PRIMARY HEALTH CARE SERVICES IN SOUTH AFRICA AND THE 'IDEAL CLINIC':
Is quality improvement programme associated with better clinic performance?

by

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SUBMITTED TO THE UNIVERSITY OF CAPE TOWN
In partial fulfilment of the requirements for the degree

MPH specialising in Health Economics

Faculty of Health Sciences

UNIVERSITY OF CAPE TOWN

Date of Submission: 31 March 2024

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DECLARATION

I, Caitlin van Rensburg, hereby declare that the work on which this dissertation is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university.

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DEDICATION

For my partner turned husband over the course of researching and writing this dissertation, thank you for your endless patience and support.

ACKNOWLEDGEMENTS

I would like to acknowledge the support and guidance of my supervisor, Dr Lucy Cunnama. She provided direction in determining the scope of this dissertation, useful advice on strengthening the delivery of my research and findings, and a voice of reason when navigating the enormous pressures of completing this task.

I was further aided by the Clinton Health Access Initiative (CHAI) which, under a new partnership with the Health Economics Unit of the University of Cape Town to provide internship opportunities to budding health economists, contracted me as an Independent Consultant from November 2022 to July 2023 (with ongoing support thereafter). Through this collaboration, I was provided with a topic associated with a current CHAI project area as well as access to relevant data. I would like to acknowledge and thank Nikhil Khanna of CHAI, in particular, who provided me countless hours of guidance in developing my topic and methods.

ABSTRACT

A well-functioning, high-quality primary health care (PHC) system will be essential to achieve the ambitious goals set forth in South Africa's proposed system of National Health Insurance (NHI). NHI, informed by principles of Universal Health Coverage, will introduce a centralised health financing scheme in a bid to improve equity in the current two-tiered (public/private) system of health care delivery. NHI will rely heavily on PHC facilities as the 'gateway' to the health system. Against this backdrop and the findings of a 2012 facilities audit report which revealed less than 50% of South Africa's public health facilities at the time complied with vital measures for health care delivery, the Ideal Clinic Realisation and Maintenance Programme (ICRMP) was developed as a tool for quality improvement.

The ICRMP encompasses a comprehensive framework of standards which primary care facilities should meet, with manuals and training provided for facility staff alongside district support to assist facilities in doing so. Under the ICRMP, clinics are routinely assessed and afforded the status of an 'Ideal Clinic' if specified minimum scores are met. These assessments should be accompanied by measures to improve areas of the framework under which clinics scored poorly. Facility managers should be supported by a Perfect Permanent Team for Ideal Clinic Realisation and Maintenance (PPTICRM) established at district level to conduct peer reviews and to improve on clinic weaknesses. National implementation of the ICRMP began in 2015/16, although the Western Cape joined only in 2016/17.

While assessment/accreditation frameworks are increasingly being utilised globally as tools for quality improvement (as the ICRMP purports to be), evidence in support of their efficacy in achieving their stated goals remains sparse. Literature on the ICRMP is equally limited. Empirical studies considering the impact of early implementation of the ICRMP on indicators of primary care quality have yielded mixed results, suggesting minimal meaningful impact of the programme on patient waiting times, patient perceptions of quality of care, or on other proxy indicators of quality. The objective of the present study is to build on this body of literature assessing the association of the ICRMP with access and quality of care across South Africa over time.

Leveraging longitudinal data now available, the effects of the programme on two measures of utilisation and six further indicators of primary care quality spanning maternal and early childhood care, TB/HIV treatment, and non-communicable disease screening are explored using panel regression models. Controlling for heterogeneity across clinics and for year, increases in ICRMP percentage scores over time appear to be associated with very small magnitude increases in childhood PHC utilisation and early usage of antenatal care. Findings, however, reveal no further significant effects on a general PHC utilisation marker nor on other proxy measures of quality included in analysis. While ICRMP percentage

scores have improved over time, it appears limited impact of this improvement is evidenced in access and quality of care.

Based on these findings, further research into underlying ICRMP element associations with indicators of quality of care is recommended. This may inform a revision of the ICRMP framework to better align scoring with access and PHC quality of care. To avoid the ICRMP becoming merely a tick-box exercise, targeted quality improvement plans as envisaged by the ICRMP and informed by such revised framework should be given renewed focus.

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ABBREVIATIONS

ANC	Antenatal care
ARV	Antiretroviral therapy
CCMDD	Centralised Chronic Medicine Dispensing and Distribution
CDC	Community Day Centre
CHC	Community Health Centre
DHIS	District Health Information Software 2
DS-TB	Drug susceptible tuberculosis
ICRMP	Ideal Clinic Realisation and Maintenance Programme
LMICs	Low- and middle-income countries
LTFU	Loss to follow up
NDoH	National Department of Health of South Africa
NHI	National Health Insurance
NIDS	National Indicator Data Set
OHSC	Office of Health Standards Compliance
PHC	Primary Health Care
PPTICRM	Perfect Permanent Team for Ideal Clinic Realisation and Maintenance
SDG	Sustainable Development Goal
WBPHCOT	Ward Based Primary Healthcare Outreach Team
WHO	World Health Organization
UHC	Universal health coverage

PART A: LITERATURE REVIEW

1. INTRODUCTION

Quality of health care is an essential determinant of health, and a high-quality health system is a catalyst for successful progress toward Universal Health Coverage (UHC) through provision of equitable health outcomes (South African Lancet National Commission, 2019). As South Africa undergoes a significant overhaul of health care financing structures to achieve improved equity in health care access and outcomes, focus has been on improving utilisation and quality of care provision, particularly at the level of primary health care (PHC).

To achieve the large-scale health system reforms required to reduce inequity and progressively realise UHC ideals, the National Department of Health (NDoH) has implemented various interventions aimed at quality improvement in health care. One of these, the Ideal Clinic Realisation and Maintenance Programme (ICRMP), provides for the first nationwide routine assessment of PHC facilities according to an exhaustive list of facility standards together with processes to improve deficiencies in quality. This study will explore the impact of the ICRMP on utilisation and quality of care, the latter being the chief aim of the programme.

The objectives of this review are to contextualise the ICRMP within the health system of South Africa and its proposed system of National Health Insurance (NHI). Attention is then given to implementation of the programme and the initial successes or challenges of clinics in undergoing assessments. Comparative assessment frameworks for quality improvement and research related to such frameworks are then briefly explored before literature concerning the ICRMP itself is presented. While the ICRMP has been formally implemented since 2015, literature on its implementation and impact remains limited. Literature herein reviewed presents an exhaustive list of published work on the ICRMP deemed to be applicable to this study and of sufficient quality (see Appendix for search terms and criteria). This review concludes with emergent gaps in the literature which the present study seeks to address, both adding to the body of literature concerning the ICRMP, in particular, as well as broader research concerning effectiveness of assessment frameworks for quality improvement.

2. THE IDEAL CLINIC REALISATION AND MAINTENANCE PROGRAMME

2.1. Planning of the ICRMP in the Context of NHI in South Africa

Public sector provision of health care in South Africa follows a district-managed system for PHC, with secondary and tertiary care provided by networks of regional, provincial and

national hospitals. PHC services are provided at largely nurse-run clinics with general practitioner support as well as at larger Community Health Centres (CHCs) that provide some in-patient services including emergency and maternal care (NDoH, 2017).

Great strides have been taken post-Apartheid to extend health care as an equal right of all in South Africa. This has resulted in improved PHC utilisation (with PHC visits increasing from 67 million visits in 1998 to 128 million in 2013) and other health indicators, such as childhood immunisation and antiretroviral coverage (Fryatt, Hunter and Precious Matsoso, 2014; NDoH, 2017; South African Lancet National Commission, 2019). However, significant inequities persist both in access to and quality of health care services. These inequities endure particularly as a product of fragmented health financing which, along with service provision, exists within a two-tiered system. Approximately 50% of total expenditure on health care, predominantly through private health insurance with some out-of-pocket payments, falls within the private sector that services only around 15% of the population. The remaining 50% is allocated within the public sector tasked with providing health care services to the remaining bulk of the population (NDoH, 2017).

Quality of facilities and the provision of health services in the public sector have suffered as a result of this fragmented system and this has led to differential experiences of care for users able and unable to afford private medical aid coverage and services. To address these disparities and achieve universal access to quality health services for all people in the country as envisioned in section 27 of the Constitution of South Africa (which echoes the principles of UHC, discussed below), a new approach to health financing through a system of NHI has been proposed (NDoH, 2017; NHI Bill, 2019). NHI aims to provide a path toward UHC through a revised framework for the strategic purchasing of health services by a single fund on behalf of all users in the country, thus pooling resources to provide for more equitable distribution. The provision of private medical insurance will be limited to coverage only for those services not included in the NHI health benefit package.

While various policies and interventions to ready the South African health system for NHI have been implemented since 2012, legislative amendments codifying NHI policy to pave the way for full implementation of the new financing measures are only recently nearing completion, although much opposition thereto persists. After a long period of consultation, the NHI Bill (B11-2019) was passed by the National Assembly in June 2023 followed by the National Council of Provinces on 6 December 2023 (Parliamentary Monitoring Group, 2024). True as of writing, the NHI Bill has been sent to the President of South Africa and is awaiting assent and signing into law.

To achieve the amalgam of the two-tiered system and progress toward UHC, the implementation of NHI will require improvements in health care management and service delivery in the public sector (NDoH, 2017). These health system improvements will be especially important at the PHC level. Under NHI, PHC facilities will serve as the 'gateway' to the health system whereby all users will in most instances need to access health services first at PHC providers, being a clinic in the public sector or, amongst others, a general practitioner in the private sector (NHI Bill, 2019). This serves the ambitions of NHI well as PHC services, as being closest to the community, are especially effective in increasing population coverage (particularly in reaching those most in need) while addressing health service needs affordably (Mcintyre, 2012; NDoH, 2022b).

As stated, South Africa's ambitious right to health and the goals of NHI are deeply rooted in principles of UHC. UHC is defined by the World Health Organization (WHO) as all people having access to health services as needed, including prevention, promotion, treatment, rehabilitation and palliative services, of sufficient quality to be effective without exposure of the user to undue financial hardship (World Health Organization, 2023). UHC forms part of the United Nations' 2030 agenda as part of Sustainable Development Goal (SDG) 8 (World Health Organization, 2018). According to this definition, UHC as a strategy proposed to improve health in low- and middle-income countries (LMICs) is predicated not only on the expansion of care to improve access but on the provision of good quality care. South Africa's Constitution and proposed NHI legislation echo these same sentiments.

While improving access has been of particular focus in the past, numerous studies support a shift in attention to quality as a key driver of health beyond access, particularly for people in LMICs who have been found to be especially vulnerable to poor quality of care (Kruk et al., 2018a; Kruk et al., 2018b; World Health Organization, Organisation for Economic Co-operation and Development and The World Bank, 2019). A 2016 systematic analysis of excess mortality in 137 LMICs for conditions targeted in the SDGs found that poor quality of care was a major driver of excess mortality spanning a range of conditions, including cardiovascular, neonatal and communicable diseases (Kruk et al., 2018b). Of the 15.6 million excess deaths under study, 8.6 million were considered amenable to health care, with 5 million being attributable to poor quality of care and 3.6 million to non-utilisation of health care. These findings suggest that UHC for SDG-related conditions could prevent almost 9 million excess deaths globally a year, but only if expansion of health care services (increased access) is accompanied by an improvement in the quality of care provided through these expanded services. This study was

the first to attempt a quantification of the role of improved quality of health services over enhanced access thereto in reducing excess deaths amenable to health care in LMICs.

Studies such as these provide important context to South Africa's goal of progressing toward UHC. While NHI may flatten the current tiered system of care to ensure all people have access to the same basket of services without incurring financial stress, equal access alone will not bring the country closer to reaching the ideals of UHC. Quality of care needs to be prioritised alongside access. This appears to be well recognised by the NDoH as evidenced in early NHI interventions, including the ICRMP as a comprehensive framework for quality improvement in PHC.

Implementation of NHI was planned with three phases, each expected to last five years. The first of these commenced in 2012 (NHI Phase 1) and included the piloting of various interventions aimed at reengineering and strengthening PHC services in recognition of their essential role in achieving global coverage. This proved a necessary first step in light of the findings of a baseline facilities audit report which painted a dire picture of the state of health care provision, particularly in PHC services, in the country at the time. The report, commissioned by the NDoH and published in 2012, found that less than 50% of public health facilities in the country complied with vital measures for services delivery and that only one health facility, a public hospital, fully met required standards (Visser, Bhana and Monticelli, 2013). The audit further found that PHC facilities, scoring lower than hospitals in all priority areas, still encountered challenges such as unreliable essential drug supplies, inadequate staffing, poor infrastructure and long wait times resulting in negative experiences of care and poor utilisation of PHC facilities.

NHI Phase 1 interventions are wide-ranging and have included the development of Ward Based Primary Health Care Outreach Teams (WBPHCOTs) to provide promotive and preventative health services within households; Centralised Chronic Medicine Dispensing and Distribution (CCMDD) to provide medications for stable chronic care patients at designated pick-up points to limit waiting times for patients and to ease congestion at clinics; and the ICRMP to improve quality of services through use of assessment tools and quality improvement mechanisms (Genesis, Centre for Health Policy and PWC, 2019).

The ICRMP was launched in South Africa in July 2013, shortly after the government's green paper on NHI was released in 2011, to systematically address deficiencies in public sector PHC clinics particularly as exposed in the national baseline audit report (Fryatt and Hunter, 2015; NDoH, 2022b). While incorporating an assessment tool, the chief aim of the ICRMP is to

systematically improve the quality of health services delivered in public sector facilities in South Africa. The programme is intended to establish the foundations for the successful implementation of NHI through the provision of integrated and comprehensive community-based preventive, promotive, diagnostic, curative, rehabilitative and palliative services – being the full continuum of essential services enshrined in UHC goals (Fryatt and Hunter, 2015).

2.2. Overview of the ICRMP quality improvement process

The principal objective of the ICRMP is to ensure the delivery of high-quality health services to all (Hunter et al., 2017). The ICRMP is predicated on the idea that to provide equitable access to good quality services, PHC facilities need to function optimally and this requires the presence of a combination of elements rendering it 'Ideal' (NDoH, 2022b). The ICRMP framework provides a tool to both measure and promote good quality of care provided by PHC facilities including clinics, CHCs and community day centres (CDCs), with separate frameworks in place for the Ideal Clinic and Ideal CHC. This study will focus exclusively on the Ideal Clinic framework and clinics (excluding CHCs and CDCs which may offer differing services and facilities).

In terms of the ICRMP framework, an Ideal Clinic is defined as "a clinic with good infrastructure, adequate staff, adequate medicine and supplies, good administrative processes, and sufficient adequate bulk supplies. It uses applicable clinical policies, protocols and guidelines, and it harnesses partner and stakeholder support" (NDoH, 2022b:4). An Ideal Clinic further works in collaboration with other government departments, the private sector and NGOs to address the social determinants of health.

The NDoH, in collaboration with management and staff of PHC facilities, districts and provinces, tested and developed the ICRMP framework resulting in a standardised questionnaire presented as a dashboard, initially with 10 components, 32 sub-components and 178 elements (the vast majority of which require yes/no type answers) within respective sub-components that Ideal facilities should meet (Hunter et al., 2017; Steinhöbel, Wolvaardt and Webb, 2021). During initial clinic assessment, elements are colour-coded as green if present and optimally functional, orange if partially functional with corrective measures in place, or red if the element is non-functional or absent (Hunter et al., 2017; NDoH, 2022b). Final assessment on each element is binary, being either achieved or not achieved.

While a new measure for quality assessment, the ICRMP framework is intended to ensure PHC facilities comply with, or systematically improve so as to comply with, already existing expectations of well-functioning clinics (Hunter et al., 2017). Therefore, rather than

introducing new requirements, the ICRMP presents a clear list and definitions of such requirements. As a framework encompassing existing expectations, the NDoH posits that the resources required to achieve Ideal Clinic status should be already contained within routine budgets (Hunter et al., 2017).

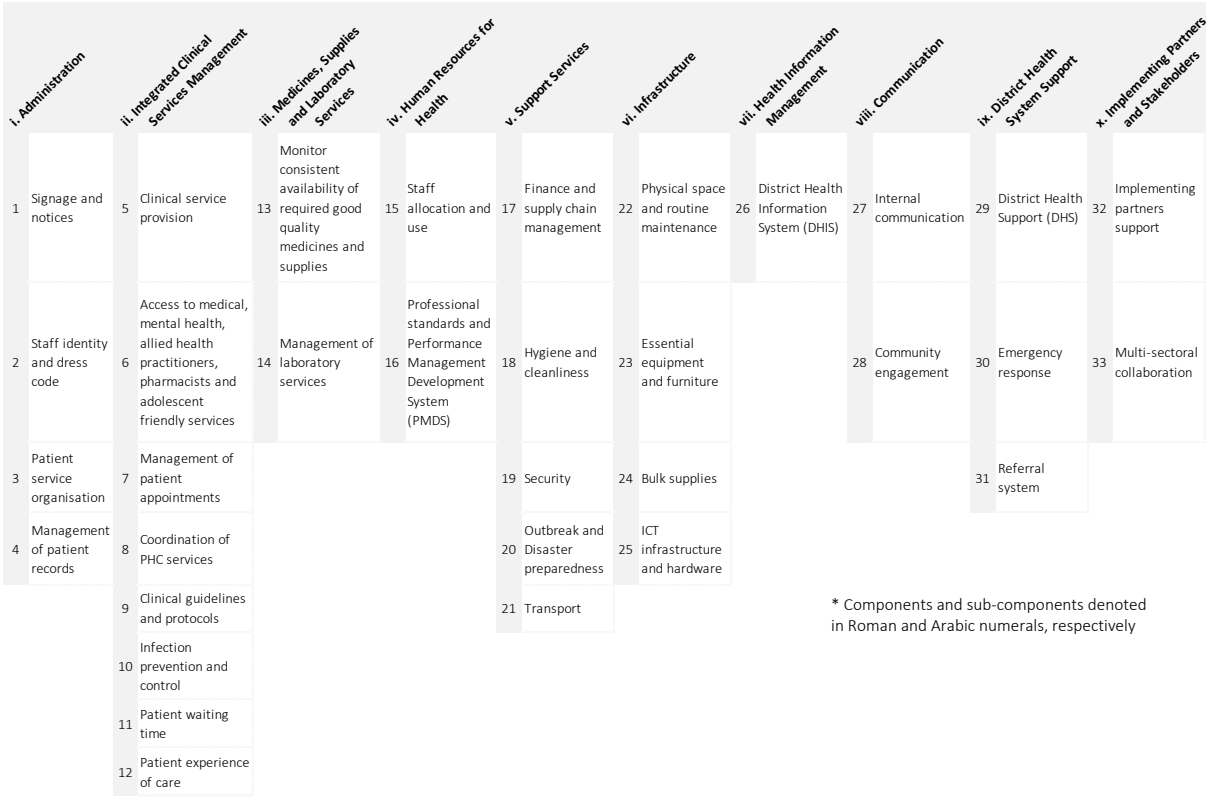
Implementation of version 15 of the ICRMP framework and manual began nationally in April 2015, the beginning of the governmental financial year, although the Western Cape Department of Health joined their province in the programme only in the 2016/17 financial year (Hunter et al., 2017). Nationally representative data for the ICRMP is thus available from 2017 to date.

Development of the ICRMP framework is predicated on the theory of implementation research which informs bringing new strategies to scale and maintaining the performance of these over time (Hunter et al., 2017). This requires an understanding of what is or is not working, why implementation may not be going as planned and the testing of new approaches to improve implementation. Thus, through consultation on the framework starting in 2013, and following feedback from health professionals and managers at health facilities at district, provincial and national levels, constant refinement of the ICRMP has been enacted. This has resulted in numerous iterations of the programme being introduced (version 16 in April 2016, version 17 in April 2017, version 18 in April 2018 and version 19 in April 2020). Version 19 of the ICRMP framework and manual, updated April 2022, is currently in use (NDoH, 2022b, 2022a).

