result in unsuccessful CPG implementation and subsequent failure on standardised national indicator 'report cards':

> Most of the time we will be Number 0 [on audit reports]…., because it [the guideline] is not implemented in the Eastern Cape. It's not working. But they [national government] will always say Eastern Cape is Number 0. It's Number 0 because the tool does not fit here, it's [the guideline] is just not right, they are using something which is round in a square hole… (Provincial manager, EC)

Many provincial managers reported that consultation between national and provincial government was happening, prior to finalisation of a CPG, to address contextual barriers:

> So I think in terms of implementation what I've seen works really well is when people have been part of the process from the policy development side from the word go. (Provincial manager, WC)

However, many participants, particularly district managers, did not feel consultations were done consistently and in meaningful ways to ensure that the final CPGs and linked indicators were aligned with geographical and cultural contexts. Many felt that CPG content was 'one-size-fits-all' and that examples of contextually appropriate implementation were limited.

Despite participants emphasising the importance of context, processes for the contextual adaption of CPGs were not routinely described. One exception was an example provided about the structured approach to adopt, adapt or develop new CPGs in the WC. A provincial manager noted:

> …either use the policy from national as is or we either translate it for the local context or we develop policy, because national just hasn't done it. (Provincial manager, WC)

DISCUSSION

This study explored perspectives of South African provincial and district health managers on potential barriers to and enablers of primary care CPG implementation. Two major themes emerged. The first related to broader health system factors, such as financial constraints, governance and health workforce capacity gaps. The second emphasised the importance of socio-cultural and geographic factors, and the need for CPGs to be adapted to fit local contexts.

Regarding health system factors, we found that, despite managers' willingness to support PHC CPG use, the relative dysfunction of the health system posed barriers to doing so. Aspects of this theme mirrored several of the often-cited WHO health system building blocks, including leadership and governance; financial arrangements; health service arrangements and implementation strategies, such as training.[47 48]

Strong leadership is required to drive CPG implementation.[48 49] Participants, all of whom occupy responsible management positions, described governance gaps affecting CPG implementation, a factor also identified in other studies in sub-Saharan African countries.[50] Participants described volumes of incoming policies without time for consultation, adaptation or planning; and rushed implementation responding to political drivers rather than healthcare quality considerations. To address this challenge, managers often partnered with community leaders and NGOs. This was deemed necessary, particularly in the EC, a province where many health system and

financial issues were emphasised by our participants and have been highlighted in national reports.[4 7] CPG implementation strategies take many forms, including professional development, dissemination of summary products to patients and healthcare providers, use of key opinion leaders, to name a few.[24] In the South African setting, delegating responsibility to partners with relevant skills and resources is necessary, however, participants were concerned about sustainability of donor-funded activities.

Relatedly, accountability was a reported gap, and, in particular, clarity regarding who is responsible for CPG implementation and how best to monitor success. For monitoring, audit and feedback was proposed, a quality improvement strategy premised on the notion that clinicians may change their performance when they receive feedback regarding substandard practice.[51] Those we spoke to provided examples of constructive audit and feedback allowing managers to adapt implementation to address gaps. However, mostly, audits were experienced as punitive, driving managers to 'comply' rather than innovate. A systematic review of 49 trials of audit and feedback found that this approach should benefit CPG implementation.[51] Importantly, this review identified success factors that need be considered, including whether the baseline performance of health professionals is low to start with; feedback is recurrent and given both verbally and in writing; and the process includes clear targets and action plans.[51] Our findings suggest that further factors may need to be considered, such as feasibility and context, to ensure that implementers feel empowered, rather than discouraged or demotivated, by audit and feedback systems.

Most participants described CPG implementation as reactive, rather than proactive, driven by demands to implement without adequate time or funds to do so effectively. Participants spoke of a 'compliance culture' and explained that requirements were heavily weighted towards administrative reporting rather than consideration of clinical quality improvement. Within the field of 'quality of care' measurement, a longstanding model posited by Donabedian proposed three measurable facets of quality of care: (1) structure (eg, inputs to care such as facilities, staffing); (2) process (eg, clinical care); and (3) outcomes (eg, health outcomes, patient satisfaction).[52 53] In South Africa, the apparent emphasis on structural measurement is unlikely to be sufficient, as shown by a multicountry, cross-sectional study in similarly poor settings which found that infrastructure reports correlated poorly with clinical care or CPG adherence.[54] Drawbacks of this narrower structural and process focus have also been described in the UK's National Health Service, where attempts to create efficiency resulted in 'compliance-oriented bureaucratised management' and was felt to hinder rather than enable quality service delivery.[55]