Under version 19 of the framework, there remain 10 components, while sub-components have increased to 33 and individual elements now total 238. Version 19 of the framework has further aligned the Ideal Clinic elements with the National Norms and Standards Regulations of the Office of Health Standards Compliance (OHSC) as gazetted in February 2018 (NDoH, 2022a). The OHSC is a legal entity formed to promote the safety of users of health care by ensuring facility and service provider compliance with national core standards on quality. According to section 39 of the NHI Bill, both private and public health care service providers and health establishments will need to be certified by the OHSC before accreditation by and contracting with the NHI fund (NHI Bill, 2019). The ICRMP, being the NDoH's internal means of ensuring clinic compliance, thus directly aims to improve public sector clinics to meet NHI standards and ready PHC facilities for OHSC accreditation under NHI (Hunter et al., 2017).

Figure 1 illustrates the current matrix of ICRMP components and subcomponents. A comprehensive list of all 238 elements together with levels of responsibility (health facility, district, or provincial or national departments of health) is included in the Appendix.

FIGURE 1 Ten components and 33 sub-components of the ICRMP version 19 (image adapted from NDoH (2022a))



The inclusion of the different components through to the specific elements could impact quality of care provision in a plethora of ways, both directly and indirectly (Stacey et al., 2021). For instance, under the "Integrated Clinical Service Management" component, clinical service delivery is monitored together with results in improvements in key population health and service indicators. More indirectly, the "Infrastructure" component monitors the adequacy of each facility space to manage PHC workload and accessibility of PHC services for different users, including those with disability. Taken as a whole, resultant ICRMP scores are intended to be indicative of clinic performance and quality of service provision.

The Ideal Clinic Manual is a comprehensive stepwise guide with exhaustive detail for facility managers and staff on how to improve and achieve each element as well as the reviewer's guide on how to assess facilities. The ICRMP framework provides for different levels of responsibility for each element as well as different methods for the assessment of each element, including physically checking applicable documents, asking staff members/clients for

their views, making objective observations or manually testing the functionality of systems or equipment (NDoH, 2022b, 2022a).

The ICRMP framework follows a Plan-Do-Study-Act cycle whereby, generally, status determinations in the first quarter comprise of self-assessments carried out by PHC facility managers followed by correction of weakness (to turn red/orange elements to green) and district peer reviews in the second quarter, culminating in cross-district peer reviews conducted in the third or fourth quarter on a sub-set of facilities selected at the beginning of the year based on the probability of the select facilities achieving Ideal Clinic status that year (Hunter et al., 2017; Steinhöbel, Wolvaardt and Webb, 2021). Peer-reviewed results are captured on ICRMP web-based monitoring software. Once a PHC facility achieves Ideal Clinic status it is not assessed in following years by cross-district peer reviews but rather only through self-assessment and district peer reviews to support maintaining Ideal Clinic status (Steinhöbel, 2020).

Scale-up teams, called the Perfect Permanent Team for Ideal Clinic Realisation and Maintenance (PPTICRM), are formed in each district to drive the ICRMP and conduct peer reviews to verify the results of self and district assessments (Steinhöbel, 2020). PPTICRMs are then enjoined to assist facility managers and staff to improve on failed elements before the first assessment of the following financial year through the development of initiatives to improve quality (Hunter et al., 2017; Steinhöbel, Wolvaardt and Webb, 2021). However, findings have suggested that the tool may be currently utilised more for compliance instead of a catalyst for quality improvement (Steinhöbel, 2020). To achieve the ambitions of the ICRMP, results should be used by facility managers and PPTICRMs to drive improvement by resolving challenges in reaching Ideal Clinic status with district and provincial office assistance.

In assessment, scores for each clinic are tallied in two ways, one to achieve an overall percentage score and another to determine if a clinic has achieved Ideal Clinic status (which may be graded as Silver, Gold or Platinum). All elements coded as green/achieved are divided by the total elements assessed for that clinic to reach an overall percentage score for each facility. However, this percentage does not directly influence whether a facility achieves an Ideal Clinic status. Instead, different weight categories are accorded to each element. Each weight category requires a specified minimum aggregate percentage of elements achieved out of total elements in the weight category for the clinic to achieve Ideal Clinic status (NDoH, 2022b). Prior to version 19, the ICRMP included three categories - ‘vital’, ‘essential’ and ‘important’ elements (although minimum required percentages under each weighting have

varied across revisions). A new category, 'non-negotiable vital' was introduced with version 19 of the framework in 2020. Table 1 outlines current weight categories.

TABLE 1 Weighting system for determining Ideal Clinic status and grade as per version 19 of the ICRMP (NDoH, 2022b, 2022a)

Weights	Description of elements	Silver	Gold	Platinum
Non-negotiable vital (3 elements)	Can cause loss of life or prolonged periods of recovery	100%	100%	100%
Vital (53 elements)	Affect direct service delivery to and clinical care of patients; require immediate and full correction without which there may be immediate and long-term adverse effects on population health.	60-69%	70-79%	≥80%
Essential (104 elements)	Process and structural, indirectly affecting quality and safety of clinical care; require resolution within a given time period	50-59%	60-69%	≥70%
Important (78 elements)	Process and structural, affecting quality of environment in which healthcare is given; require resolution within a given time period	50-59%	60-69%	≥70%

Based on current weightings, a clinic could theoretically score up to 99% overall while still not achieving status (this being if even 1 non-negotiable vital element is failed). The three non-negotiable vital elements, all under sub-component 23 'Essential equipment and furniture', are: element 193 'Emergency trolley is restored daily or after each use', element 196 'Functional oxygen cylinder with pressure gauge is available in resuscitation/emergency room', and element 197 'Oxygen available in the cylinder is above the minimum level'.

2.3. Implementation of the ICRMP and Results

Countrywide implementation of the ICRMP, save for participation of the Western Cape, began in the 2015/16 fiscal year. This included the implementation of a scale-up process which envisioned an incremental approach to achieve the conversion of 1000 facilities to Ideal Clinics each year, necessitating the prioritisation of certain clinics which would be included in cross-district peer-reviews (Fryatt and Hunter, 2015). The goal of the NDoH was for all clinics to achieve Ideal Clinic status by the 5 years ending 2020/21, although this was not met (Steinhöbel, 2020).

In 2015/16, the first year of implementation, only 9.29% of fixed PHC facilities achieved Ideal Clinic status. The following year status achievement rose threefold to 29.9%. Progress per annum slowed between 2016/17 and 2017/18 (44%), reaching 55,8% in 2018/19 (Steinhöbel, 2020; Mokgalagadi, 2022). This milestone achievement of more than half of PHC facilities achieving status was attributed by the NDoH to a collaboration between the department and

National Treasury to resolve anomalies in the supply chain concerning infrastructure, equipment and essential supplies (NDoH, 2018).

Achievement of Ideal Clinic status among all PHC fixed facilities began a decline from 2019/20, dropping to 42% in 2020/21 (NDoH, 2022c). Early 2020 marked the beginning of the COVID-19 pandemic in South Africa which could have impacted clinic performance under the ICRMP due to an explicit shift in focus by national and provincial health departments to accommodate pandemic-related activities which resulted in provinces not procuring the additional resources necessary to improve status of PHC facilities under the ICRMP (NDoH, 2022c). Ideal status across all clinics, CHCs and CDCs assessed did, however, rebound to 55.61% in 2021/22.

Maintenance of Ideal Clinic status of facilities achieved in previous financial years has been a concern to the NDoH. 20.4% of PHC facilities having Ideal Clinic status since the 2015/16 year of inception lost their status in 2019/20 (Steinhöbel, 2020). Achievement of Ideal Clinic status has also varied markedly across provinces. For instance, in 2021/22 92.16% of facilities obtained status in Gauteng province with only 21.74% in Limpopo province (Mokgalagadi, 2022).

Thus, while the number of clinics achieving Ideal Clinic status at varying levels has increased significantly since the programme was first implemented, this progress has plateaued in more recent years. Given the primary aim of the ICRMP is to systematically improve quality of PHC services prior to the introduction of NHI (which appears imminent), this levelling-off of progress may be a cause for concern. This is particularly relevant if facility scores under the ICRMP are associated with good quality of care as they are purported to be.

3. RESEARCH ON ASSESSMENT FRAMEWORKS AND IMPACT ON QUALITY IMPROVEMENT

While the ICRMP encompasses an assessment framework, it is considered to go beyond quality assessment (the purview of the OHSC) to encompass comprehensive quality improvement of PHC services. Similar attention to the development of suitable measures for the assessment of performance across health domains while moving beyond access to effective coverage, and from input and process to measurement of impacts and outcomes, is increasing internationally (South African Lancet National Commission, 2019).

Such standards-based accreditation frameworks for quality improvement, while more prevalent in high-income settings, are gaining prominence in LMICs too (Stacey et al., 2021). These include Tanzania's Star Rating System and PharmAccess Foundation's SafeCare. Comparing the ICRMP with

similar quality improvement initiatives in other LMICs can provide valuable insights into alternative approaches and potential for refinements.

Like South Africa, Tanzania has faced similar challenges of poor access and quality of PHC. To address these, the country launched its five star rating assessments in 2015 to ascertain true standards of care which revealed only 2% of facilities at the time met minimum standards of three or more stars (reminiscent of South Africa's own baseline audit findings) (Yahya and Mohamed, 2018). The Star Rating System has been credited with increasing attention to quality and accountability and stoking a culture of improvement. One and a half years after baseline assessments, 21% of facilities were scoring three or more stars. Yahya and Mohamed (2018) believe that immediate feedback of data to facilities shifted the culture of care to one informed by data-driven quality improvement. They further reported on the plan for public disclosure of ratings at each facility which may incentivise improvements and enhance accountability through community engagement. Improvement in data sharing and literacy at facility level together with scoring transparency could be a beneficial adaptation for the ICRMP, fostering a more participatory approach, including both facility staff and users, to quality improvement.

SafeCare, a further large cross-border programme which bears some resemblance to the ICRMP, aims to improve quality of care in emerging economies through assessment of primary and secondary health care facilities together with fully customised improvement plans informed by assessment results with specific, measurable activities to achieve quality improvement (Johnson et al., 2016). The SafeCare program emphasizes incremental improvements tailored to each facility's specific context, recognising the diversity of challenges faced by health facilities across different settings (Johnson et al., 2016). According to SafeCare, 77% of facilities have improved under their programme with progress in quality of care measured across a broad range of clinical and business topics, including infection prevention, infectious disease care (HIV, TB and malaria), mother and child care, stock management, staff training and business performance (SafeCare, 2024). Incorporating SafeCare's flexible, context-sensitive approach could address criticisms of the ICRMP's one-size-fits-all methodology and enhance the program's responsiveness to the unique needs of South African health facilities.

However, while increasing global consideration is being given to accreditation strategies for quality improvement with indications that such frameworks result in improved standards scoring, there remains little empirical evidence supporting their effectiveness in improving quality of care (Brubakk et al., 2015; Stacey et al., 2021). In contrast to earlier reviews focused predominantly on upper-income countries, a recent comprehensive systematic review considered the cost and effectiveness of health care provider improvement strategies in LMICs (Rowe et al., 2019). Of the

499 studies included in the review, around 18% concerned accreditation schemes as a quality improvement strategy (whereas low-intensity training, patient/community support, and supervision were the most utilised strategies for improvement and were included in over 40% of studies reviewed). However, the authors found the evidence supporting most strategies identified in the review, including accreditation and assessment, to be thin with limited scope for generalisability of findings.

4. EXISTING LITERATURE ON THE ICRMP

Tools such as the ICRMP for the assessment of quality of care provided in health facilities constitute an essential part of continuous quality improvement (Whittaker et al., 2011; Steinhöbel, Wolvaardt and Webb, 2021). However, being a policy for quality improvement, much of the value of the ICRMP is predicted on the standards underlying Ideal Clinic status being associated with improved quality of care (Stacey et al., 2021).

The body of research surrounding the ICRMP remains equally limited. A number of studies have considered ICRMP implementation and challenges associated therewith, however, there is a paucity of literature assessing the success of the ICRMP in achieving its stated goals of improving quality of PHC care. We begin with a review of literature concerning implementation of the ICRMP before moving on to studies evaluating the programme's impact on externally measured markers of quality of care.

4.1. Implementation of the ICRMP and related challenges

Several key lessons are presented in an analysis spearheaded by the NDoH on ICRMP assessment in the first year of the programme's implementation (2015/16), where only 322 of 1139 prioritised clinics achieved Ideal Clinic status (Hunter et al., 2017). The first of these lessons recognised the main bottlenecks preventing status achievement of clinics at the time as being supply chain management, infrastructure and staffing. Clinics achieving less than 40% on the ICRMP assessment overall experienced extensive problems in all three of these areas. Further to staffing concerns, the analysis also found an inverse correlation between clinic performance under the programme and the presence of clinic managers, thus noting the imperative of having a professional nurse assigned as clinical manager for quality improvement. These challenges reveal the nested nature of responsibility under the ICRMP whereby improvement under the programme does not fall solely on the clinic itself but requires district, provincial and national support in areas such as infrastructure development that fall beyond the control of the particular PHC facility being assessed.

A full evaluation of NHI Phase 1 interventions in NHI pilot districts, also funded and supported by the NDoH, considered early NHI interventions from 2012 to 2017/18 (Genesis, Centre for Health Policy and PWC, 2019). The evaluation was based on a combination of in-depth interviews at multiple levels (from facility managers to stakeholders within the NDoH), surveys completed by facility users, as well as secondary level data sourced from annual NHI rapid assessments and routine data collection systems. According to evaluation findings, the ICRMP achieved significant scale and reach during NHI Phase 1 implementation, with the programme being commonly understood amongst participants as having made a large contribution to health system strengthening in the first 5 years of its implementation. The ICRMP was seen to have improved the ability of facilities to quantify needs and advocate for increased funding and the procurement of equipment and essential medicines. However, some stakeholders reported that the ICRMP was not sensitive to the specific contexts of facilities which led some clinics to purchase equipment that they did not need for the sole purpose of achieving Ideal Clinic status. Despite attitudes toward the programme being generally positive, some facility managers reported feeling demotivated by the constant amendments being made to the framework and financial constraints of facilities, the latter being perceived as the main obstruction to progressing to Ideal Clinic status. From the patients' perspective, of the 206 surveyed, 17% believed facility conditions to be excellent, 48% reported them as good, 24% as fair and 10% and poor. In instances in which the ICRMP was considered to have been correctly implemented, there was a perception amongst both facility managers and patients of an improvement in quality of care. However, others considered the quality improvement vision of the programme to be eroding due to over-bureaucratisation and inflexibility of the standards to facility context. These findings led the authors to recommend reconfiguration of the framework to include a limited set of core standards for all facilities to meet, coupled with a set of flexible standards based on specific clinic conditions with longer framework revision intervals. This report provides valuable insight into stakeholder perspectives of the programme, from both providers and users, with the potential for broad generalisability given the study's nationally representative sampling methods.

Work by Muthelo et al. (2021) on ICRMP implementation in selected health care facilities through semi-structured one-on-one interviews too considered the perspectives of implementers of the ICRMP, in this instance those of professional nurses. It revealed similar positive attitudes towards perceived benefits of the ICRMP on PHC service delivery to the community, but the participants also noted persistent challenges in meeting the ICRMP standards due in part to inadequate infrastructure and insufficient supply of resources. The

nurses reported a lack of knowledge and training on the implementation of the ICRMP and inadequate support from line-managers, all resulting in a perception of poor-quality patient care. While limited in generalisability due to purposive sampling of only 15 professional nurses from three PHC facilities in a single district, the findings support those of the NHI Phase 1 evaluation above and provide substantive, qualitative insights necessary for understanding the nuanced on-the-ground realities of ICRMP implementation. However, these findings related to impact of the ICRMP on quality of care remain the unique perceptions of specific respondents rather than offering an objective evaluation of improved quality.

A further descriptive, cross-sectional assessment of two clinics (one rural, without Ideal Clinic status, and one urban with Ideal Clinic designation) sought to study the challenges in service provision experienced by clinics and the readiness of public sector facilities for NHI (Motsepe et al., 2020). Echoing the findings of the preceding literature, Motsepe et al. (2020) found a lack of adequate resources available to clinics to effectively implement the ICRMP and NHI improvement initiatives, even in NHI pilot districts which were earmarked in 2012 for focused NHI implementation supported by a nationally allocated NHI grant. This contrasting with the assertions of the NDoH that achievement of ICRMP expectations should not require additional budget. The study employed a self-developed, structured questionnaire (which included open-ended questions) based on elements of the ICRMP framework concerning service provision inputs. Respondents from the rural clinic reported not having a doctor or pharmacist on site, while most respondents from the urban clinic reported having such professional staff although inconsistencies in responses left the authors unclear as to whether these staff were regularly available on site or not. Further challenges identified by respondents included medicine stock-outs and a lack of computer skills development (with only one third of administrators at the rural clinic having received training). Despite both clinics being designated as NHI pilot sites which should have allowed for similar availability of resources, the authors found this not to be the case. Without the basics necessary for organisational efficiency as included in the ICRMP framework being present at all clinics, Motsepe et al. caution that NHI is unlikely to meet its mandate.

A further trio of studies on the implementation of the ICRMP have revealed perceptions of exclusion held by facility managers as well as challenges due to inadequate policy implementation processes of information sharing, consultation and support, leading some key informants to question the sustainability of the programme (Muthathi, Levin and Rispel, 2020; Muthathi, Rispel and Rispel, 2020; Muthathi, Kawonga and Rispel, 2021).

In one of these studies, Muthathi, Rispel and Rispel (2020) sought to analyse implementation of the ICRMP using Bresser's theory and thematic analysis within a nested qualitative study to examine policy context to produce insights into contextual facilitators and/or constraints to the ICRMP to improve upon future implementation of the programme. The authors conducted in-depth interviews with 36 key informants in two NHI pilot districts in Mpumalanga and Gauteng provinces with questions focusing on the philosophy of the ICRMP, the policy context, inter-governmental cooperation, roles and responsibilities within the programme, resourcing and implementation progress. The wider policy context was correctly understood by informants to be improvement of quality of PHC services in anticipation of NHI, although a theme of weak intergovernmental relationships and cooperation among the three spheres of government also emerged. The informants revealed a potential disjuncture between national quality of care initiatives and available resources on the ground for these to succeed, impacting actors' perceptions toward the ICRMP and their motivation regarding its implementation.

A further empirical study in the trio utilised social network analysis to determine cohesiveness of inter-governmental relationships within the ICRMP policy workings. The authors found non-cohesive relationships between different spheres of government which included poor consultation in ICRMP implementation (Muthathi, Kawonga and Rispel, 2021). The most cohesive governmental relationships within ICRMP policy development and implementation were found to exist within the NDoH itself, suggesting stronger consultation was sought from within the department, being the central sphere of national authority, instead of provincial health actors who are the main implementers of the ICRMP. This supports the perspective of the key informant nurses in the prior study who reported limited knowledge of the policy and support in its implementation.