Financial constraints were identified as critical factors limiting effective CPG implementation. Lack of basic equipment, and CPG books, was described as the norm. Additionally, lack of infrastructure, including internet or devices, was a perceived barrier to using CPGs. These views mirrored those of PHC providers in the same districts that we spoke to who described that they would be more likely to use CPGs if digital access was possible.[32] However, like the managers, they perceived lack of internet in facilities, and exorbitant costs of data required for downloading CPGs, asbarriers to digital access.[32]

Human resource constraints, such as clinical workload and understaffing, was another health system issue hindering CPG implementation, a finding that echoes a substudy of PHC clinical staff in these districts.[32] Training is the mainstay of capacity building for human resources for health. It is vital for building skills and knowledge to implement CPGs, but is also a form of enablement for teams more generally. In South Africa, like many low-income or middle-income settings, nurses are the backbone of PHC services. Yet, poor quality nurse training was a concern, associated with outdated curricula, inaccessible training sites and a presumed impact on patient care. Similar findings have been reported from other research in South Africa, for example in the context of antenatal care guideline adherence.[56] This is a global challenge, with the WHO recognising the importance of quality health workforce training in realising UHC.[57] One of the contradictions from our findings was that despite training gaps and primary care provider workload, one of the doctors said that 'nurses know more than doctors'. This was in reference to the view that nurses have more training opportunities and are also more motivated to use current CPGs than doctors. Our previous research with primary care providers supports this finding of more willingness to use guidelines by nurses, compared to doctors, but further research is needed to explore this issue.[32]

To overcome these challenges, many participants pointed to the importance of post-training clinical mentorship. When in place, this was perceived to provide the necessary, case-based, in-facility support for CPG implementation and role-modelling of CPG use. This view has been reported by other South African studies, in particular a study exploring the Ideal Clinic programme implementation suggested that family doctors in the DCSTs have similar perspectives regarding the importance of mentorship.[58 59]

In addition to health systems issues, the importance of context emerged as a significant theme. Within the public sector, CPG production in South Africa is generally the responsibility of the National Department of Health and implementation a provincial mandate, with further devolvement of decision-making to districts.[7] This decentralised approach is advocated globally, particularly for health systems progressing to UHC to enable more responsive, ground-up health services.[60] However, we learnt from our participants that the problem with this is twofold. First, health indicators are aligned with national strategies, which do not consider differences between provinces. Second, local teams lack time and specific

training in the adaptation of the CPGs for their setting. These concerns were also expressed by national primary care CPG developers, who described that the fragmentation between and within provinces likely hampers implementation.[30] According to our participants, implementation of a 'one-size-fits-all' national CPG may result in several negative consequences, including poor scores on national indicators due to unfeasible recommendations that are not adequately implemented ('round peg in a square hole' analogy), and rushed implementation to align with a national programme or political drive.

Despite, and perhaps because of, the contextual challenges these managers encountered, many described innovative approaches to overcome geographic barriers or cultural issues. For example, a female manager in the EC led the development of a male nurse-led programme for medical male circumcision because in her setting for women to discuss circumcision is a cultural taboo. In addition, where geographical barriers arose, such as flooding rivers, district managers tried to provide vehicles and airtime to community healthcare workers to reach patients. This was not always successful, due to financial barriers and inadequate procurement processes. A number of managers described plans that required impressive ingenuity and commitment to overcome health system and contextual barriers, despite all odds, and seemingly with little recognition. Additionally, despite the managers' evident wealth of knowledge, experience and creative solutions, when pressed, there was a notable absence of examples provided by participants of opportunities to share lessons learnt, innovative approaches and successes or challenges between and within districts or provinces.

Taken together, these health system and contextual barriers to CPG implementation are recognised in various CPG frameworks as potential challenges to implementation.[22 61] However, arguably, those frameworks, largely developed in higher-income settings, contain more detail regarding the CPG and healthcare provider characteristics and less regarding the social, political and contextual factors. In South Africa, availability of CPGs and motivation of healthcare providers and managers to support CPG use are less of an issue than those of context and health systems.[32]

Implications for policy and practice

In this study, participants made recommendations regarding structural barriers that hinder CPG implementation and ultimately impact on patient care and its quality, and through these on UHC. Participants emphasised the importance of strengthening leadership, clarifying roles and putting in place constructive accountability measures. Skilled nursing and other clinical services are required to address the health burden, along with the equipment and supplies to deliver their services as recommended by evidence-informed CPGs. Quality assurance of PHC training programmes, particularly nurses, and facilitating interdisciplinary training to ensure all staff are adhering to CPGs were suggested. Innovations, such as the DCSTs, are filling a reported gap in providing clinical mentorship, but these collaborative working groups need further strengthening. Finally, for effective CPG implementation in health services to occur, considerations of the unique settings in each province, including culture, geography and social needs, must be undertaken. Systematic use of available CPG implementation checklists to explore, understand and plan for implementation will assist to tailor strategies to address local needs, making best use of limited resources for quality healthcare.[22 25 61]

Limitations

Elsewhere we have discussed limitations within the broader SAGE qualitative study.[31 32] In brief, exploring CPG implementation for all PHC CPGs encompasses a very broad research area. Many PHC CPGs are available, each likely has different barriers. However, in our exploratory research, we found many cross-cutting issues such as access, training and supply chain factors. Future research can build on our findings and identify CPG-specific barriers and enablers. In particular, the thematic area on socio-cultural–geographic issues, although important, included relatively fewer findings. This requires further exploration with additional participants from various groups including patients and community leaders. To provide further specific contextual insights.

Another potential limitation is the sample, including provincial and district managers in four provinces, which may not sufficiently capture all views for this subgroup of the health services. Additionally, we used a mix of purposive and convenience sampling, resulting in inclusion of participants who were more likely to be available or responsive. Despite this, common themes emerged across provinces and reflect previous research. As this is not a static situation, research during the evolving process to UHC is necessary. Moreover, while many of the same themes emerged among interviewees, complete data saturation was not reached in this substudy. Time and financial restraints prevented further data collection and additional concepts may have emerged if we had spoken to more people. Further research among this population would thus be potentially useful.

Finally, we cannot rule out the possibility of response bias, in which participants respond according to what they believe we want to hear.[43] However, many rich issues emerged from most participants. Using the individual interview approach may have provided a safe space and achieved the depth that we have been able to capture and share in this paper.

CONCLUSION

CPGs are among the suggested policy tools to achieve evidence-informed, effective and cost-effective universal

healthcare.[41] Subnational health managers reported that health system challenges, along with socio-cultural and geographic context, are central issues hampering successful CPG implementation. Our study adds to a body of knowledge regarding evidence-informed policy implementation. Our participants provide practical insights relevant to primary care CPG implementation for lower-resourced settings aiming for UHC.

Author affiliations
[1]Cochrane South Africa, South African Medical Research Council, Tygerberg, South Africa
[2]Department of Medicine, Division of Clinical Pharmacology, Stellenbosch University Faculty of Medicine and Health Sciences, Cape Town, Western Cape, South Africa
[3]School of Public Health and Family Medicine, University of Cape Town Faculty of Health Sciences, Observatory, Western Cape, South Africa
[4]Deans office and Centre for Evidence Based Health Care, Stellenbosch University Faculty of Medicine and Health Sciences, Cape Town, Western Cape, South Africa
[5]New Social Research and Faculty of Social Sciences, Tampere University, Tampere, Pirkanmaa, Finland
[6]Department of Public Health Sciences, Karolinska Institute, Stockholm, Stockholm County, Sweden

Twitter Tamara Kredo @tamarakredo

Acknowledgements We would like to thank all those who participated in the research, giving us time from their management duties and helping us to understand the clinical guideline implementation landscape in South Africa. Many thanks also to several Cochrane South Africa staff and researchers who assisted with the project including Tebogo Mokganyetji, Karen Daniels, Michelle Galloway and Joy Oliver.

Contributors TK drafted the protocol, with input from JV, and ALA, among others involved with the initial SAGE project. TK, ALA and JM were involved with data collection. TK, SA, JV, ALA, JM, SC and BMS contributed to discussions regarding analysis of findings. TK drafted the manuscript, with input from all authors. All authors approved the final version of the manuscript.