The third of the studies draws on policy implementation theory and Bossert's concept of decision space to assess participation of facility managers in ICRMP implementation (Muthathi, Levin and Rispel, 2020). Garnering insights through anonymous self-administered questionnaires completed by PHC facility managers in two districts of two provinces in the 2017/18 fiscal year, the authors found a reported lack of involvement in the conceptualisation phase and policy revisions of the ICRMP (despite purported efforts by the NDoH at a broad consultative approach). This was, however, contrasted with high levels of participation in the implementation phase. In a show of support for the programme, over 80% of respondents agreed to varying degrees that the ICRMP is an 'excellent' initiative that should have started sooner, even though most agreed that striving for Ideal Clinic status was frustrating, strenuous

and a potential burden. Most managers reported being proud to be part of the programme and confirmed that they had a plan to achieve Ideal Clinic status. Supporting the need for participation throughout the hierarchy of responsibility in the PHC system, approximately one fifth of facility managers reported narrow decision space in the critical areas of essential medicine and basic resuscitation equipment availability. Importantly, the qualitative data derived through open-ended questions revealed a widely reported unintentional negative consequence of the pressure, real or perceived, to attain Ideal status: the creation of a 'compliance culture'. Most facility managers reported on some occasions feeling as though they had no other option but to self-fund for clinic needs under the framework, to 'borrow' equipment from other facilities before assessment, or to otherwise 'improvise' so as to have the necessary item. This finding suggests the potential need for further research on ICRMP results to determine their veracity in assessing real improvement to clinic functioning and quality of care beyond this possible skewing of results. The cross-sectional nature of the study and its restriction to two districts in South Africa means that it captures the limited experiences of facility managers at a specific point in time. These limitations are, however, balanced against the opportunity for the study, which employed rigorous methods to ensure reliability and validity of the questionnaire, to elicit anonymised responses from frontline workers on the implementation of the ICRMP, including through open-ended questions. These revealed personal insights into the decision space of facility managers and on-the-ground realities which ICRMP reporting itself would not be able to discern.

The possibility of an illusion of compliance being created poses difficulties in analysing the true success with which the ICRMP is being implemented. Findings of unofficial initiative taking in response to resource limitations is supported by the findings of Hodes et al. (2017) (although not strictly related to ICRMP assessment). The authors found the coping strategies of PHC facility managers to drug stock-outs in the Eastern Cape province of South Africa included the formation of facility networks within districts to borrow drugs which served to obscure the severity of essential medicine stock-outs present at the time. As outlined above, the proportion of facilities achieving Ideal Clinic status has seen vast improvement since the inception of the programme (although this upward trend has levelled off in recent years). Findings such as those of Muthathi et al. and Hodes et al., despite their limited generalisability to all clinics in South Africa, do suggest the need for further investigation into the robustness of the ICRMP framework to truly capture improvements in the quality of care provided by PHC facilities beyond improvements in framework standards alone.

The potential need to investigate the impact of the ICRMP beyond its reported clinic scores is further supported by an analytical cross-sectional study into inter-rater agreement in ICRMP assessment (Steinhöbel, Wolvaardt and Webb, 2021) . Steinhöbel et al. (with first author being responsible for coordinating the development of the ICRMP assessment tool together with its web-based information system for capturing scores) utilised Bland-Altman plots to determine whether scores obtained in ICRMP assessments showed inter-rater agreement between self-assessments, district peer reviews and cross-district peer reviews. Total aggregate scores together with aggregate scores on vital elements for 587 facilities (being all PHC facilities undergoing all three assessment types in 2017) were analysed according to three assessments pairs: self-assessment/district peer reviews, self-assessment/cross-district peer reviews and district/cross-district peer reviews. Considering nationwide scores, Steinhöbel et al. found no inter-rater agreement across any of the pairs for either total aggregate scores or vital element aggregate scores in any of South Africa's nine provinces. The authors found that self-assessment scores exceeded scores in both district or cross-district assessment, consistent with earlier research suggesting that self-assessed scores are not as accurate or reliable as other forms due to the tendency of the assessor to over-rate own performance (although such assessment remains beneficial in allowing the opportunity to appraise own work and identify own needs). Despite the considerable cost involved in conducting district and cross-district reviews, including staff time, transport and accommodation, Steinhöbel et al. found a continued need for such assessments and for further investigation into the reason for disagreements between review types despite all reviewers being similarly trained and assessing according to the same criteria which are largely objective in nature and should be less subject to self-assessment inflation.

The studies in this section provide valuable insight into implementation of the ICRMP. Insights from both provider and user perspectives indicate that the programme is viewed to have improved or otherwise have the capacity to improve quality of care and operation of facilities, although it is not without its challenges. These include systemic issues in infrastructure and supply chain, limited consultation and decision space, the potential for a compliance culture and issues in objective assessment - the latter two having the potential to obscure true clinic performance under the ICRMP. Further research into validity of ICRMP scores to accurately measure good clinic performance to meet programme aims of improving quality of care may be beneficial. However, few published studies have assessed ICRMP outcomes against external measures of quality of care. These are reviewed in the following section.

4.2. Impacts of the ICRMP on quality of care provided by PHC facilities

Although the NDoH has reported a positive impact of the ICRMP on stock availability and waiting times, progress under the programme remains mixed with less than 60% of clinics achieving Ideal Clinic status (Steinhöbel, 2018). The literature that follows attempts to quantify changes in quality of care associated with ICRMP implementation.

In a study leveraging the differential prioritisation of clinics in the first 12 months of the ICRMP's implementation (financial year 2015/16, prior to joining of the Western Cape province), Stacey et al. (2021) explored the effects of the quality improvement programme on (i) clinic scores under the framework and (ii) primary care quality indicators over one year. Utilising a robust difference-in-differences approach, the authors found large and statistically significant improvements in ICRMP scores over the year of analysis, but mixed results in terms of four proxy indicators for PHC quality of care with data routinely captured at the clinic level via the District Health Information Software 2 (DHIS). On early antenatal care usage (percentage of first antenatal visits before 20 weeks' gestation) the authors found the ICRMP to have had a small positive effect, contrasted with a small magnitude negative effect on the number of HIV positive clients initiated on Izoniazid preventive therapy (IPT), and no statistically significant impacts of the programme on the number of infants with complete primary immunisation under one year nor on the number of women over 30 screened for cervical cancer. To note, the authors preferred use of the overall ICRMP percentage scores for each clinic due to their richer distributions from which to infer programme-induced changes as opposed to the binary nature of the Ideal Clinic status classifications, based on what they deem an arbitrary nature of underlying weighting thresholds.

The quasi-experimental approach of Stacey et al. provides valuable empirical evidence on the impact of the ICRMP as a key health system intervention to improve PHC quality as South Africa progresses towards the implementation of NHI. The study provides a unique, systematic evaluation of the programme's effectiveness across multiple dimensions of health care quality, adopting a robust methodological approach with robustness checks supporting primary findings. While Stacey et al. found that improved clinic performance implied by increases in ICRMP scores was not generally reflected in other quality of care indicators, the authors do note that the ICRMP may likely require a longer period than the single year under study to reveal greater impacts.

Despite this recommendation for more longitudinal research, the literature reveals no further study employing similar empirical methods to assess the effect of the ICRMP on a countrywide

level nor investigation over time into the association between ICRMP scores and measures of PHC health outputs or outcomes as captured on the DHIS as proxy indicators of quality of care. Two further studies have, however, employed cross-sectional methods to investigate the associations of the ICRMP with patient waiting times and patient satisfaction in limited samples of facilities.

Egbujie et al. (2018) assessed the impact of the ICRMP on patient waiting time. The NDoH has identified long wait times, a major source of dissatisfaction among users of public health care services, as one of six priority areas for improvement. The authors studied the impact of ICRMP interventions, including facility reorganisation, staff training and upgrades to booking systems, at 10 purposively selected facilities in a single district of the KwaZulu-Natal province. Following one year of implementation of these measures, the authors found mixed results. While some clinics showed statistically significant improvement in patient waiting times, waiting times at other facilities stayed the same or even increased. The authors attributed these discrepancies predominantly to the proper implementation of a booking system as recommended under the ICRMP. They also noted factors outside of clinic control, such as sporadic public transport, that prevented some facilities from achieving the preferred spread of patient arrivals which could contribute to longer wait times.

Looking at adequacy of the ICRMP framework itself to monitor good quality of service, Egbujie et al. found that reporting on an average waiting time as required under the ICRMP framework can produce inadequate and potentially misleading information. The ICRMP framework requires patient waiting times to be no more than three hours. The authors found that while average wait times exceeded 3 hours in only one of the ten facilities, 21% of patients spent over three hours waiting. They recommend a new ICRMP indicator be included to measure the percentage of patients exiting a facility in under 3 hours to provide a more accurate reflection of the experience of all users thus recognising the UHC principle of equity for all in access to good quality of care. While the study is restricted in its generalisability due to limited purposive selection of facilities and patients (the first 100 arriving each day), it both quantifies the impact of the ICRMP on a marker of PHC performance and illuminates the need for such assessment of impact to ensure the ICRMP assessment tool is able to measure what it purports to without obscuring the broad reality of quality of service provision and patient experience.

A final study assessed the impact of the ICRMP on patient experience of care, being a key marker of quality particularly in a patient-centred system of PHC. Harrichandparsad and Mahomed (2021) followed a patient-centric approach, gathering data through self-administered anonymous questionnaires distributed at six PHC facilities in the KwaZulu-Natal

province in 2018 with 369 respondents. The authors found significant positive associations between patients' good experiences of care and elements in Component 3 of the ICRMP framework which includes good signage and notices, staff dress code, service organisation and management of appointments. Findings failed, however, to reveal significant associations with other components of the framework or between Ideal Clinic status itself and patients' positive experience of care. This study provides useful insight into a potentially limited association between the ICRMP framework components and Ideal Clinic designation, and quality of care from the user's perspective, although generalisability of findings is limited by its cross-sectional and jurisdiction-specific sampling.

5. GAPS IDENTIFIED IN EXISTING LITERATURE

The collective body of research on the ICRMP with its varied findings underscore the importance of continued research to fully understand and enhance the ICRMP's effectiveness. A number of studies have researched the implementation of the ICRMP and garnered self-reported insights into its successes and challenges, which have included perceptions of quality improvement and improved resourcing, together with frustrations over lack of consultation, budgetary limitations and persistent supply chain issues. Additionally, the pressure on facilities to achieve Ideal Clinic status may inadvertently prioritize compliance over meaningful quality improvements, risking the creation of a "tick-box" culture that overlooks deeper systemic issues. Further findings indicate the scorer anomalies raising concerns about the consistency and objectivity of ICRMP evaluations. These could cloud true performance under the ICRMP, warranting further research into the veracity of ICRMP scores and the true impact of the programme. There is, however, a dearth of literature attempting to measure such impacts on PHC performance and quality of care which the ICRMP purports to assess and improve.

Stacey et al. (2021) present the only published study to provide a nationwide analysis on quantifiable impacts of the ICRMP on quality of care, which identified limited mixed impacts of the programme on proxy indicators of PHC quality following ICRMP implementation, although this notably covers only one year of implementation. The findings of Egbujie et al. (2018), too, found mixed effects of the programme on patient waiting times while Harrichandparsad and Mahomed (2021) identified no association between Ideal Clinic status and patient satisfaction, with only one of 10 components yielding a significant positive association. No further literature provides longitudinal analysis on a similar basis to assess the programme's impact with proxy indicators typically used to assess quality of PHC service provision.

The present study is positioned to address these gaps, contributing valuable insights into the programme's long-term effectiveness in improving PHC facility performance and quality of care. The study at hand will draw on the approach of Stacey et al. to investigate the effects of ICRMP implementation on quality of care in public sector clinics across South Africa, heeding the authors' recommendation to extend analysis longitudinally to consider impact of the programme over time. This study may offer further evidence-based insights into the ICRMP's strengths and potential for policy refinement.

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PART B: JOURNAL-READY MANUSCRIPT

TITLE

PRIMARY HEALTH CARE SERVICES IN SOUTH AFRICA AND THE 'IDEAL CLINIC':
Is quality improvement programme associated with better clinic performance?

ABSTRACT

Word count: 298

A high-quality primary health care (PHC) system will be essential to achieve the ambitious goals set forth in South Africa's proposed system of National Health Insurance (NHI). NHI, informed by principles of Universal Health Coverage, will introduce centralised health financing in a bid to improve equity in the current two-tiered (public/private) system of health care delivery. NHI will rely heavily on PHC facilities as the 'gateway' to the health system. Against this backdrop, the Ideal Clinic Realisation and Maintenance Programme (ICRMP) was developed as a tool for PHC quality improvement. The ICRMP encompasses a comprehensive framework of standards for all PHC facilities. Clinics are routinely assessed against these and afforded the status of an 'Ideal Clinic ' if specified minimum scores are met. While assessment/accreditation frameworks are increasingly being utilised globally as tools for quality improvement, evidence in support of their efficacy in achieving their stated goals remains sparse. Literature on the ICRMP is equally limited. Studies considering the impact of early implementation of the ICRMP on indicators of PHC quality have yielded mixed results, suggesting minimal meaningful impact of the programme on quality of care. The objective of the present study is to build on this body of literature with a longitudinal assessment of the association of the ICRMP with utilisation and quality of care across South Africa. Leveraging longitudinal data, we utilise panel regression models to explore the associations of the ICRMP with two measures of utilisation and six further indicators of PHC quality spanning maternal and early childhood care, TB/HIV treatment, and non-communicable disease screening. Controlling for heterogeneity across clinics and for year, we find increases in ICRMP scores over time to be associated with small magnitude increases in childhood PHC utilisation and early usage of antenatal care. Our findings reveal no further significant associations with a general PHC utilisation marker nor other measures of quality. While ICRMP percentage scores have improved across the years of analysis, limited impact of this improvement is evidenced in indicators of access and quality of care.

MANUSCRIPT

Word count: 5975

1. INTRODUCTION

Quality of health care provision is an essential determinant of health, and a high-quality health system is a catalyst for successful progress toward Universal Health Coverage (UHC) through provision of equitable health outcomes (South African Lancet National Commission, 2019). The health system in South Africa is currently undergoing largescale UHC-informed health financing reforms through the introduction of a system of National Health Insurance (NHI) to reduce current inequities. Achievement of NHI goals will require systematic improvements to quality of care, particularly at the primary health care (PHC) level. One intervention to improve PHC services is the Ideal Clinic Realisation and Maintenance programme (ICRMP), a quality assessment and improvement tool implemented in 2015. This study aims to assess the impact of the ICRMP on access and quality of care over time.

2. THE IDEAL CLINIC REALISATION AND MAINTENANCE PROGRAMME

2.1. The Ideal Clinic Realisation and Maintenance Programme in the context of National Health Insurance

Public sector provision of health care in South Africa follows a district-managed system for PHC, with secondary and tertiary care provided by networks of regional, provincial and national hospitals. PHC services are provided at largely nurse-run clinics with general practitioner support and at larger Community Health Centres (CHCs) which provide some in-patient services including emergency and maternal care (National Department of Health (NDoH), 2017).

While great strides have been taken post-Apartheid to extend health care as an equal right of all in South Africa, significant inequities persist within the health system both in access to and quality of health care services (Fryatt, Hunter and Precious Matsoso, 2014; NDoH, 2017; South African Lancet National Commission, 2019). These inequities endure as a product of fragmented health financing which, along with service provision, exists within a two-tiered system. Approximately 50% of total expenditure on health care, predominantly through private health insurance with some out-of-pocket payments, falls within the private sector that services around 15% of the population. The remaining 50% is allocated within the public sector tasked with providing health care services to the remaining bulk of the population (NDoH, 2017). NHI aims to provide a path toward UHC through the strategic purchasing of health services by a single fund on behalf of all users in the country,

thus pooling resources to provide for more equitable distribution. The NHI Bill (B11-2019) was passed by the National Assembly in June 2023 followed by the National Council of Provinces in December 2023 (Parliamentary Monitoring Group, 2024). True as of writing, the NHI Bill is awaiting assent and signing into law by the President of South Africa. Under NHI, PHC facilities will serve as the 'gateway' to the health system whereby all users will in most instances need to access health services first from PHC providers, being a clinic in the public sector or, amongst others, a general practitioner in the private sector (NHI Bill, 2019).

While improving access has been of particular focus, numerous studies support a shift in attention to quality as a key driver of health beyond access, particularly for people in low- and middle-income countries especially vulnerable to poor quality of care (Kruk et al., 2018a; Kruk et al., 2018b; World Health Organization, Organisation for Economic Co-operation and Development and The World Bank, 2018). Early NHI interventions (NHI Phase 1) are aimed at reengineering and strengthening quality of PHC services in recognition of their essential role in achieving global coverage. This has proved a necessary first step, particularly considering the findings of a baseline facilities audit report which painted a dire picture of the state of PHC services in South Africa at the time. The report, commissioned by the National Department of Health (NDoH) and published in 2012, found less than 50% of public health facilities in the country complied with vital measures and only one health facility, a public hospital, fully met required standards (Visser, Bhana and Monticelli, 2013). The audit further found PHC facilities, scoring lower than hospitals in all priority areas, still encountered challenges such as unreliable essential drug supplies, inadequate staffing, poor infrastructure and long wait times resulting in poor utilisation and negative experiences of care.

2.2. Overview of the Ideal Clinic Realisation and Maintenance Programme framework

The ICRMP was launched in July 2013 to systematically address deficiencies in public sector PHC clinics as exposed in the national baseline audit report in anticipation of NHI (Fryatt and Hunter, 2015; NDoH, 2022b). While incorporating an assessment tool, the chief aim of the ICRMP is to systematically improve the quality of health services delivered in public sector facilities in South Africa. The programme is intended to establish the foundations for the successful implementation of NHI through provision of integrated and comprehensive community-based preventive, promotive, diagnostic, curative, rehabilitative and palliative services – being the full continuum of essential services enshrined in UHC goals (Fryatt and Hunter, 2015).

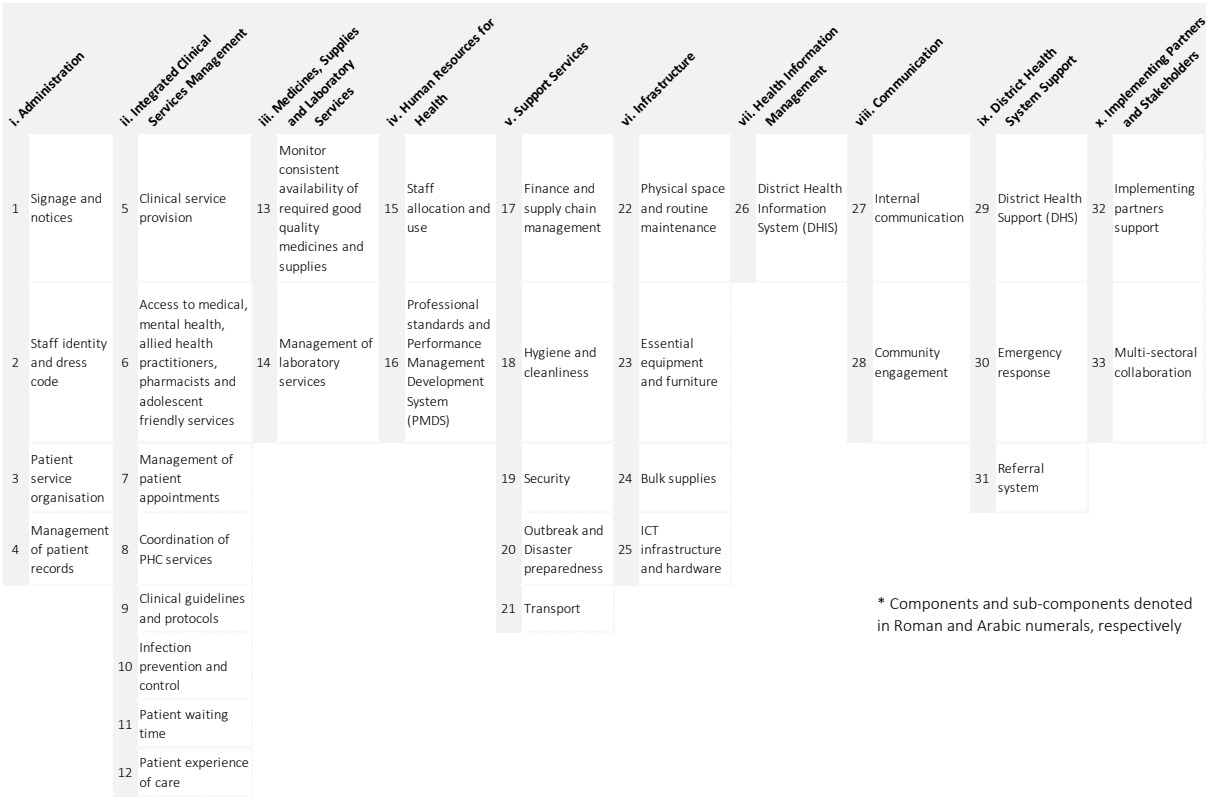
The ICRMP is predicated on the idea that to provide equitable access to good quality services, PHC facilities need to function optimally, and this requires the presence of a combination of elements

rendering it 'Ideal' (NDoH, 2022b). An Ideal Clinic is defined as "a clinic with good infrastructure, adequate staff, adequate medicine and supplies, good administrative processes, and sufficient adequate bulk supplies. It uses applicable clinical policies, protocols and guidelines, and it harnesses partner and stakeholder support" (NDoH, 2022b:4).

The NDoH, in collaboration with management and staff of PHC facilities, districts and provinces, tested and developed the ICRMP framework resulting in a standardised questionnaire presented as a dashboard of components, sub-components and elements (Hunter et al., 2017; Steinhöbel, Wolvaardt and Webb, 2021). As a framework encompassing existing expectations, the NDoH posits that the resources required to achieve Ideal Clinic status should be contained within existing budgets (Hunter et al., 2017).

Implementation of version 15 of the ICRMP framework and manual began nationally in the 2015/16 fiscal year, although the Western Cape province only joined the following year (Hunter et al., 2017). Nationally representative data of ICRMP assessment outcomes is thus available from 2017 to date. Through consultation on the framework starting in 2013, and following feedback from health professionals and managers at health facility, district, provincial and national levels, refinement of the ICRMP has resulted in numerous iterations to the programme being introduced. Version 19 of the ICRMP framework and manual, updated April 2022, is currently in use (NDoH, 2022b, 2022a). Figure 1 illustrates the present matrix of ICRMP components and subcomponents. A comprehensive list of all 238 elements is included in supplemental materials (see Appendix 2).

FIGURE 1 Ten components and 33 sub-components of the ICRMP version 19 (NDoH, 2022a)



The inclusion of different components through to specific elements could impact care provision in a plethora of ways, both directly and indirectly (Stacey et al., 2021). For instance, under 'Integrated Clinical Service Management' component, clinical service delivery is monitored together with results in improvements in key population health and service indicators. More indirectly, the 'Infrastructure' component monitors the adequacy of each facility to manage PHC workload and accessibility for disabled users of PHC services.

Clinics are assessed at multiple points in the year. Self-assessments are conducted in the first quarter and are generally followed by district peer reviews and cross-district peer reviews in latter quarters (although once a clinic achieves Ideal Clinic status it no longer undergoes cross-district review in subsequent years) (Steinhöbel, 2020). Results for peer reviews are routinely captured on the ICRMP web-based platform.

A scale-up team, called the Perfect Permanent Team for Ideal Clinic Realisation and Maintenance (PPTICRM), is formed in each district to drive the ICRMP and conduct peer reviews to verify the results of self and district assessments (Steinhöbel, 2020). PPTICRMs are then enjoined to assist facility managers and staff to improve on failed elements before the first assessment of the following financial year through the development of initiatives to improve quality (Hunter et al., 2017; Steinhöbel, Wolvaardt and Webb, 2021). However, findings have suggested that the tool may

be currently utilised more for compliance than as a catalyst for quality improvement (Steinhöbel, 2020).

In assessment, scores for each clinic are tallied in two ways, one to achieve an overall percentage score and another to determine if a clinic has achieved Ideal Clinic status (which may be graded as Silver, Gold or Platinum). All elements achieved are divided by the total elements assessed for that clinic to reach an overall percentage score for each facility. However, this percentage does not directly influence whether a facility achieves Ideal Clinic status. Instead, weight categories are assigned to each element, with respective categories requiring a specified minimum aggregate for the clinic to achieve Ideal Clinic status (NDoH, 2022b). Prior to version 19, the framework included three categories - 'vital', 'essential' and 'important' elements (although minimum required percentages under each weighting have varied across revisions). A new category, 'non-negotiable vital' was introduced in version 19. Table 1 outlines current weight categories. Based on these, a clinic could theoretically score up to 99% overall while still not achieving status (if even one non-negotiable vital element is failed).

TABLE 1 Weighting system for determining Ideal Clinic status and grade as per version 19 of the ICRMP (NDoH, 2022b, 2022a)

Weights	Description of elements	Silver	Gold	Platinum
Non-negotiable vital (3 elements)	Can cause loss of life or prolonged periods of recovery	100%	100%	100%
Vital (53 elements)	Affect direct service delivery to and clinical care of patients; require immediate and full correction without which there may be immediate and long-term adverse effects on population health.	60-69%	70-79%	≥80%
Essential (104 elements)	Process and structural, indirectly affecting quality and safety of clinical care; require resolution within a given time period	50-59%	60-69%	≥70%
Important (78 elements)	Process and structural, affecting quality of environment in which healthcare is given; require resolution within a given time period	50-59%	60-69%	≥70%

In the first year of implementation, only 9.29% of fixed PHC facilities achieved Ideal Clinic status. The following year, status achievement rose threefold to 29.9%, and to 44% in 2017/18 (Steinhöbel, 2020; Mokgalagadi, 2022). However, achievement of Ideal Clinic status among all PHC fixed facilities began to decline in 2019/20, dropping to 42% in 2020/21 (NDoH, 2022c). Early 2020 marked the introduction of version 19 of the framework as well as the beginning of the COVID-19 pandemic which could have impacted clinic performance under the ICRMP due to an explicit shift in focus by national and provincial health departments to accommodate pandemic-related

activities (NDoH, 2022c). Ideal Clinic status attainment did, however, rebound in 2021/22 although success in achieving status has generally plateaued since 2017/18. Given the primary aim of the ICRMP is to systematically improve quality of PHC services prior to the introduction of NHI this levelling-off of progress may be a cause for concern. This is particularly relevant if facility scores under the ICRMP are associated with good quality of care as they are purported to be.

2.3. Existing literature

Standards-based accreditation frameworks for quality improvement (such as the ICRMP), while more prevalent in high-income settings, are gaining prominence in LMICs. Examples include Tanzania's Star Rating Assessments (Yahya and Mohamed, 2018), and PharmAccess Foundation's SafeCare (which bears similarities to the ICRMP) operating in many emerging economies in Africa to provide assessment of primary and secondary health care facilities together with customised improvement plans (Johnson et al., 2016).

However, while increasing global consideration is being given to accreditation strategies for quality improvement, there remains little empirical evidence supporting their effectiveness (Brubakk et al., 2015; Stacey et al., 2021; Rowe et al., 2019). The same is true of the ICRMP. While there is a limited yet growing body of literature on its implementation together with related challenges and success, there remains a dearth of empirical literature considering the impact such implementation has had on quality of care, particularly over time.

Attitudes toward the ICRMP have been mixed. Some stakeholders have expressed positivity, with both patients and staff perceiving the programme to have improved quality of care when implemented as planned (Genesis, Centre for Health Policy and PWC, 2019, Muthelo et al., 2021), while others have reported being demotivated by constant version revisions and lack of adequate funding to meet requirements (Genesis, Centre for Health Policy and PWC, 2019; Muthathi, Levin and Rispel, 2020; Muthathi, Rispel and Rispel, 2020). Multiple studies have illuminated systemic challenges faced by PHC facilities in implementation of the ICRMP. These include supply chain issues, and infrastructure and staffing inadequacies (Hunter et al., 2017; Muthelo et al., 2021), although some facility managers have reported the ICRMP has helped to quantify needs and advocate for increased funding (Genesis, Centre for Health Policy and PWC, 2019).

Further studies have found unintended negative consequences of implementation. Some clinics have been found to purchase unnecessary equipment for the sole purpose of improving assessment scores (Genesis, Centre for Health Policy and PWC, 2019), while others report 'borrowing' supplies from neighbouring clinics or having facility managers personally purchase

items to have on hand during assessments (Muthathi, Levin and Rispel, 2020). The further findings of Steinhöbel, Wolvaardt and Webb (2021) found no inter-rater agreement in self-assessment, district peer review or cross-district peer review scores despite assessment criteria being largely objective. These findings of scoring manipulation support the need for further research on ICRMP results to determine their veracity in assessing and promoting quality of care.

Few empirical studies have assessed the associations of the ICRMP with quality of care. Harrichandparsad and Mahomed (2021) through self-administered anonymised questionnaires distributed at six PHC facilities in KwaZulu-Natal province in 2018, found significant positive associations between patients' good experience of care and elements in Component 3 of the ICRMP framework, which includes good signage, staff dress code, service organisation and appointment management. Findings failed, however, to reveal significant associations between other components or Ideal Clinic status itself and patients' positive experiences of care. Looking to impact on average patient waiting times, over one year of ICRMP implementation at 10 purposively selected facilities, Egbujie et al. (2018) found mixed results. While some clinics showed statistically significant improvement in patient waiting times, waiting times at other facilities stayed the same or increased.

In a final quasi-experimental study leveraging the differential prioritisation of clinics in the first 12 months of ICRMP implementation (2015/16, prior to Western Cape's joining), Stacey et al. (2021) explored the effects of ICRMP implementation on (i) clinic scores under the framework and (ii) primary care quality indicators over one year. Utilising a robust difference-in-differences approach, the authors found large and statistically significant improvements in ICRMP scores over the year of analysis, but mixed results in terms of four proxy indicators of PHC quality of care. On early antenatal care (ANC) usage, the authors found the ICRMP had a small positive effect, contrasted with a small magnitude negative effect on the number of HIV positive clients initiated on Izoniazid preventive therapy (IPT). They found no statistically significant impacts of the programme on the number of infants under 1 year with complete primary immunisation nor on the number of women over 30 screened for cervical cancer. Stacey et al. (2021) present the only nationwide study on quantifiable impacts of the ICRMP on a range of quality of care indicators, although this notably follows only one year of implementation with the authors noting quality improvement may require a longer period. The objective of the present study is to build on this body of literature with a longitudinal assessment of the association of the ICRMP with utilisation and quality of care across South Africa.

3. MATERIALS AND METHODS

3.1. Data Sources and Preparation

This study utilises longitudinal data spanning six years (2017/2018 to 2022/2023) sourced from two health information platforms: the ICRMP and the District Health Information Software 2 (DHIS). The DHIS routinely captures facility scores for indicators of process, health outputs and outcomes within the National Indicator Data Set (NIDS) of the NDoH (NDoH, 2017; NDoH, 2024). Together, these platforms and data offer a unique opportunity to evaluate the association of the ICRMP with proxy measures of PHC access and quality of care (together PHC Performance Indicators) across health facilities in South Africa and over time.

3.2. Variable Specification

3.2.1. The Ideal Clinic Realisation and Maintenance Programme aggregate score

ICRMP standards scoring on elements, sub-components and components are collected and reported for each clinic together with a total aggregate score and status determination. Aggregate ICRMP scores are calculated by dividing the number of elements a clinic meets the requirements of by the total elements assessed for that clinic in a particular year. Mirroring the approach of Stacey et al., we restrict our analysis to the association of aggregate scores for each clinic rather than binary Ideal Clinic status outcomes with PHC Performance Indicators. Aggregate scores provide a fuller distribution of data and reflect clinic performance on the broad array of underlying elements within the ICRMP.

3.2.2. Primary Health Care Performance Indicators

PHC Performance Indicators, as our dependent variables, were drawn from the NIDS list as captured on the DHIS. We endeavored to include a range of indicators covering maternal and child health, infectious disease and non-communicable disease. We were, however, limited in our choice of indicators to those routinely collected and recorded at the clinic level in all provinces. Varying degrees of missingness and changes to indicator definitions across the years of analysis further limited our selection. Our final selection of PHC Performance Indicators cover clinic processes, outputs and outcomes and include proxy indicators of both access and quality of care. These proxy indicators for quality of care monitor clinical performance and provision of care in different ways. For instance, utilisation rates inform considerations of access, ANC visits before 20 weeks and rates of ANC clients initiated on antiretroviral therapy

(ART) monitor early ANC usage and implementation of Prevention of Mother to Child Transmission (now referred to as Vertical Transmission Prevention) guidelines, while drug-susceptible tuberculosis loss to follow up (DS-TB LTFU) rates monitor effectiveness of retention in care strategies. These indicators together with NIDS specifications are included in Table 2. Data on all PHC Performance Indicators were collected for six years, 2017/18 to 2022/23, save for cervical cancer screening coverage collected for a three year period 2020/21 to 2022/23 as this indicator underwent a change in definition and calculation in 2020 bringing it in line with the 2017 Cervical Cancer Prevention and Control Policy of the NDoH.

TABLE 2 PHC performance indicators

NIDS Indicator	NIDS Level	NIDS definition, use and context
PHC Utilisation Rate Total (N)	Output	Average number of PHC visits/headcount per annum per person in the catchment population.
PHC Utilisation Under 5 Years Rate (N)	Output	Average number of PHC visits/headcount per annum per person under 5 years of age in the catchment population.
Immunisation Under 1 Year Coverage (%)	Output	Children under 1 year of age who have completed the primary course of immunisation (BCG, OPV1, DTaP-IPV-Hib-HBV 1, 2, 3, PCV 1,2,3, RV 1,2 and measles 1) as a proportion of the catchment population under 1 year.
ANC 1st Visit Before 20 Weeks Rate (%)	Process/ Activity	Women who have a first antenatal care visit before 20 weeks into pregnancy as proportion of all antenatal 1st visits
ANC Client Start on ART Rate (%)	Output	Antenatal clients started on ART as a proportion of all HIV positive antenatal clients not previously on ART
DS-TB Client LTFU Rate (%)	Outcome	DS-TB clients loss to follow up (having missed two or more months of treatment) as a proportion of all DS-TB (new, retreatment, other, pulmonary and extra-pulmonary) clients started on treatment. Follows a 6-month cohort anaysis.
HIV Postive New Client Start on IPT Rate (%)	Process/ Activity	HIV-positive clients eligible for IPT who started on IPT as a proportion of HIV positive IPT eligible clients
Cervical Cancer Screening Coverage (%)	Output	Cervical smears in non-HIV women 30-50 years and HIV-positive women 20 years and above divided by (80% women aged 30-50/10)+(205 women 20 years and above/3). The denominator is calculated assuming 20% of this population is HIV-positive.
Note	PHC primary health care; ANC antenatal care; ART antiretroviral therapy; DS-TB drug-susceptible tuberculosis; LTFU loss to follow up	

PHC Performance Indicators data drawn from the DHIS included varying degrees of missingness, outlier values and values exceeding logical parameters for rate/proportion data. Similar issues with DHIS data quality have been noted elsewhere (Massyn et al., 2020; Stacey et al., 2021). Clinics with ICRMP data but missing DHIS data were excluded from individual indicator analysis (see Appendix 4). Panel data regression models, although generally robust to non-normality particularly in large samples such as ours, remain sensitive to outliers and extreme values. Trimming (removal of outlier values) and winsorizing (imputing outliers with less extreme values, for instance 5^{th} and 95^{th} percentiles) are two methods for outlier handling.

For purposes of trimming, we defined outlier values according to the inter-quartile (or box-plot) method as observations lying beyond the 75th percentile plus 1.5 times the interquartile range or below 1.5 times the interquartile range deducted from the 25th percentile, as has been used elsewhere in health care research as a means of outlier handling suited to large tailed or skewed data (Pirson et al., 2006; Weichle et al., 2013). In our primary analysis, we report findings based on trimmed PHC Performance Indictor data (see Appendix 4 for proportion of outliers). Given the secondary nature of our large-scale data collection, it was not possible to ascertain the reasons for proportion values exceeding logical upper thresholds. These may be due, among other reasons, to errors in estimation of denominators like catchment populations (Massyn et al., 2020). Rate or proportion variables with values exceeding 100% even after the handling of outliers were retained and treated as continuous variables in form.

3.3. Inclusion and Exclusion Criteria

In the first instance, our sample was restricted to clinics assessed under the ICRMP framework with scores reported on the ICRMP platform. Larger community day centres and community health centres (CHCs), which may offer extended in-patient services and have since 2020 been assessed under a separate framework, were excluded.

PHC Performance Indicator data drawn from the DHIS were matched to clinics for which ICRMP data was available in each year of analysis. Naming conventions for clinics under the ICRMP and the DHIS differed, requiring a process of name mapping. In each year a small number of clinics in ICRMP assessments could not be matched with clinics in any DHIS derived dataset and were excluded. Clinics appearing in DHIS data but not in ICRMP were likewise excluded.

3.4. Econometric Model Selection and Validation

We utilised a panel data regression model designed to analyse data that spans both cross-sectional and time-series dimensions to assess associations between ICRMP clinic scores as independent variables and PHC Performance Indicators as dependent variables over time. Given our focus on within-facility changes over time, we adopted a fixed effects model supported by Durbin-Wu-Hausman test findings. Fixed effects models can control for time-invariant characteristics that are heterogenous across clinics. This is particularly useful where unobserved clinic-specific factors, such as geographic location or local population health, might influence dependent indicators potentially biasing our estimates. Durbin-Wu-Hausman test findings can be used to support decisions to adopt fixed effects over random effects models in panel data analysis (Croissant and Millo, 2008).

F-tests for model specification (pFtest in R) are used to compare the goodness-of-fit between two competing models (Croissant and Millo, 2008). We ran F-tests against regression models for each dependent variable to compare one-way fixed effects models against fixed effects models controlling for year. Entity- and time-fixed effects models were consistently indicated as the better fit. Controlling for year allows us to account for temporal dynamics and unobserved shocks that could affect a dependent variable, thus isolating the impact of the ICRMP on the performance indicators more effectively. This could, for example, potentially control for impacts of the COVID-19 pandemic which would have been heterogenous over time.

We thus followed a standard fixed effects model controlling for year in the following general form:

$$Y_{it} = \alpha + \beta X_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

where Y_{it} represents a PHC Performance Indicator for health facility i at time t, X_{it} denotes ICRMP score, μ_i captures the unobserved time-invariant characteristics of each health facility, λ_t denotes time-fixed effects (year), and ε_{it} is the idiosyncratic error term. We estimate separate models for each PHC Performance Indicator.

We utilised the 'plm' package in R software (R Foundation for Statistical Computing, Vienna, Austria) for analysis. The package is specifically tailored to panel data econometrics with comprehensive functionality for handling of both cross-sectional and time-series data in a panel data context (Croissant and Millo, 2008). The ICRMP datasets contain minor differences in the clinics assessed each year. We included all clinics with both ICRMP and PHC Performance Indicator scores available in each year. This resulted in unbalanced panel models which are supported by the plm package (Croissant and Millo, 2008).

3.5. Sensitivity analyses and robustness checks

To control for serial correlation and heteroskedasticity found in all initial model estimates, we employed the 'Arellano' method for robust standard errors which is designed to correct for both autocorrelation and heteroscedasticity, particularly in panel data analyses (Croissant and Millo, 2008).

To assess the sensitivity of our results to the handling of outliers, we ran parallel panel regression analyses using the raw and winsorized values of each PHC Performance Indicator.

3.6. Ethical Considerations

Ethical approval for this study was obtained by the Human Research Ethics Committee (HREC) of the Faculty of Health Sciences at the University of Cape Town (HREC reference 028/2024).

4. RESULTS

Results of entity- and time-fixed effects regression analyses depict limited associations between ICRMP scores and PHC Performance Indicators. These results are detailed following an overview of descriptive statistics and findings associated therewith.