Funding This research is supported through a grant from the Flagships Awards Project by the South African Medical Research Council (SAMRC-RFA-IFSP-01–2013/SAGE).

Competing interests TK has contributed evidence to the National Department of Health Essential Drugs List Adult level standard treatment guideline (non-funded); and facilitated workshops and capacity development for under and postgraduate students, researchers, policymakers and practitioners on clinical practice guidelines and evidence-informed practices. JV has been involved in guideline development globally and regionally, he has been on advisory committees for clinical guidelines in the Western Province and has facilitated workshops and capacity development for undergraduate and postgraduate students, researchers and practitioners on clinical practice guidelines and evidence-informed practices. SC, SA, ALA, BMS and JM have no competing interests to declare.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting or dissemination plans of this research.

Patient consent for publication Not required.

Ethics approval The study was approved by the Research Ethics Committees of the South African Medical Research Council (EC002-2/2014) and Stellenbosch University (N14/02/008). The informed consent form was sent to the individuals prior to the interviews and was also explained and confirmed at the start of interviews. All participants provided individual written informed consent. The names of participants have been captured but are saved with restricted access. We referred to the Consolidated Criteria for Reporting Qualitative Research (COREQ) to ensure comprehensive reporting.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available upon reasonable request. The datasets generated and/or analysed during the current study are not publicly available as the content may be linked to specific participants who were interviewed. Should anyone wish to have access or is interested in further exploration of the data, contact the author: tamara.kredo@mrc.ac.za.

ORCID iDs
Tamara Kredo http://orcid.org/0000-0001-7115-9535
Sara Cooper http://orcid.org/0000-0001-9894-236X
Amber Louise Abrams http://orcid.org/0000-0003-1416-7891

REFERENCES

1 World Health Organization. *The world health report 2008: primary health care: (now more than ever)*. Geneva: World Health Organization, 2008. https://www.who.int/whr/2008/en/
2 World Health Organization, the United Nations Children's Fund (UNICEF). *Declaration of Astana. global conference on primary health care 2018*. Astana, Kazakhstan, 2018.
3 World Health Organization, International Bank for Reconstruction, Development / The World Bank. *Tracking universal health coverage: 2017 global monitoring report*. Switzerland, 2017.
4 Kautzky K, Tollman SM. A perspective on Primary Health Care in South Africa : Primary Health Care : in context. *South African Health Review* 2008;2008:17–30.
5 Department of Health SA, Department of Health. *Strategic Plan: Department of Health 2014/2015 - 2018/2019*. Pretoria: Government, 2014.
6 Pillay-van Wyk V, Msemburi W, Laubscher R, *et al*. Mortality trends and differentials in South Africa from 1997 to 2012: second National burden of disease study. *Lancet Glob Health* 2016;4:e642–53.
7 Mayosi BM, Lawn JE, van Niekerk A, *et al*. Health in South Africa: changes and challenges since 2009. *Lancet* 2012;380:2029–43.
8 Minister of Health. National health insurance bill Pretoria, South Africa2018, 2018. Available: https://www.gov.za/sites/default/files/gcis_document/201806/41725gon635s.pdf
9 Rispel L. *Analysing the progress and fault lines of health sector transformation in South Africa. 2016. in: South African health review*. Durban: Health Systems Trust, 2016. http://www.hst.org.za/publications/south-african-health-review-2016
10 National Treasury. *Inter-governmental Fiscal reviews - Provincial Budgets and Expenditure Review: 2010/11 - 2016/17*. Pretoria: National Treasury of the Republic of South Africa, 2015.
11 Naledi TBP, Schneider H. Primary Health Care in SA since 1994 and Implications of the New Vision for PHC reengineering. In: Padarath AER, ed. *South African health review*. Durban: Health Systems Trust, 2011.
12 World Health Organization. Who Handbook for guideline development 2008 January 2011. Available: http://www.searo.who.int/LinkFiles/RPC_Handbook_Guideline_Development.pdf [Accessed Aug 2010].
13 Kredo T, Bernhardsson S, Machingaidze S, *et al*. Guide to clinical practice guidelines: the current state of play. *Int J Qual Health Care* 2016;28:122–8.
14 Wilkinson M, Wilkinson T, Kredo T, *et al*. South African clinical practice guidelines: a landscape analysis. *S Afr Med J* 2017;108:23–7.
15 Spyridonidis D, Calnan M. Opening the black box: a study of the process of NICE guidelines implementation. *Health Policy* 2011;102:117–25.
16 Runciman WB, Hunt TD, Hannaford NA, *et al*. CareTrack: assessing the appropriateness of health care delivery in Australia. *Med J Aust* 2012;197:100–5.
17 Ncube NBQ, Solanki GC, Kredo T, *et al*. Antibiotic prescription patterns of South African general medical practitioners for treatment of acute bronchitis. *S Afr Med J* 2017;107:119–22.
18 Mash B, Rhode H, Pather M, *et al*. Quality of asthma care: Western Cape Province, South Africa. *S Afr Med J* 2009;99:892–6.
19 Grol R, Wensing M, Eccles M, *et al*. *Improving patient care: the implementation of change in health care*. Second Edn. United Kingdom: John Wiley & Sons, Ltd, 2013.
20 Grimshaw JM, Thomas RE, MacLennan G, *et al*. Effectiveness and efficiency of guideline dissemination and implementation strategies. *Health Technol Assess* 2004;8:84.
21 Schünemann HJ, Wiercioch W, Etxeandia I, *et al*. Guidelines 2.0: systematic development of a comprehensive checklist for a successful guideline enterprise. *CMAJ* 2014;186:E123–42.