4.1. Descriptive statistics

In Figure 2 and Figure 3 we present the proportion of clinics assessed which achieved Ideal Clinic status and their average ICRMP scores, respectively, across the six financial years under consideration. The introduction of new versions of the ICRMP manual and framework are indicated by vertical line.

FIGURE 2 The proportion of clinics achieving Ideal Clinic status from 2017/18 to 2022/23

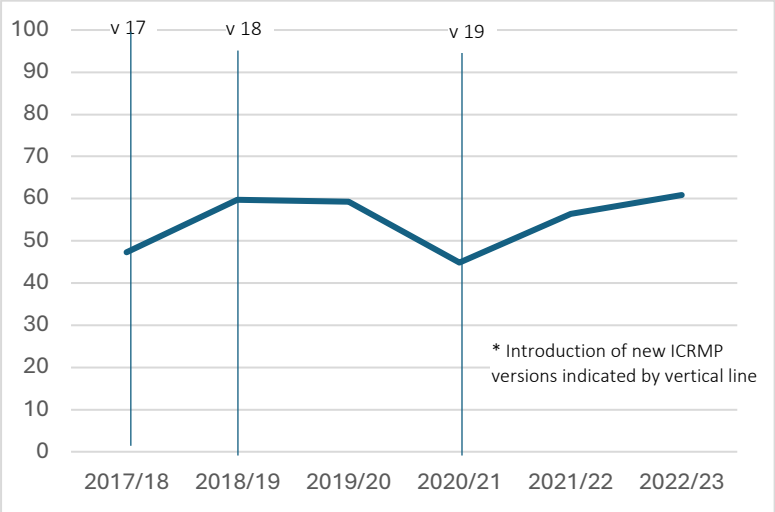
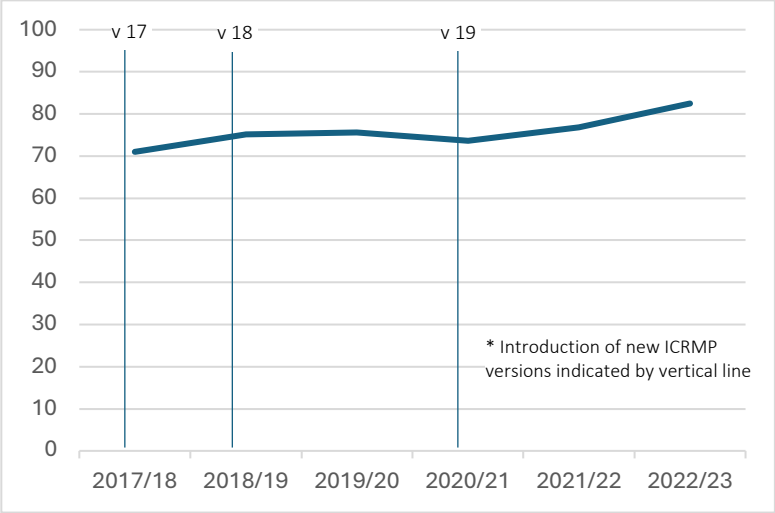


FIGURE 3 Trend in aggregate ICRMP score achieved from 2017/18 to 2022/23



From 2017/18 to 2018/19 the proportion of clinics achieving Ideal Clinic status increased 12 percentage points, reaching 59.8%. 2019/20 to 2020/21 marked the biggest decrease in status by 14.4 percentage points although status attainment recovered in following years, culminating in a high of 60.9% by 2022/23. Table 3 provides further detail on Ideal Clinic status including grading of status achievement. While the number of clinics achieving status rose only 13.6 percentage points in total across the six financial years under consideration, by 2022/23 53.25% of clinics achieving Ideal Clinic status were given the highest grade of 'Platinum', up from only 4.75% of Ideal clinics reaching this grade in 2017/2018.

Aggregate ICRMP scores (prior to weight-adjustment for determination of status) reveal a similar trend to that of Ideal Clinic status across years of assessment. The biggest decease was likewise between 2019/20 and 2020/21 although this was much less pronounced at 1.95 percentage points, with overall scores rebounding in 2021/22 to 76.85%, reaching a high of 82.48% in 2022/23. Table 4 provides further summary statistics on aggregate ICRMP scores. While some clinics achieved perfect scores in three of the six years under analysis, minimum aggregate scores remained low, fluctuating from 15% in 2017/18 to a high of 26% in 2021/22, dropping again to 14,46% in 2022/23.

TABLE 3 Ideal Clinic status attainment of clinics and grading of status where achieved

Year	n	Not achieved N(%)	Achieved N(%)	Silver N(%)	Gold N(%)	Platinum N(%)
2017	3096	1632 (52,71)	1464 (47,29)	686 (22,16)	631 (20,38)	147 (4,75)
2018	3085	1241 (40,23)	1844 (59,77)	892 (28,91)	794 (25,74)	158 (5,12)
2019	3021	1231 (40,75)	1790 (59,25)	883 (29,23)	772 (25,55)	135 (4,47)
2020	3099	1709 (55,15)	1390 (44,85)	181 (5,84)	425 (13,71)	784 (25,30)
2021	3097	1349 (43,56)	1748 (56,44)	206 (6,65)	523 (16,89)	1019 (32,90)

TABLE 4 Descriptive statistics of ICRMP scores and PHC performance indicators

	Year	N	Mean (SD)	Min	Max	Range		Year	n	Mean (SD)	Min	Max	Range
	2017	3096	71,00 (16,29)	15,00	97,00	82,00							
	2018	3085	75,08 (13,87)	24,00	97,00	73,00							
	2019	3021	75,56 (13,59)	14,00	100,00	86,00							
ICRMP	2020	3099	73,61 (13,10)	19,00	100,00	81,00							
aggregate	2021	3097	76,85 (12,06)	26,00	100,00	74,00							
score (%)	2022	3095	82,48 (10,43)	14,46	99,37	84,91							
	2017	3037	2,40 (0,65)	0,66	4,40	3,74		2017	3064	3,77 (0,88)	1,40	6,10	4,70
	2018	3049	2,37 (0,64)	0,67	4,10	3,43		2018	3039	3,78 (0,84)	1,50	6,20	4,70
	2019	2981	2,36 (0,63)	0,72	4,10	3,38	**PHC utilisation**	2019	2995	3,78 (0,83)	1,50	6,20	4,70
	2020	3072	1,93 (0,53)	0,56	3,30	2,74	**under 5**	2020	2997	2,81 (0,63)	1,10	4,40	3,30
PHC utilisation	2021	3048	1,99 (0,56)	0,58	3,50	2,92	**years rate**	2021	3026	3,21 (0,87)	0,92	5,60	4,68
rate (N)	2022	3003	2,06 (0,59)	0,56	3,70	3,14	**(N)**	2022	2954	3,43 (0,98)	0,87	6,10	5,23
	2017	2966	69,98 (22,77)	9,40	134,60	125,20		2017	3035	70,37 (11,83)	38,10	100,00	61,90
	2018	2950	76,41 (24,12)	10,00	144,20	134,20		2018	3019	71,93 (11,21)	40,70	100,00	59,30
	2019	2900	80,43 (23,65)	18,50	146,70	128,20	**ANC 1st**	2019	2967	73,13 (11,02)	42,90	100,00	57,10
Immunisation	2020	2990	77,46 (23,87)	12,90	142,30	129,40	**visit before**	2020	3026	71,58 (12,24)	38,60	100,00	61,40
under 1 year	2021	3000	81,65 (26,61)	8,50	155,60	147,10	**20 weeks**	2021	3022	71,97 (12,28)	38,70	100,00	61,30
coverage (%)	2022	2959	78,76 (25,60)	6,90	151,50	144,60	**rate (%)**	2022	3043	72,52 (12,16)	40,00	100,00	60,00
	2017	2434	96,65 (7,56)	73,30	116,00	42,70		2017	2506	5,62 (8,03)	0,00	30,80	30,80
	2018	2210	99,33 (1,97)	91,70	105,10	13,40		2018	2977	8,21 (8,13)	0,00	34,20	34,20
	2019	2086	99,56 (1,57)	93,00	104,10	11,10		2019	2915	8,20 (8,23)	0,00	34,60	34,60
ANC client	2020	2076	99,56 (1,79)	91,90	104,90	13,00	**DSTB client**	2020	2956	8,25 (8,90)	0,00	35,70	35,70
start on ART	2021	2110	99,64 (1,57)	92,30	104,60	12,30	**LTFU rate**	2021	2938	8,40 (8,99)	0,00	37,00	37,00
rate (%)	2022	2019	99,77 (1, 19)	93,30	104,00	10,70	**(%)**	2022	2749	1,63 (2,62)	0,00	10,00	10,00
	2017	2652	93,37 (11,31)	58,30	125,00	66,70		2017					
	2018	2600	95,20 (8,35)	67,90	117,10	49,20	**Cervical**	2018					
HIV positive	2019	2509	96,93 (6,11)	76,30	113,90	37,60	**cancer**	2019					
client	2020	2552	96,40 (6,86)	73,00	115,00	42,00	**screening**	2020	2804	15,16 (12,92)	0,14	55,40	55,26
inititated on	2021	2517	96,31 (6,83)	72,70	116,50	43,80	**coverage**	2021	2928	18,02 (16,08)	0,00	67,10	67,10
IPT rate (%)	2022	2585	96,05 (6,99)	71,40	117,20	45,80	**(%**	2022	2924	22,39(18,42)	0,00	78,30	78,30

Average PHC utilisation rates decreased by 0.34 visits per person across years of analysis. The biggest improvement among PHC Performance Indicators was immunisation under 1 year coverage which increased by 8.78 percentage points over the six years, reaching 78.76% in 2022/23. However, lowest reported rates of immunisation coverage worsened across the period, falling to 6.9% in 2022/23. Cervical cancer screening coverage increased by 7.23 percentage points over the three years ending 2022/23. Other PHC Performance indicators saw more modest percentage point improvements: ANC 1st visit before 20 weeks, 2.15; ANC client starting on ART, 3.12 (although this improvement represents a close to perfect coverage); and HIV positive client initiated on IPT, 2.68. DS-TB client LTFU rates initially rose to 8.21% in 2018/2019, holding steady across the following three years before a significant decrease (improvement) of 6.77 percentage points to 1.63%.

4.2. Panel data regression analyses

Results of our entity- and time- fixed effects panel regression analyses assessing the association between ICRMP aggregate clinics scores and PHC Performance Indicators (trimmed values) are presented in Table 5.

TABLE 5 Impact of ICRMP on PHC Performance Indicators

	PHC Utilisation Rate Total (N)	PHC Utilisation Under 5 Years Rate (N)	Immunisation Under 1 Year Coverage (%)	ANC 1st Visit Before 20 Weeks Rate (%)	ANC Client Start on ART Rate (%)	DS-TB Client LTFU Rate (%)	HIV Postive New Client Start on IPT Rate (%)	Cervical Cancer Screening Coverage (%)
ICRMP score (%)	0.0001	0.0007*	0.0008	0.0306***	-0.0010	-0.0041	0.0043	0.0160
	(0.0002)	(0.0004)	(0.0165)	(0.0071)	(0.0043)	(0.0059)	(0.0071)	(0.0168)
factor 2018/19	-0.0368***	0.0134	6.5130***	1.4162***	2.5284***	2.6685***	1.6115***	
	(0.0064)	(0.0097)	(0.3858)	(0.1755)	(0.1562)	(0.1716)	(0.2387)	
factor 2019/20	-0.0452***	0.0330***	10.2801***	2.6089***	2.7611***	2.6528***	3.2165***	
	(0.0064)	(0.0096)	(0.4343)	(0.1979)	(0.1564)	(0.1865)	(0.2374)	
factor 2020/21	-0.4819***	-0.9240***	7.2578***	1.0484***	2.7621***	2.7481***	2.9266***	
	(0.0066)	(0.0106)	(0.4561)	(0.2227)	(0.1591)	(0.1971)	(0.2480)	
factor 2021/22	-0.4156***	-0.5460***	11.3715***	1.3014***	2.8716***	2.8983***	2.9375***	2.9836***
	(0.0076)	(0.0126)	(0.4995)	(0.2282)	(0.1594)	(0.2014)	(0.2534)	(0.2525)
factor 2022/23	-0.3511***	-0.3274***	8.4688***	1.7617***	2.9545***	-3.7513***	2.5627***	6.6490***
	(0.0086)	(0.0153)	(0.5273)	(0.2447)	(0.1662)	(0.1732)	(0.2678)	(0.3481)
N	3130	3126	3115	3123	3017	3106	3072	3085
Observations	18,190	18,075	17,765	18,112	12,935	17,041	15,415	8,656
R2	0.4547	0.4402	0.0546	0.0163	0.1068	0.1490	0.0280	0.0988
Adjusted R^2	0.3412	0.3228	-0.1468	-0.1891	-0.1656	-0.0411	-0.2144	-0.4009
F Statistic	2,092.2500***	1,958.0340***	140.9548***	41.3791***	197.4544***	406.4694***	59.2279***	203.3685***
	(df = 6; 15054)	(df = 6; 14943)	(df = 6; 14644)	(df = 6; 14983)	(df = 6; 9912)	(df = 6; 13929)	(df = 6; 12337)	(df = 3; 5568)

Notes: All specifications include time fixed effects. Analyses on all PHC Performance Indicators include 6-year panels 2017/18 to 2022/23 (with 2017/18 as reference year) save for Cervical Cancer Screening Coverage which is based on a 3-year panel 2020/21
PHC: Primary Health Care; ANC: Antenatal Care; DS-TB: Drug Susceptible Tuberculosis; ART: Anteretroviral Therapy; LTFU: Lost to
*p<0.1; **p<0.05; ***p<0.01

Statistically significant panel regression results reveal increases in ICRMP scores over time to be associated with very small magnitude improvements in average PHC utilisation of users under 5 years of age (0.007) and percentage of women attending their first ANC visit before 20 weeks of gestation (0.0306). No further statistically significant associations were discerned between ICRMP scores and the remaining six PHC Performance Indicators.

Panel regression analyses were likewise run on raw and winsorized PHC Performance Indicators to test the veracity of our outlier handling methods. Descriptive statistics for raw and winsorized DHIS data can be found in the supplemental material (see Appendix 3). Results of our analyses in Table 6 reveal similar findings to our primary analysis whereby utilisation rates of young health care users

and early antenatal care usage yield the only statistically significant results with both indicating a positive association with increases in ICRMP scores over time. Our panel regression model, while considered robust in handling issues like non-normality, remains sensitive to outliers. Results based on raw PHC Performance Indicators data which includes a high degree of extreme outlier values should be interpreted with caution.

TABLE 6 Sensitivity of panel data results to methods of outlier handling

	PHC Utilisation Rate Total(N)		PHC Utilisation Under 5 Years Rate(N)		Immunisation Under 1 Year Coverage(%)		ANC 1st Visit Before 20 Weeks Rate (%)		ANC Client Start on ART Rate (%)		DS-TB Client LTFU Rate (%)		HIV Postive New Client Start on IPT Rate (%)		Cervical Cancer Screening Coverage (%)	
	Raw	Winsorized	Raw	Winsorized	Raw	Winsorized	Raw	Winsorized	Raw	Winsorized	Raw	Winsorized	Raw	Winsorized	Raw	Winsorized
ICRMP score (%)	0.0004	0.0002	0.0013**	0.0007*	0.0056	-0.0032	0.0321***	0.0321***	-0.0244	-0.0244	-0.0026	-0.00001	-0.0346	-0.0045	0.0208	0.0126
	(0.0003)	(0.0002)	(0.0006)	(0.0004)	(0.0266)	(0.0162)	(0.0080)	(0.0067)	(0.0217)	(0.0217)	(0.0091)	(0.0063)	(0.0271)	(0.0124)	(0.0249)	(0.0187)
factor 2018/19	-0.0650***	-0.0408***	0.0221*	0.0217**	6.0893***	6.4518***	1.3562***	1.4475***	1.0578	1.0578	0.8010***	1.2971***	2.6855***	2.4733***		
	(0.0092)	(0.0061)	(0.0113)	(0.0094)	(0.5492)	(0.3707)	(0.1854)	(0.1607)	(0.9377)	(0.9377)	(0.2780)	(0.1953)	(0.7087)	(0.3206)		
factor 2019/20	-0.0779***	-0.0566***	0.0329***	0.0268***	9.6925***	9.9708***	2.6057***	2.6241***	1.7228*	1.7228*	1.0276***	1.3935***	3.0940***	3.8864***		
	(0.0093)	(0.0061)	(0.0106)	(0.0090)	(0.6243)	(0.4224)	(0.2077)	(0.1833)	(0.9677)	(0.9677)	(0.3030)	(0.2131)	(0.6583)	(0.3412)		
factor 2020/21	-0.5082***	-0.4946***	-0.9101***	-0.9220***	6.2596***	6.8006***	0.8031***	0.9104***	0.7391	0.7391	1.3021***	1.7154***	2.0426***	2.9133***		
	(0.0100)	(0.0063)	(0.0125)	(0.0100)	(0.6543)	(0.4481)	(0.2398)	(0.2102)	(0.9453)	(0.9453)	(0.3081)	(0.2239)	(0.7092)	(0.3755)		
factor 2021/22	-0.4103***	-0.4288***	-0.4048***	-0.5370***	14.3428***	10.7471***	1.0488***	1.1588***	-0.1317	-0.1317	1.7424***	1.9521***	2.1076***	2.1128***	3.2224***	2.8038***
	(0.0362)	(0.0072)	(0.1307)	(0.0121)	(4.1088)	(0.4886)	(0.2410)	(0.2133)	(0.9777)	(0.9777)	(0.3180)	(0.2321)	(0.8061)	(0.4076)	(0.4896)	(0.2735)
factor 2022/23	-0.3339***	-0.3604***	-0.1164	-0.2904***	12.8391***	8.2150***	1.7370***	1.7556***	0.1417	0.1417	-4.9898***	-4.7215***	0.4330	1.8093***	7.1649***	6.5653***
	(0.0424)	(0.0083)	(0.1402)	(0.0149)	(4.3960)	(0.5174)	(0.2541)	(0.2285)	(0.9614)	(0.9614)	(0.3195)	(0.2111)	(0.7046)	(0.4200)	(0.5187)	(0.3763)
N	3131	3131	3130	3030	3128	3128	3126	3126	3105	3105	3112	3112	3129	3129	3112	3112
Observations	18,368	18,368	18,369	18,369	18,352	18,352	18,315	18,315	17,413	17,413	17,709	17,709	17,925	17,925	9,125	9,125
R2	0.0349	0.4869	0.0092	0.4532	0.0019	0.0515	0.0148	0.0191	0.0008	0.0008	0.0672	0.1220	0.0023	0.0102	0.0384	0.0796
Adjusted R^2	-0.1638	0.3812	-0.1947	0.3406	-0.2036	-0.1438	-0.1883	-0.1832	-0.2165	-0.2165	-0.1321	-0.0656	-0.2091	-0.1995	-0.4599	-0.3973
F Statistic	91.7825*** (df = 6; 15231)	2,408.7890*** (df = 6; 15231)	23.6599*** (df = 6; 15233)	2,104.0200*** (df = 6; 15233)	4.7735*** (df = 6; 15218)	137.6670*** (df = 6; 15218)	38.1415*** (df = 6; 15183)	49.3172*** (df = 6; 15183)	1.8503* (df = 6; 14302)	1.8503* (df = 6; 14302)	175.1598*** (df = 6; 14591)	337.8829*** (df = 6; 14591)	5.7908*** (df = 6; 14790)	25.3821*** (df = 6; 14790)	79.9229*** (df = 3; 6010)	173.2115*** (df = 3; 6010)

Notes: All specifications include time fixed effects. Analyses on all PHC Performance Indicators include 6-year panels 2017/18 to 2022/23 (with 2017/18 as reference year) save for Cervical Cancer Screening Coverage which is based on a 3-year panel 2020/21 to 2022/23 (with 2020/21 as reference year). We performed simple winsorization imputing low and high outliers with 5th and 95th percentile values, respectively. Robust standard errors reported in parentheses.

PHC: Primary Health Care; ANC: Antenatal Care; DS-TB: Drug Susceptible Tuberculosis; ART: Anteretroviral Therapy; LTFU: Lost to follow up

*p<0.1; **p<0.05; ***p<0.01

5. DISCUSSION

We sought to ascertain to what extent ICRMP scoring is associated with better access and quality of care. Our findings, however, reveal limited associations.

The attainment of equitable health outcomes, particularly in South Africa given its current tiered system of health care provision, requires the presence of both access to and good quality of health services when needed and without exposure to financial hardship. These principles of UHC as written in the Sustainable Development Goals (SDGs), are enshrined both within South Africa's constitutional right to health as well as its transformative health policy of NHI.

The ICRMP, as one of South Africa's quality improvement initiatives for PHC, provides a roadmap to achieving good quality of care through comprehensive standard operating procedures, methods of assessment and redress of weaknesses where needed. However, results from early implementation reveal the same challenges to ICRMP standards attainment that have hampered good quality of care in LMICs generally: inadequate financial and human resources, poor infrastructure and supply chains, and insufficient training.

While ICRMP standards scores improved dramatically in the first years of its implementation, clinic scores and the proportion of clinics achieving Ideal Clinic status have remained fairly consistent in later years (apart from a decline in 2020 which could be due to redirection of resources during the COVID-19 pandemic and introduction of a new weighting system of elements under the ICRMP). Underlying these averages is, however, a worrying trend. While best performing clinics under the programme are increasingly scoring the highest grading of Ideal Clinic status, ICRMP scores of worst performing clinics remain as low as 14%. South Africa's system of NHI purports to reduce the vast inequities currently entrenched in its public/private system of health care. However, such differentials among standards within public facilities will likely hamper these efforts (if such poor performing facilities are able to achieve OHSC accreditation to contract with the NHI fund at all). The ICRMP is not envisaged only as an assessment tool. More focus on quality improvement plans tailored for clinics based on their ICRMP assessment shortfalls together with additional PPTICRM, district and national support will likely be necessary to ensure no clinic and community served thereby is left behind as South Africa progresses towards NHI.

As a policy for quality improvement in health care provision, much of the value of the ICRMP is predicated on the standards underlying its assessment being associated with improved quality of care (Stacey et al., 2021). We found minimal evidence of improvement in ICRMP scores over time

being associated with our PHC Performance Indicators. Our results revealed very small magnitude related associations of ICRMP improvement with increased utilisation among young users of PHC facilities and antenatal care usage in early gestation. Our findings could not discern significant association between ICRMP scores over time and any of the other measures of access and quality that we included in our analysis.

Utilisation rates of PHC facilities have been declining in South Africa in more recent years, notably beginning prior to the pandemic. Reasons for this decline are complex and may include a combination of new interventions (such as the Central Chronic Medicine Dispensing and Distribution programme which allows stable patients to collect chronic medications at pick up points), the COVID-19 pandemic (which saw a 17% decrease on average in headcount March to June 2020, although figures have since rebounded), and longstanding perceptions of poor quality of care (Massyn et al., 2020; Mahomed et al., 2020; National Department of Health, 2022). The latter presents a major cause of persistent declines in PHC utilisation rates in the public sector and has resulted in the bypassing of PHC facilities by users who opt instead to visit secondary and tertiary facilities or pay out of pocket for private consultations to access what is perceived to be better service (NDoH, 2017; Massyn et al., 2020). This presents an obstacle for NHI in terms of which PHC facilities are considered the more efficient gateway to accessing health care. Improved utilisation associated with clinic improvement under the ICRMP, although only in those under 5 years in our analysis, is a welcome finding albeit one of small magnitude.

ANC usage before 20 weeks is used as a proxy indicator of coverage and quality of ANC in South Africa, an important component of PHC and a predictor of maternal and child health which also allows for the screening of other conditions like HIV (Massyn et al., 2020). South Africa has witnessed major decreases since 2009, the peak period of maternal mortality, in maternal, infant and child deaths. However, in this same period, approximately 60% of all institutional maternal deaths and a quarter of neonatal deaths are considered to have been potentially preventable (South African Lancet National Commission, 2019). In order to meet SDG target 3 of reducing mother, infant and child mortality, the NDoH is committed to improving early antenatal care usage. However, while vast improvements were achieved between 2010 and 2015, improvements in rates of early utilisation have since slowed (NDoH, 2020). The association of improvements in ICRMP scores with increased early antenatal care usage, a finding that mirrors that of Stacey et al., presents further indication, although minimal, that ICRMP implementation may have a positive impact on certain aspects of quality of care in PHC services.

Our study adds to the limited body of knowledge concerning the impact of the ICRMP on quality of care while adding a longitudinal dimension not previously studied. While our methods were designed to provide robust estimates of the relationship between ICRMP scores and PHC Quality Indicators, limitations exist. Our reliance on secondary data means quality of data collection, estimation and reporting could not be controlled. Similar issues relating to extreme outliers and proportion ranges have been experienced elsewhere with recommendations made, which we reiterate here, for active processes to be implemented to support the strengthening of data quality on the DHIS (Massyn et al., 2020). 2020 marked the beginning of the COVID-19 pandemic which could have impacted clinic performance under the ICRMP and our PHC Performance Indicators due to an explicit shift in focus to accommodate pandemic-related activities. This resulted in provinces not procuring the additional resources necessary to improve status of PHC facilities under the ICRMP together with a de-escalation in services such as TB screening, HIV testing, family planning and immunisation services (NDoH, 2022). While factoring for year may have helped to control for these shocks, sensitivity of our results to impacts of the pandemic may to some extent persist. Three ICRMP framework revisions were also introduced during our period of our analysis although changes more drastically impacted status-related weighting than overall scores. A final limitation exists with the inclusion of four of our PHC Performance Indicators (immunisation, early ANC usage, antenatal patient initiation on ART and TB defaulter rate), in principle with some variation, as elements in version 19 of the ICRMP (see 'Integrated Clinical Services Management ', Annexure 1 for detail). The outcomes of these elements remain binary compared to our dependent variables with full rate/proportion data. For this reason, as well as each related element accounting for only 0,42% of total ICRMP score, we consider the potential correlation effect to be minimal. However, with further data related to element scoring our model could be strengthened by standardising aggregate scores across years with inclusion only of elements common across revisions and removal of elements related to our dependent variables.

The achievement of NHI goals to reduce inequities currently pervasive in the health system of South Africa will require large-scale improvement in PHC service provision in the public sector. The ICRMP is positioned as a comprehensive programme to achieve these aims. However, to do so the programme's standards must be effective in assessing what they purport to. Our findings reflect those of previous researchers in portraying minimal, mixed associations of the ICRMP with access and quality of care. Further research into underlying component and element associations with indicators of quality of care may be useful to inform framework revision. Renewed focus on quality improvement aspects of the policy to meet its stated aims may likewise be necessary to ensure the improvement of all public sector clinics prior to NHI implementation.

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PART C: APPENDIX

TABLE OF CONTENTS

1. SEARCH TERMS AND CRITERIA

The following terms were used to search for published work applicable to this study for inclusion in the structured literature review in Part A:

“Universal Health Coverage”, “UHC”

“National Health Insurance”, “National Health Insurance in South Africa”, “NHI”

“Ideal Clinic Realisation and Maintenance Programme”, “ICRM”, “ICRMP”, “Ideal Clinic”

“quality improvement programme in health care”, “quality improvement in health care”

The quality of published work was evaluated according to it being peer reviewed, its accuracy and consistency when compared with ICRMP functioning and other peer reviewed articles, correct method and data usage, data transparency/accessibility, journal metrics, and quality and sufficiency of references.

2. ICRMP FRAMEWORK VERSION 19

KEY
WEIGHT: I important; E essential; V vital; NNV non-negotiable vital
LEVEL OF RESPONSIBILITY: HF health facility; D district; P province; NDoH National Department of Health

COMPONENT	SUB-COMPONENT			WEIGHT	LEVEL OF RESPONSIBILITY
Administration	Signage and notices	1	All external signage in place	I	P
		2	Facility information board displayed at the entrance of the premises reflects relevant information for the facility	E	D
		3	Disclaimer sign is clearly sign posted at the entrance of the facility	E	D
		4	Vision, mission and values of the province/district are visibly displayed	I	D
		5	Facility organogram with contact details of the facility manager is displayed on a central notice board	I	HF
		6	Patients' Rights Charter is displayed in all waiting areas in at least two local languages	I	HF
		7	All service areas within the facility are clearly signposted	E	HF
	Vision, mission and values of the province/district are visibly displayed	8	There is a prescribed dress code for all service providers	I	P
		9	All healthcare professional staff members comply with prescribed dress code	I	HF
		10	All staff members wear an identification tag	I	HF
	Patient service organisation	11	Sign posted help desk/reception services are available	E	HF
		12	There is a process that prioritises the very sick, frail and elderly patients	V	HF
		13	A functional wheelchair is available	E	HF
	Management of patient record	14	There is a single patient record irrespective of health conditions	I	HF
		15	Patient record content adheres to ICSM prescripts	V	HF
		16	District/provincial SOP/guideline for filing, archiving and disposal of patient records is available	E	P
		17	District/provincial SOP/ guideline for filing, archiving and disposal of patient records is adhered to	E	HF
		18	There is a single location for storage of all active patient records	I	HF
		19	Patient records are filed close to patient registration desk	I	HF
		20	Retrieval of a patient's file takes less than 10 minutes	I	HF
		21	Records are not left unattended in public areas and are only accessible to facility staff and patients	V	HF
		22	Records are not left unattended in clinical service areas	E	HF
		23	Priority stationery (clinical and administrative) is available at the facility in sufficient quantities	I	HF
Integrated Clinical Services Management	Clinical service provision	24	Facility has been reorganised with designated consulting areas and staffing for acute, chronic health conditions and preventative health services.	E	HF
		25	Patients are consulted, examined and counselled in privacy	I	HF
		26	TB treatment success rate is at least 87% or has increased by at least 5% from the previous year	E	HF
		27	TB (new pulmonary) defaulter rate < 5%	E	HF
		28	Antenatal visit rate before 20 weeks gestation is at least 70% or has increased by at least 5% from the previous year	E	HF

	29	Antenatal patient initiated on ART rate is at least 97% or has increased by at least 5% from the previous year	E	HF
	30	Immunisation coverage under one year (annualised) is at least 86% or has increased by at least 5% from the previous year	E	HF
	31	Quality Improvements plans are signed off by the facility manager and updated quarterly	E	HF
	32	Six monthly district/sub-district clinical performance review report with action plan from clinical quality supervisors are available	E	D
Access to medical, mental health, allied health practitioners, pharmacists and adolescent friendly services	33	Patients that require consultation with a medical practitioner have access to a medical practitioner at the facility at least once a week.	E	HF
	34	Patients have access to oral health services	I	D
	35	Patients have access to occupational therapy services	I	D
	36	Patients have access to physiotherapy services	I	D
	37	Patients have access to dietetic services	I	D
	38	Patients have access to social work services	I	D
	39	Patients have access to radiography services	I	D
	40	Patients have access to ophthalmic service	I	D
	41	Patients have access to mental health services	E	D
	42	Patients have access to speech and hearing services	I	D
	43	Staff authorised to dispense medicine have access to the support of a pharmacist	I	D
	44	Adolescent and Youth Friendly Health Services are provided	I	D
Management of patient appointments	45	ICSM compliant patient appointment system for patients with chronic health conditions and MCWH patient is in use	I	HF
	46	Records of booked patients are retrieved not later than the day before the appointment	I	HF
	47	Pre-dispensed medication for clinically stable chronic patients is prepared for collection not later than the day before collection date or patients are enrolled on the CCMDD/CDU programme	E	HF
Coordination of PHC services	48	Facility does referrals to and receives referrals from school health services in its catchment area	I	D
	49	Facility refers patients with chronic but stable health conditions to home- and community-based services for support	E	HF
	50	Facility refers environmental health related risks to environmental health services	I	D
Clinical guidelines and protocols	51	ICSM compliant package of clinical guidelines is available in all consulting rooms	E	HF
	52	National guidelines on priority health conditions are available	E	HF
	53	80% of professional nurses have been fully trained on Adult Primary Care OR Practical Approach to Care Kit	E	D
	54	80% of professional nurses have been fully trained on Integrated Management of Childhood Illness	E	D
	55	Resuscitation protocol is available	E	HF
	56	SOP for informed consent available	E	HF
	57	80% of professional nurses have been trained on Basic Life Support	V	D
	58	50% of professional nurses at the facility are trained on BANC Plus	E	D
	59	National Guideline for Patient Safety Incident Reporting and Learning is available	E	NDoH
	60	Facility/district SOP for Patient Safety Incident Reporting and Learning is available	E	HF
	61	Patient safety incident records comply with the National Guideline for Patient Safety Incident Reporting and Learning	V	HF

		62	All SAC 1 adverse events are reported to the next level of management within 24 hours	V	HF
		63	National Clinical Audit Guideline is available	E	NDoH
		64	Clinical audits are conducted annually on priority health conditions	E	HF
		65	80% of patient records audited are compliant	E	HF
		66	Clinical audit meetings are conducted quarterly in line with the guidelines	E	HF
		67	National guidelines are followed for all notifiable medical conditions	V	HF
		68	SOP for the management of patients with highly infectious diseases is available	V	HF
	Infection prevention and control	69	National Infection Prevention and Control strategic framework is available	E	NDoH
		70	Facility has a designated staff member who is responsible for infection prevention and control	E	HF
		71	SOP for standard precautions is available	V	HF
		72	All staff have received in-service training in the past two years on standard precautions that is inline with the SOP	V	HF
		73	Posters on hand hygiene is displayed	I	HF
		74	Awareness day on hand hygiene is held annually	V	HF
		75	Poster on cough etiquette is displayed in every waiting area	I	HF
		76	Staff wear appropriate protective clothing	V	HF
		77	The linen in use is sufficient, clean, appropriately used and not torn	E	HF
		78	Dirty, soiled and infectious linen are collected in a wheeled cart or trolley	I	HF
		79	Sharps are disposed of appropriately	V	HF
		80	An annual risk assessment for infection prevention and control compliance is conducted	I	HF
		81	All staff are made aware of the provincial letter/memo/circular that inform staff of the procedure to follow for prophylactic immunisations	E	HF
	Patient waiting time	82	National Guideline for the Management of Waiting Times is available	I	NDoH
		83	National target of not more than three hours for time spent in a facility is visibly displayed	E	HF
		84	Waiting time tools to record waiting time is available	E	HF
		85	Waiting time survey report is available	E	HF
		86	Average time that a patient spends in the facility is no longer than 3 hours	E	HF
	Patient experience of care	87	National Patient Experience of Care Guideline is available	E	NDoH
		88	Results of the annual Patient Experience of Care Survey are visibly displayed at the main waiting area	E	HF
		89	An average overall score of 80% is obtained in the Patient Experience of Care Survey	E	HF
		90	National Guideline to Manage Complaints/Compliments/Suggestions is available	E	NDoH
		91	Complaints/compliments/suggestions toolkit is available at the main entrance/exit	E	HF
		92	Complaints/compliments/suggestions records complies with the National Guideline to Manage Complaints/Compliments/Suggestions	E	HF
		93	Targets set for complaints indicators are met	E	HF
Medicines, Supplies and Laboratory Services	Medicines and supplies				
		94	There is a 'No unauthorised entry' sign on the door	E	HF
		95	SOP for the management of availability of medicines is available	E	HF
		96	Hand hygiene facilities are available	V	HF

		97	Cleaning schedule for the Medicine room/dispensary is available	E	HF
		98	Cleaning is carried out in accordance with the schedule	V	HF
		99	All work completed is signed off by cleaners and verified by manager or delegated staff member	E	HF
		100	Medicine room/dispensary and waiting area are clean	V	HF
		101	Medicine room/dispensary is neat and medicines are stored to maintain quality	I	HF
		102	The temperature of the medicine room/dispensary is maintained within the safety range	V	HF
		103	Cold chain procedure for vaccines is maintained	V	HF
		104	Medicine cupboard or trolley is neat and orderly	I	HF
		105	The register for schedule 5 and 6 medicines is completed correctly	V	HF
		106	Schedule 5 and 6 medicine in stock correspond with the balance recorded in the register	V	HF
		107	Electronic networked system for monitoring the availability of medicines is used effectively	E	HF
		108	Stock take conducted in the medicine room/dispensary in past 12 months	V	HF
		109	Medicines on the tracer medicine list are available	V	HF
		110	Re-ordering stock levels (min/max) are determined for each item on the district/facility formulary	V	HF
		111	There is no expired medicine on the shelves	V	HF
		112	Waste receptacles for pharmaceutical waste are available	V	HF
		113	Health care waste is managed appropriately	E	HF
		114	Expired medicine is disposed of according to prescribed procedures	E	HF
		115	Basic medical supplies (consumables) are available	V	HF
	Management of laboratory services	116	Primary Health Care Laboratory Handbook is available	E	NDoH
		117	Required functional diagnostic equipment and concurrent consumables for point of care testing are available	V	HF
		118	Required specimen collection materials and stationery are available	V	HF
		119	Specimens are collected, packaged, stored and prepared for transportation according to the Primary Health Care Laboratory Handbook	E	HF
		120	Laboratory results are received from the laboratory within the specified turnaround times	E	HF
		121	Facility is enrolled as testing point in the NHLS HIV- Proficiency Testing scheme	I	HF
		122	Facility controls rapid test kit performances by running one negative and one positive control on a weekly basis	E	HF
Human Resources for Health	Staff allocation and use	123	Staffing needs have been determined in line with workload requirements	V	D
		124	Staff appointed in line with determined requirements	V	D
		125	Facility has a dedicated manager	E	D
		126	Work allocation schedule is signed by all staff members	I	HF
		127	Leave policy is available	I	D
		128	An annual leave schedule is available	I	HF
	Professional standards and Performance Management Development System (PMDS)	129	Record of staff induction is available	I	HF
		130	All healthcare workers have current registration with relevant professional bodies	V	HF
		131	Performance Management guidelines are adhered to	E	HF
		132	Continued staff development needs are determined for the current financial year and submitted to the district manager	I	HF

		133	Training records reflect planned training is conducted as per the district training programme	I	HF
		134	The disciplinary procedure is available	I	HF
		135	The grievance procedure is available	I	HF
		136	Staff satisfaction survey is conducted annually	I	D
		137	The results of the staff satisfaction survey are used to improve the work environment	I	HF
		138	SOP for management of occupational health and safety incidents is available	E	HF
		139	Health and Safety representative appointed (NA is staff establishment is less than 20 staff members)	E	HF
		140	Health and Safety committee appointed (NA if less than 2 safety reps)	E	HF
		141	Occupational Health and Safety incidents are managed and recorded in a register	E	HF
		142	Occupational health and safety risk assessment has been conducted in the past two years	E	HF
		143	Risk mitigation interventions are implemented for identified occupational health and safety risks	E	HF
Support Services	Finance and supply chain management	144	Facility has a dedicated budget	I	D
		145	Facility has a SOP for obtaining general supplies	E	HF
	Hygiene and cleanliness	146	All cleaners have been trained on cleaning procedures	V	HF
		147	Cleaning schedules are available for all areas in the facility	E	HF
		148	Cleaning is carried out in accordance with the schedule	V	HF
		149	Disinfectant, cleaning materials and equipment are available	V	HF
		150	All work completed is signed off by cleaners and verified by manager or delegated staff member	E	HF
		151	All service areas are clean	V	HF
		152	Hand hygiene facilities are available	V	HF
		153	SOP for managing health care waste is available	V	HF
		154	Health care waste is managed appropriately	V	HF
		155	Central storage area for health care waste is appropriate	V	D
		156	All toilets are clean, intact and functional	V	HF
		157	Exterior of the facility is clean and well maintained	E	HF
		158	Signed waste removal service level agreement between the health department and the service provider is available	E	P
		159	Health care risk waste is removed in line with the service level agreement	V	HF
		160	The service level agreement for waste removal and disposal of waste is monitored	E	HF
		161	Breaches in waste removal contract are escalated to the relevant authority	E	HF
		162	Records show that pest control is done according to schedule	V	HF
	Security	163	Safety and security SOP is available	E	HF
		164	Perimeter fencing is intact	I	HF
		165	Parking for staff is provided on the facility premises	I	D
		166	There is a standard security guard room OR the facility has an alarm system linked to armed response	I	D
		167	There is a security guard on duty OR the facility has an alarm system linked to armed response	I	D
		168	Security services rendered according to contract OR provincial security policy/facility SOP	E	HF