22 Gagliardi AR, Marshall C, Huckson S, *et al*. Developing a checklist for guideline implementation planning: review and synthesis of Guideline development and implementation advice. *Implement Sci* 2015;10:19.
23 Gagliardi AR, Brouwers MC, Palda VA, *et al*. How can we improve guideline use? A conceptual framework of implementability. *Implement Sci* 2011;6:26.
24 Pantoja T, Opiyo N, Lewin S, *et al*. Implementation strategies for health systems in low-income countries: an overview of systematic reviews. *Cochrane Database Syst Rev* 2017;9:CD011086.
25 Baker R, Camosso-Stefinovic J, Gillies C, *et al*. Tailored interventions to address determinants of practice. *Cochrane Database Syst Rev* 2015;4:CD005470.
26 Michie S, van Stralen MM, West R. The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implement Sci* 2011;6:42.
27 French SD, McKenzie JE, O'Connor DA, *et al*. Evaluation of a theory-informed implementation intervention for the management of acute low back pain in general medical practice: the implement cluster randomised trial. *PLoS One* 2013;8:e65471.
28 Fairall L, Cornick R, Bateman E. Empowering frontline providers to deliver universal primary healthcare using the practical and approach to care kit. *BMJ Global Health* 2018;3.
29 Young T, Garner P, Clarke M, *et al*. Evidence-Based health care and policy in Africa: past, present, and future. *J Clin Epidemiol* 2016.
30 Kredo T, Abrams A, Young T, *et al*. Primary care clinical practice guidelines in South Africa: qualitative study exploring perspectives of national stakeholders. *BMC Health Serv Res* 2017;17:608.
31 Kredo T, Cooper S, Abrams A, *et al*. National stakeholders' perceptions of the processes that inform the development of national clinical practice guidelines for primary healthcare in South Africa. *Health Res Policy Syst* 2018;16:68.
32 Kredo T, Cooper S, Abrams A, *et al*. Using the behavior change wheel to identify barriers to and potential solutions for primary care clinical guideline use in four provinces in South Africa. *BMC Health Serv Res* 2018;18:965.
33 Dizon JM, Grimmer K, Louw Q, *et al*. Barriers and enablers for the development and implementation of allied health clinical practice guidelines in South African primary healthcare settings: a qualitative study. *Health Res Policy Syst* 2017;15:79.
34 Dizon JM, Grimmer K, Machingaidze S, *et al*. Mapping South African allied health primary care clinical guideline activity: establishing a stakeholder reference sample. *Health Res Policy Syst* 2016;14:77.
35 Dizon JM, Grimmer KA, Machingaidze S, *et al*. South African primary health care allied health clinical practice guidelines: the big picture. *BMC Health Serv Res* 2018;18:48.
36 Louw Q, Dizon JM, Grimmer K, *et al*. Building capacity for development and implementation of clinical practice guidelines. *S Afr Med J* 2017;107:745–6.
37 Statistics South Africa. Mid-year population estimates Pretoria, South Africa contract No: P0302, 2019. Available: http://www.statssa.gov.za/
38 The World Bank. South Africa - overview, 2019. Available: https://www.worldbank.org/en/country/southafrica/overview
39 Day C, Gray A, Padarath A, *et al*. *Health and related indicators*. South African Health Review Durban, South Africa: Health Systems Trust, 2017: 217–340.
40 Department of Health SA. *White Paper for the Transformation of the Health System in South Africa #17910*. Pretoria: Department of health, 1997.