		169	A signed copy of the service level agreement between the security company and the provincial department of health is available	E	D
		170	Security breaches are managed and recorded in a register	E	HF
	Outbreak and Disaster preparedness	171	Functional firefighting equipment is available	V	D
		172	Evacuation plan is displayed in the manager's office and the main entrance	I	HF
		173	Contact numbers of healthcare personnel required in emergencies are available in the management offices and at reception	I	HF
		174	Emergency evacuation procedure is practised annually	E	HF
		175	Deficiencies identified during the practice of the emergency evacuation drill are addressed	E	HF
		176	SOP for outbreak notification and response are available	E	HF
	Transport: Monitor whether staff and patients are transported safely	177	All official vehicles used to render services or transport patients are licensed annually	E	D
		178	All official vehicles used to render services or transport patients are serviced according to manufacturer's schedule	E	D
		179	All staff driving official vehicles to render services or transport patients have a valid driver's license	E	D
		180	All staff driving official vehicles to render services or transport patients have a valid professional driving permits where applicable	E	D
Infrastructure	Physical space and routine maintenance	181	Clinic space accommodates all services and staff	E	D
		182	Clinical service areas have natural ventilation or functional mechanical ventilation	V	D
		183	There is access for people in wheelchairs	E	D
		184	Maintenance schedules for building (s) and grounds are available	V	D
		185	Building(s) is maintained according to schedule	E	D
		186	Building(s)complies with safety regulations	V	D
	Essential equipment and furniture	187	Furniture is available and intact in-service areas	I	HF
		188	Essential equipment is available and functional in consulting areas	V	HF
		189	Staff are trained on the use of essential equipment	E	HF
		190	SOP for reactive maintenance of medical equipment is available	I	HF
		191	Maintenance plan for essential equipment is adhered to	E	HF
		192	Resuscitation room is equipped with functional, basic resuscitation equipment	V	HF
		193	Emergency trolley is restored daily or after each use	NNV	HF
		194	There is an emergency sterile obstetric delivery pack	V	HF
		195	There is a sterile pack for minor surgery	V	HF
		196	Functional oxygen cylinder with pressure gauge is available in resuscitation/ emergency room	NNV	HF
		197	Oxygen available in the cylinder is above the minimum level	NNV	HF
		198	Imaging service unit is accredited	E	HF
		199	An up-to-date asset register is available	I	HF
		200	Redundant and non-functional equipment is removed from the facility	I	HF
	Bulk supplies	201	Facility has a functional piped potable water supply	V	D
		202	Facility has emergency water supply	V	D
		203	Facility has a functional back-up electrical supply	V	D
		204	Sewerage system is functional	V	D
	ICT infrastructure and hardware	205	There is a functional telephone in the facility	E	D
		206	There is a functional computer	I	HF
		207	There is functional printer connected to the computer	I	HF
		208	There is internet access	I	D

Health Information Management	District Health Information System (DHIS)	209	Facility performance in response to burden of disease of the catchment population is displayed and is known to all clinical staff members	I	HF
		210	National District Health Information Management System policy OR Provincial SOP aligned with National Policy is available	I	HF
		211	Clinical personnel and data capturer trained on the facility level Standard Operating Guidelines for Data Management	I	HF
		212	Relevant DHIS registers are available and are kept up to date	I	HF
		213	Facility submits all monthly data on time to the next level	I	HF
		214	There is a functional computerised patient information system	I	D
Communication	Internal communication	215	There are sub-district/district quarterly facility performance review meetings	I	D
		216	A staff meeting is held at least quarterly within the facility	I	HF
		217	Staff members demonstrate that incoming policies/guidelines/SOPs/ notices have been read and are understood by appending their signatures on such policies/guidelines/SOPs/notifications	E	HF
	Community engagement	218	There is a functional clinic committee	E	P
		219	Contact details of clinic committee members are visibly displayed	I	HF
		220	Facility hosts an annual open day	I	HF
District Health System Support	District Health Support (DHS)	221	There is a health facility operational plan in line with district health plan	I	HF
		222	District PPTICRM visits all facilities at least once a year and those targeted to be Ideal in the specific year at least twice a year to ensure that weaknesses have been corrected and to record the Ideal Clinic Realisation status for the end of year report	E	D
	Emergency response	223	There is a pre-determined EMS response time to the facility	E	D
		224	Register for emergency transport requests is available	E	D
		225	Remedial action taken when predetermined EMS response time is not adhered to	E	D
		226	Emergency contact numbers (fire, police, ambulance) are displayed in areas where telephones are available	V	HF
		227	SOP available for the handover between facility and EMS	E	HF
	Referral system	228	National Referral Policy is available	I	NDoH
		229	District SOP for the referral system is available	E	HF
		230	There is a referral register that records referred patients	E	HF
		231	Copy of referral form available in the patient record	E	HF
Implementing Partners and Stakeholders	Implementing partners support	232	An up to date list of all organisations that provide health related services in the catchment area and implementing health partners is available	I	HF
		233	The list of implementing health partners shows their areas of focus and business activities	I	HF
	Multi-sectoral collaboration	234	There is an official memorandum of understanding between the PDOH and SAPS	I	P
		235	There is an official memorandum of understanding between the PDOH and Department of Education	I	P
		236	There is an official memorandum of understanding between the PDOH and the Department of Social Development	I	P
		237	There is an official memorandum of understanding between the PDOH and Department of Public Works	I	P
		238	There is an official memorandum of understanding between the PDOH and Department of Transport	I	P

3. Descriptive statistics of raw and winsorized versions of PHC Performance Indicators

TABLE 1 Descriptive statistics of PHC Performance Indicator raw data

	Year	N	Mean (SD)	Min	Max	Range		Year	N	Mean (SD)	Min	Max	Range
	2017	3082	2,45 (0,77)	0,66	13,10	12,44		2017	3080	3,78 (0,90)	1,30	8,20	6,90
	2018	3072	2,38 (0,66)	0,67	4,80	4,13		2018	3070	3,81 (0,89)	1,00	8,70	7,70
	2019	2994	2,37 (0,64)	0,72	4,50	3,78		2019	3007	3,79 (0,84)	1,30	7,30	6,00
	2020	3088	1,94 (0,58)	0,01	11,60	11,59	**PHC utilisation**	2020	3086	2,87 (0,79)	0,01	19,80	19,79
PHC utilisation	2021	3086	2,04 (1,97)	0,58	106,40	105,82	**under 5 years**	2021	3083	3,39 (7,20)	0,14	399,10	398,96
rate (N)	2022	3046	2,13 (2,28)	0,00	122,20	122,20	**rate (N)**	2022	3043	3,69 (7,70)	0,00	417,70	417,70
	2017	3075	73,57 (33,72)	0,00	631,70	631,70		2017	3059	70,08 (12,25)	14,30	100,00	85,70
	2018	3066	79,70 (32,89)	0,00	518,20	518,20		2018	3048	71,52 (11,96)	0,00	100,00	100,00
	2019	3004	83,28 (32,25)	0,00	593,00	593,00		2019	2996	72,75 (11,65)	0,00	100,00	100,00
Immunisation	2020	3084	79,81 (32,05)	0,00	636,50	636,50	**ANC 1st visit**	2020	3073	70,97 (13,12)	12,50	100,00	87,50
under 1 year	2021	3081	88,15 (225,23)	0,00	12425,00	12425,00	**before 20**	2021	3069	71,33 (13,28)	0,00	100,00	100,00
coverage (%)	2022	3042	86,91 (240,11)	0,00	12950,00	12950,00	**weeks rate (%)**	2022	3070	72,16 (12,72)	4,10	100,00	95,90
	2017	2920	96,59 (48,63)	5,60	2100,00	2094,40		2017	2657	8,08 (13,78)	0,00	100,00	100,00
	2018	2926	97,29 (21,49)	3,70	700,00	696,30		2018	3026	8,85 (9,72)	0,00	100,00	100,00
	2019	2853	98,38 (23,64)	10,00	700,00	690,00		2019	2980	9,15 (10,67)	0,00	100,00	100,00
ANC client start	2020	2895	97,11 (19,77)	5,30	310,00	304,70		2020	3042	9,39 (11,38)	0,00	100,00	100,00
on ART rate	2021	2921	95,90 (24,10)	0,00	325,00	325,00	**DSTB client**	2021	3032	9,81 (12,20)	0,00	100,00	100,00
(%)	2022	2898	95,8 (27,73)	0,00	700,00	700,00	**LTFU rate (%)**	2022	2972	3,10 (7,91)	0,00	200,00	200,00
	2017	3017	90,22 (30,67)	2,80	727,80	725,00		2017					
	2018	3002	92,75 (32,80)	2,70	1100,00	1097,30		2018					
	2019	2940	93,39 (28,57)	1,00	1100,00	1099,00		2019					
HIV positive	2020	2978	92,34 (26,39)	2,10	614,10	612,00	**Cervical cancer**	2020	2998	19,39 (22,37)	0,14	438,70	438,56
client inititated	2021	2990	91,78 (34,24)	0,00	1160,00	1160,00	**screening**	2021	3082	22,22 (31,39)	0,00	1066,60	1066,60
on IPT rate (%)	2022	2998	90,27 (23,40)	0,00	439,40	439,40	**coverage (%**	2022	3045	26,39 (30,05)	0,00	576,20	576,20

TABLE 2 Descriptive statistics of PHC Performance Indicator winsorized data

	Year	N	Mean (SD)	Min	Max	Range		Year	N	Mean (SD)	Min	Max	Range
	2017	3082	2,42 (0,62)	1,40	3,70	2,30		2017	3080	3,77 (0,84)	2,30	5,40	3,10
	2018	3072	2,39 (0,6)	1,40	3,70	2,30		2018	3070	3,80 (0,80)	2,50	5,40	2,90
	2019	2994	2,36 (0,58)	1,40	3,50	2,10		2019	3007	3,78 (0,76)	2,50	5,20	2,70
	2020	3088	1,93 (0,51)	1,00	2,90	1,90	**PHC utilisation**	2020	3086	2,85 (0,64)	1,90	4,20	2,30
PHC utilisation	2021	3086	2,00 (0,53)	1,10	3,00	1,90	**under 5 years**	2021	3083	3,24 (0,87)	1,90	5,10	3,20
rate (N)	2022	3046	2,07 (0,57)	1,10	3,20	2,10	**rate (N)**	2022	3043	3,50 (1,00)	2,00	5,69	3,69
	2017	3075	71,99 (23,43)	33,97	123,10	89,13		2017	3059	70,18 (11,07)	50,00	90,21	40,21
	2018	3066	78,43 (25,02)	38,33	133,53	95,20		2018	3048	71,73 (10,49)	52,50	90,67	38,17
	2019	3004	82,02 (24,09)	42,75	132,97	90,23		2019	2996	72,90 (10,32)	54,08	91,70	37,63
Immunisation	2020	3084	78,77 (23,82)	38,90	128,09	89,19	**ANC 1st visit**	2020	3073	71,19 (11,75)	49,16	92,20	43,04
under 1 year	2021	3081	82,79 (26,16)	38,00	134,20	96,20	**before 20**	2021	3069	71,55 (11,82)	48,90	92,50	43,60
coverage (%)	2022	3042	80,37 (25,32)	39,30	131,90	92,60	**weeks rate (%)**	2022	3070	72,28 (11,53)	50,50	93,00	42,50
	2017	2920	96,59 (48,63)	5,60	2100,00	2094,40		2017	2657	7,19 (10,08)	0,00	33,30	33,30
	2018	2926	97,29 (21,49)	3,70	700,00	696,30		2018	3026	8,38 (8,09)	0,00	26,10	26,10
	2019	2853	98,38 (23,64)	10,00	700,00	690,00		2019	2980	8,52 (8,37)	0,00	27,31	27,31
ANC client start	2020	2895	97,11 (19,77)	5,30	310,00	304,70		2020	3042	8,82 (9,38)	0,00	30,40	30,40
on ART rate	2021	2921	95,90 (24,10)	0,00	325,00	325,00	**DSTB client**	2021	3032	9,06 (9,57)	0,00	31,30	31,30
(%)	2022	2898	95,85 (27,73)	0,00	700,00	700,00	**LTFU rate (%)**	2022	2972	2,43 (3,77)	0,00	12,64	12,64
	2017	3017	88,75 (17,47)	43,16	106,30	63,14		2017					
	2018	3002	91,20 (14,56)	51,10	105,29	54,19		2018					
	2019	2940	92,68 (13,03)	54,49	103,41	48,92		2019					
HIV positive	2020	2978	91,73 (14,57)	49,84	104,20	54,37	**Cervical cancer**	2020	2998	18,15 (16,80)	1,30	61,68	60,38
client inititated	2021	2990	90,65 (16,85)	40,63	104,06	63,43	**screening**	2021	3082	20,51 (18,94)	0,79	67,09	66,30
on IPT rate (%)	2022	2998	90,44 (16,22)	42,04	100,00	57,96	**coverage (%**	2022	3045	24,43 (20,47)	1,70	73,04	71,34

4. Missing and outlier data

TABLE 3 Number and proportion of clinics missing data and clinics with outlier values

	Missing N (%)						Outliers: trimmining method N (%)					
	2017	2018	2019	2020	2021	2022	2017	2018	2019	2020	2021	2022
PHC Utilisation Rate Total	14 (0,45)	13 (0,42)	27 (0,89)	11 (0,35)	11 (0,36)	49 (1,58)	45 (1,46)	23 (0,75)	13 (0,43)	16 (0,52)	38 (1,23)	43 (1,41)
PHC Utilisation Under 5 Years Rate	16 (0,52)	15 (0,49)	14 (0,46)	13 (0,42)	14 (0,45)	52 (1,68)	16 (0,52)	31 (1,01)	12 (0,40)	89 (2,88)	57 (1,85)	89 (2,92)
Immunisation Under 1 Year Coverage	21 (0,68)	19 (0,62)	17 (0,56)	15 (0,48)	16 (0,52)	53 (1,71)	109 (3,54)	116 (3,78)	104 (3,46)	94 (3,05)	81 (2,63)	83 (2,73)
ANC 1st Visit Before 20 Weeks Rate	37 (1,20)	37 (1,20)	25 (0,83)	26 (0,84)	28 (0,90)	25 (0,81)	24 (0,78)	29 (0,95)	29 (0,97)	47 (1,53)	47 (1,53)	27 (0,88)
ANC Client Start on ART Rate	176 (5,68)	159 (5,15)	168 (5,56)	204 (6,58)	176 (5,68)	197 (6,37)	486 (16,64)	716 (24,47)	767 (26,88)	819 (28,29)	811 (27,76)	879 (30,33)
DS-TB Client LTFU Rate	439 (14,18)	59 (1,91)	41 (1,36)	57 (1,84)	65 (2,10)	123 (3,97)	151 (5,68)	49 (1,62)	65 (2,18)	86 (2,83)	94 (3,10)	223 (7,50)
HIV Postive New Client Start on IPT Rate	79 (2,55)	83 (2,69)	81 (2,68)	121 (3,90)	107 (3,45)	97 (3,13)	365 (12,10)	402 (13,39)	431 (14,66)	426 (14,30)	473 (15,82)	413 (13,78)
Cervical Cancer Screening Coverage				101 (3,26)	15 (0,48)	50 (1,62)				194 (6,47)	154 (5,00)	121 (3,97)

Notes: PHC Performance Indicator data were matched to clinics for which ICRMP data were available in each year of analysis. If no PHC Performance Indicator data was available for a clinic, it was considered missing. Outliers for purposes of trimming were calculated according to the interquartile (or box-plot) method as observations lying beyond the 75th percentile plus 1.5 times the interquartile range or below 1.5 times the interquartile range deducted from the 25th percentile.

5. PROTOCOL

RELATIONSHIPS BETWEEN IDEAL CLINIC STATUS, AND MEASURES OF PRIMARY HEALTH CARE PERFORMANCE

Research Location:	South Africa
Duration of Study:	Approximately 4 months
Candidate:	Caitlin van Rensburg, Master of Public Health (Health Economics) student
Principal Investigator:	Dr Lucy Cunnama, Senior Lecturer, Health Economics Unit
Collaboration:	Study will be conducted in collaboration with the Clinton Health Access Initiative (CHAI), a global health organisation. A memorandum of understanding has been signed both by the University of Cape Town and CHAI to provide internship opportunities to postgraduate students. In terms of this arrangement, CHAI contracted the Candidate from November 2022 to July 2023 as an Independent Consultant. Through this collaboration, CHAI has provided and will continue to offer guidance on the scope of the study and access to all necessary data required by the Candidate.
Outcomes:	The results of this study will be submitted as a mini dissertation in partial fulfilment of a Master of Public Health (Health Economics) degree. Results will also be provided to CHAI in the form of a report.

1. BACKGROUND & LITERATURE REVIEW

1.1 Ideal Clinic Realisation and Maintenance Programme

The Ideal Clinic Realisation and Maintenance (ICRMP) programme was launched in South Africa in July 2013, shortly after the government's green paper on National Health Insurance (NHI) was released in 2011 (1).

The implementation of NHI will require improvements in health care management and service delivery, with an emphasis on the primary health care (PHC) level. PHC facilities are best able to respond to the immediate needs of the community in promoting health and preventing illness and further complications through health promotion activities, early detection of illness, treatment and appropriate referral (1). PHC facilities, as being closest to the community, are especially effective in increasing population coverage (particularly in reaching those most in need) and in addressing most health service needs affordably (2). In South Africa, PHC services are largely delivered through clinics, community health centres (CHCs) and outreach programmes in communities.

The success of NHI will, to a large extent, depend on a well-functioning PHC system. However, despite success in improving utilisation and numerous health indicators in South Africa over time, PHC facilities have still faced challenges such as long wait times and insufficient space and resources leading to negative experiences of care (3). The ICRM programme was launched to systematically address these deficiencies and improve the quality of care provided in PHC facilities across the country as related to various elements indicative of optimal PHC functioning and to meet national standards in anticipation of the introduction of NHI (1).

An Ideal Clinic is defined as "a clinic with good infrastructure, adequate staff, adequate medicine and supplies, good administrative processes, and sufficient adequate bulk supplies. It uses applicable clinical policies, protocols and guidelines, and it harnesses partner and stakeholder support" (1). An Ideal Clinic further works in collaboration with other government departments, the private sector and NGOs to address the social determinants of health.

The ICRM programme measures the performance of clinics, community health centres (CHCs) and community day centres (CDCs), with separate frameworks in place for the Ideal Clinic and Ideal CHC. This study will focus on the Ideal Clinic framework, specifically.