41 Department of Health SA. *National Health Insurance for South Africa - towards universal health coverage (White Paper) Department of health*. Pretoria: Government, 2015.
42 Department of Health. Ideal clinic South Africa. Available: https://www.idealclinic.org.za
43 Green J, Thorogood NSilverman D, ed. *Qualitative methods for health research*. Third edn. London: SAGE, 2004.
44 Graneheim UH, Lundman B. Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Educ Today* 2004;24:105–12.
45 Saldana J. *The coding manual for qualitative researchers*. Los Angeles, CA: SAGE, 2009.
46 Malterud K. Standards Qualitative Research:Challenges, and guidelines. *The Lancet*;358:483–8.
47 Health systems evidence. Taxonomy of governance, financial and delivery arrangements and implementation strategies within health systems [Internet]. McMaster Health Forum, 2017. Available: https://www.mcmasterforum.org/docs/default-source/resources/hse_taxonomy.pdf?sfvrsn=4 [Accessed 17 Feb 2019].
48 World Health Organization. *Monitoring the building blocks of health systems: a Handbook of indicators and their measurement strategies*. Geneva, Switzerland: World Health Organization, 2010. https://www.who.int/healthinfo/systems/monitoring/en/
49 Herrera CA, Lewin S, Paulsen E, *et al*. Governance arrangements for health systems in low-income countries: an overview of systematic reviews. *Cochrane Database Syst Rev* 2017;9:CD011085.
50 Ngidi WH, Naidoo JR, Ncama BP, *et al*. Mapping evidence of interventions and strategies to bridge the gap in the implementation of the prevention of mother-to-child transmission of HIV programme policy in sub-Saharan countries: a scoping review. *Afr J Prim Health Care Fam Med* 2017;9:e1-e10.
51 Ivers N, Jamtvedt G, Flottorp S, *et al*. Audit and feedback: effects on professional practice and healthcare outcomes. *Cochrane Database Syst Rev* 2012;6:CD000259.
52 Donabedian A. The quality of care. How can it be assessed? *JAMA* 1988;260:1743–8.
53 Campbell S M, Roland M, Buetow S. *Defining quality of care*, 2001: 1611–25.
54 Leslie HH, Sun Z, Kruk ME. Association between infrastructure and observed quality of care in 4 healthcare services: a cross-sectional study of 4,300 facilities in 8 countries. *PLoS Med* 2017;14:e1002464.
55 Dixon-Woods M, Baker R, Charles K, *et al*. Culture and behaviour in the English National health service: overview of lessons from a large multimethod study. *BMJ Qual Saf* 2014;23:106–15.
56 Patience NTS, Sibiya NM, Gwele NS. Evidence of application of the basic antenatal care principles of good care and guidelines in pregnant women's antenatal care records. *Afr J Prim Health Care Fam Med* 2016;8:e1–6.
57 World Health Organization. *Global strategy on human resources for health: workforce 2030*. Geneva, Switzerland, 2016. ISBN: Report No: ISBN 978 92 4 151113 1.
58 Nkosi ZZ, Asah F, Pillay P. Post-basic nursing students' access to and attitudes toward the use of information technology in practice: a descriptive analysis. *J Nurs Manag* 2011;19:876–82.
59 Department of Health SA. *Ideal Clinic- components and definition department of health*. Pretoria: Government, 2014.
60 Cobos Muñoz D, Merino Amador P, Monzon Llamas L, *et al*. Decentralization of health systems in low and middle income countries: a systematic review. *Int J Public Health* 2017;62:219–29.
61 Flottorp SA, Oxman AD, Krause J, *et al*. A checklist for identifying determinants of practice: a systematic review and synthesis of frameworks and taxonomies of factors that prevent or enable improvements in healthcare professional practice. *Implement Sci* 2013;8:35.