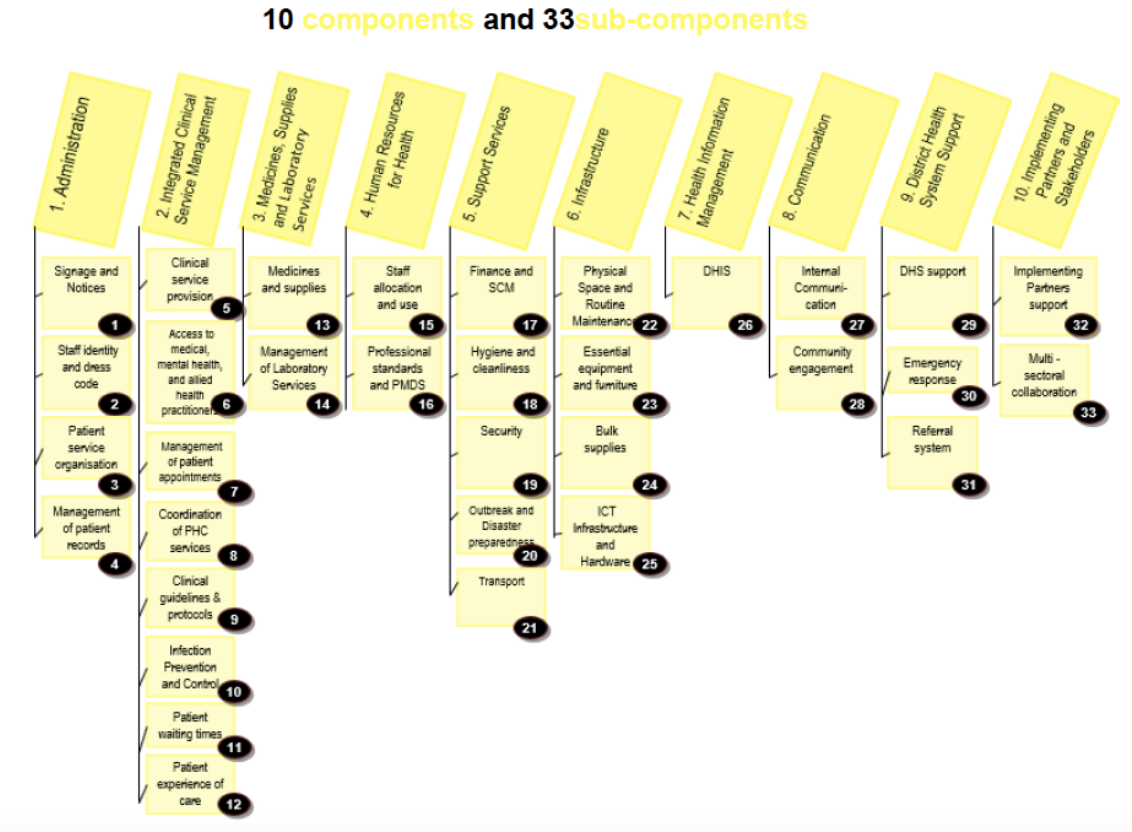
The National Department of Health (NDoH), in collaboration with management and staff of PHC facilities, districts and provinces, tested and developed the ICRM framework resulting in an initial

dashboard of 10 components, 32 sub-components and 178 elements falling within respective sub-components that Ideal facilities should meet. During clinic assessment, these are colour-coded as green if present and optimally functional, orange if partially functional with corrective measures in place, or red if the element is non-functional or absent (3).

Implementation of version 15 of the ICRM framework (which has since undergone multiple revisions) began nationally in April 2015, although the Western Cape Department of Health joined the programme only in the 2016/17 financial year (3). Nationally representative data for the ICRM programme is thus available from 2017 to date.

Version 19 of the ICRM framework and manual, updated April 2022, is currently in use (4). The iterations of the framework since 2015 have seen sub-components increase to 33 under version 19, with elements now totaling 238, up from 211 under version 18 (see Figure 1). Through extensive consultation on the framework and following feedback from health professionals and managers at health facilities at district, provincial and national levels, amendments to the framework have been effected. Version 19 has further aligned the Ideal Clinic elements to the National Norms and Standards Regulations for different health establishment categories as gazetted in February 2018 (4).

Figure 1. Version 19 of the ICRM framework delineated by components and subcomponents



Source: NDoH, 2022, Ideal Clinic Definitions, Components and Checklists v19. Accessible at: https://www.idealhealthfacility.org.za/

The framework provides for different levels of responsibility for each element, being the health facility, the district, province, or National Department of Health, as well as different methods for the measurement of each element, including physically checking applicable documents, asking staff members/clients for their views, making objective observations or manually testing the functionality of systems or equipment (4).

Different weight categories are accorded to each element. These categories until 2022 included 'vital', 'essential' and 'important' elements with a new category, 'non-negotiable vital', introduced in 2022. Version 19 of the framework defines these weight categories as follows:

Non-negotiable vital:	Elements that can cause loss of life or prolonged periods of recovery.
Vital:	Extremely important elements affecting direct service delivery to and clinical care of patients and which require immediate and full correction without which there may be immediate and long-term adverse effects on the health of the population.
Essential:	Very necessary elements, comprising process and structural elements indirectly affecting quality and safety of clinical care, that require resolution within a given time period.
Important:	Significant elements, comprising process and structural elements that affect the quality of the environment in which healthcare is given, that require resolution within a given time period (4).

An average score (of elements scored as green divided by total elements in the weight category) is calculated per weight category and determines whether a facility has achieved an Ideal Clinic status which may be graded as Silver, Gold or Platinum (each grading having a minimum required percentage). The percentage necessary to attain each Ideal Clinic grading has similarly been revised across framework versions (see Table 1 and Table 2 for comparison of the weighting/scoring system of the latest two frameworks).

Table 1. Weighting system for determining Ideal Clinic status in version 18 of the ICRM framework:

Weights	Silver	Gold	Platinum
Vital (6 elements)	83%	100%	100%
Essential (84 elements)	70%	80%	90%
Important (118 elements)	70%	79%	89%
AVERAGE	**70%-79%**	**80%-89%**	**90%-100%**

Source: NDoH, 2018, Ideal Clinic Definitions, Components and Checklists v18. Accessible at: https://www.idealhealthfacility.org.za/

Table 2. Weighting system for determining Ideal Clinic status in version 19 of the ICRM framework:

Weights	Silver	Gold	Platinum
Non-negotiable Vitals (3 elements)	100%	100%	100%
Vital (53 elements)	60-69%	70-79%	≥80%
Essential (104 elements)	50-59%	60-69%	≥70%
Important (78 elements)	50-59%	60-69%	≥70%

Source: NDoH, 2022, Ideal Clinic Definitions, Components and Checklists v19. Accessible at: https://www.idealhealthfacility.org.za/

In 2015/16, only 9.29% of fixed PHC facilities assessed nationally achieved Ideal status which increased steadily across years to 55.61% in the 2021/22 year of assessment (5).

2. STUDY OBJECTIVES & RESEARCH QUESTIONS

The objectives of the ICRM programme are to systematically improve the quality of care provided by PHC facilities. The number of clinics achieving Ideal status at varying levels (Silver, Gold and Platinum) have steadily increased across the years of assessment. The primary aim of this study is to investigate the association between Ideal Clinic status afforded to clinics in South Africa and various commonly used measures of PHC performance to ascertain whether achievement of Ideal status does, in actuality, reflect better functionality and experiences of care. This may include a determination of which elements are more closely associated with these measures of performance.

Measures of PHC performance against which elements and IC status will be compared (together, "PHC Performance Indicators") will include (1) indicators of facility access and utilisation, including clinic utilisation rates calculated as annual headcount as a proportion of the estimated catchment population, as well as (2) indicators of PHC processes, health outputs and outcomes, including:

- TB treatment success rate*: TB clients who successfully completed treatment (including both cured and those without proof of cure once treatment has completed) as a proportion of all TB clients started on treatment (9).
- TB (new pulmonary) defaulter rate*: New smear-positive pulmonary TB clients lost to follow up (missed two months or more of treatment) as a proportion of new smear-positive pulmonary TB clients started on treatment (9).
- Antenatal visit rate before 20 weeks' gestation*: Women who have a first (booking) visit to the clinic before 20 weeks into pregnancy as a proportion of all antenatal first visits (9).
- Antenatal patients initiated on ART rate*: Antenatal clients who started on ART as a proportion of the total number of antenatal clients who are known HIV positive and not previously on ART (9).
- Delivery in facility rate: Total deliveries in a facility as a proportion of expected deliveries in the population (9).
- Immunisation coverage under one year annualised*: Children under 1 year who have completed their primary course of immunisation as a proportion of estimated clinic catchment population under 1 year (9).
- HIV positive child under 1 year start on ART rate: Children under one year to start ART as a proportion of children under one year who tested HIV positive (9).
- HIV positive child 5-14 years start on ART rate: Children 5 to 14 years to start ART as a proportion of children 5 to 14 years who tested HIV positive (9).
- ART clients remaining in care rate: Cumulative proportion of clients on treatment after interval (9).
- ART clients lost to follow up: Cumulative proportion of clients lost to follow-up after interval (9).
- Mental disorders screening rate: Clients screened for mental disorders at facilities as a proportion of PHC headcount (9).
- Patient experience of care satisfaction rate**: Patient Experience of Care survey satisfied responses as a proportion of all Patient Experience of Care responses (9).

* These indicators are currently included (in principle, with some variation) in the ICRM framework version 19 under Clinical Service Provision, sub-component 5, which serves to monitor whether improvements to the integration of clinical care services result in improved population health and service indicators (4).

** These indicators are currently included (in principle, with some variation) in the ICRM framework version 19 under Patient Experience of Care, sub-component 12, which serves to monitor whether an

annual patient experience of care survey is conducted, whether patients are afforded an opportunity to complain about or compliment the facility, and if such complaints/compliments are managed within prescribed timeframes (4).

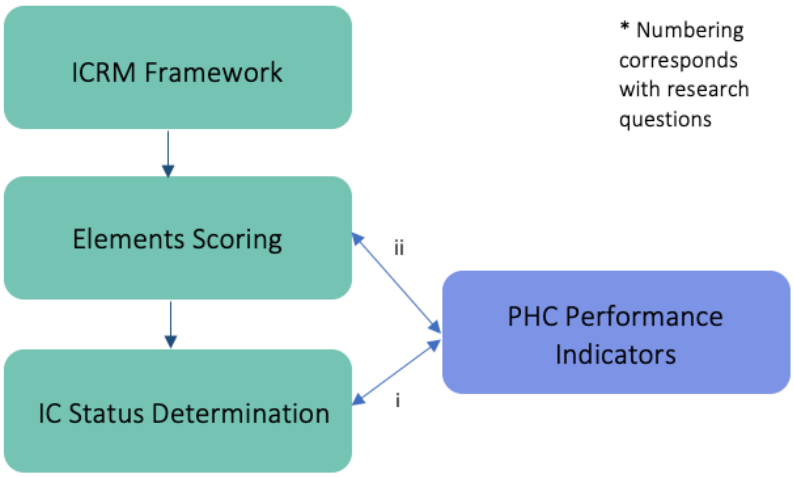
Accordingly, the following questions will be addressed through this study:

i. Are Ideal Clinic scores over time associated with good quality of care as measured by PHC Performance Indicators?
ii. Which elements in the Ideal Clinic framework are more closely associated with better clinic functioning as measured by PHC Performance Indicators?

3. CONCEPTUAL FRAMEWORK

Figure 2 illustrates a conceptual framework for this study where double-arrow lines are indicative of associations to be studied.

Figure 2. Conceptual framework for study



4. METHODOLOGY

4.1 Data

Datasets detailing Ideal Clinic performance for each clinic evaluated will be drawn from the Ideal Clinic web database by the CHAI team or the Candidate. These datasets detail Ideal Clinic overall status determinations, performance per element for each clinic and outcomes of various checklists conducted per element. Datasets from 2016/17 to 2022/23 will be accessed. It will be necessary to compile

comprehensive datasets of outcomes for each clinic on each element assessed for each year of assessment. Data will be cleaned to removed clinics which are missing scoring for a given year.

Data detailing outcomes of the PHC Performance Indicators will be accessed from the District Health Information System (DHIS) electronic database by the CHAI team or the Candidate. The DHIS is a routine system used to track health service delivery in the South African public health sector. It will be necessary to rename clinics to align with Ideal Clinic datasets. Data will be cleaned to remove clinics with missing data.

4.2 Analysis Plan

The respective research questions in section 2 above will be addressed as follows:

i. Testing of means will be conducted between two populations – those clinics with Ideal status and those clinics without Ideal status – to test the hypothesis that there is no difference between mean outcomes between the populations on different PHC Performance Indicators or on a composite PHC Performance Indicator score.
This analysis will provide insights into potential differences in performance levels between the two groups.

ii. Regression analysis will be used to determine the nature of the associations between PHC Performance Indicators as dependent variables, and Ideal Clinic status and the various elements of the ICRM framework as independent variables. This analysis aims to identify which elements of the framework are more closely associated with good clinic performance.

5. EXPECTED RESULTS AND IMPLICATIONS OF THE RESEARCH

Results of this study are expected to provide an indication of whether improved Ideal Clinic status determinations are associated with better performance of clinics according to PHC Performance Indicators. The aims of the ICRM programme include systematically improving deficiencies in PHC facilities to improve experiences of care. It is necessary to understand whether the time and resources expended on improving the Ideal status of clinics is reflected in improved performance and experiences of care in such clinics. This may serve to support the implementation of the ICRM programme or inform developments in the programme by highlighting which elements should receive increased focus to result in improved clinic performance on the ground.

6. POSSIBLE DIFFICULTIES AND SOLUTIONS

The number of elements and the weighting of these elements have been amended with each new iteration of the ICRM framework. Likewise, there is some variation in the clinics which have been assessed across the years of analysis of this report. It is expected that these challenges, when assessing data across years to identify trends, may be overcome by limiting analyses only to those clinics with complete data for all years and for only those elements which have remained the same across framework versions.

7. DATA MANAGEMENT & ETHICAL CONSIDERATIONS

7.1 Data Management

The Candidate will be granted access by CHAI to the Ideal Health Facility Monitoring System from which various reports can be drawn. Login and password details will be shared and stored separately.

Electronic datasets made available by the CHAI team to the Candidate will be shared via and stored on Box, a web-based platform for secure content storage and management, with access given to the Candidate, Supervisor and CHAI staff.

Any datasets downloaded or developed by the Candidate will be stored on a password-protected laptop and/or uploaded to the shared Box folder.

7.2 Ethical Considerations

- Approval for this study as required under CHAI's internal processes has been sought and obtained.
- Further approval is sought from the Departmental Research Committee (DRC) of the School of Public Health and the Faculty of Health Sciences Human Research Ethics Committee, UCT, if required.
- Datasets made available to the Candidate as outlined above and to be used in this study do not contain any personally identifiable information.
- Risk of harm is considered low as this study does not involve human subjects and all data to be used is at a clinic (or higher) level with no personally identifiable information. Benefits of this study may include expanding the knowledge base on the performance of the ICRM programme

to potentially improve the programme (and, as a consequence, PHC performance) and inform policy direction on the introduction of NHI.

- No conflicts of interest are declared. The Candidate does not stand to gain financially from the outcomes of this study.
- As an Independent Consultant for CHAI, the Candidate received limited compensation for a period of six months to complete work as required by CHAI for this study.
- With regards to dissemination, results of this study will be provided to CHAI in the form of a report and will be submitted to UCT as a mini dissertation in partial fulfilment of a Master of Public Health (Health Economics) degree.

8. TIMELINE

This study is anticipated to run from April 2023 to September 2023 with the following timeframe:

Nov 2023:	Protocol to be submitted to the Departmental Research Committee (DRC) of the School of Public Health
Nov/Dec 2023:	DRC amendment/approval; data collection and cleaning
Nov/Dec 2023:	Data analysis; write up and submission of CHAI report
Jan 2024:	Dissertation write up and review
Feb/Mar 2024:	Submission of mini dissertation

9. BUDGET

This study is not anticipated to incur costs other than those related to printing of the final dissertation. This cost will be covered by the Candidate.

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9. National Department of Health. 2017. National Indicator Data Set: Data element definitions April 2017 to March 2019.

6. LETTER OF APPROVAL FROM UNIVERSITY OF CAPE TOWN HUMAN RESEARCH ETHICS COMMITTEE

UNIVERSITY OF CAPE TOWN
Faculty of Health Sciences
Human Research Ethics Committee

Room 45, E-52 Old Main Building
Groote Schuur Hospital
Observatory 7925
Tel:0214066492
Email: hrec-submissions@uct.ac.za
Website: www.health.uct.ac.za/home/human-research-ethics

19 January 2024

HREC REF: 028/2024

Dr Lucy Cunnama
Department of Health Economics
Email: Lucy.Cunnama@@uct.ac.za
Student: vmcai001@myuct.ac.za

Dear Dr Cunnama

PROJECT TITLE: RELATIONSHIPS BETWEEN (a) IDEAL CLINIC STATUS , AND (b) MEASURES OF PHC PERFORMANCE, FACILITY EXPENDITURE AND HUMAN RESOURCES -MPH (HEALTH ECONOMICS) CANDIDATE: MS CAITLIN VAN RENSBURG

Thank you for submitting your study to the Faculty of Health Sciences Human Research Ethics Committee (HREC)for review.

It is a pleasure to inform you that the HREC has **formally approved** the above-mentioned study.

Approval is granted for one year until the 30 January 2025.

Please submit a progress form, using the standardised Annual Report Form (FHS016) or FHS017 if the study continues beyond the approval period. Please submit a Standard Closure form if the study is completed within the approval period.
(Forms can be found on our website: www.health.uct.ac.za/fhs/research/humanethics/forms)

The HREC acknowledges that the MPH Candidate: Ms Caitlin van Rensburg will also be involved in this study.

Please note that for all studies approved by the HREC, the principal investigator **must** obtain appropriate institutional approval, where necessary, before the research may occur.

Please note that the ongoing ethical conduct of the study remains the responsibility of the principal investigator.

Please quote HREC REF 028/2024 in all your correspondence.

Yours sincerely

PROFESSOR MARC BLOCKMAN
CHAIRPERSON, FACULTY OF HEALTH SCIENCES HUMAN RESEARCH ETHICS COMMITTEE

Federal Wide Assurance Number: FWA00001637. Institutional Review Board (IRB) number: IRB00001938 NHREC-registration number: REC-210208-007

This serves to confirm that the University of Cape Town Human Research Ethics Committee complies to the Ethics Standards for Clinical Research with a new drug in patients, based on the Medical Research Council (MRC-SA), Food and Drug Administration (FDA-USA), International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use: Good Clinical Practice (ICH GCP), South African Good Clinical Practice Guidelines (DoH 2020), based on the Association of the British Pharmaceutical Industry Guidelines (ABPI), and Declaration of Helsinki (2013) guidelines. The Human Research Ethics Committee granting this approval is in compliance with the ICH Harmonised Tripartite Guidelines E6: Note for Guidance on Good Clinical Practice (CPMP/ICH/135/95) and FDA Code Federal Regulation Part 50, 56 and 312.

7. INSTRUCTIONS FOR AUTHORS: HEALTH POLICY AND PLANNING

Source: Health Policy and Planning: the journal on health policy and systems research. Available at: https://academic.oup.com/heapol/pages/general_instructions (Accessed: 10 March 2024)

Instructions for Authors

Scope

Health Policy and Planning is an open access journal, publishing health policy and systems research focusing on low- and middle-income countries.

Our journal provides an international forum for publishing original and high-quality research that addresses questions pertinent to policy-makers, public health researchers and practitioners. Health Policy and Planning is published 10 times a year.

Specific objectives are to:

- Attract high quality research papers, reviews and debates on topics relevant to health policies in low- and middle-income countries;
- Ensure wide geographical coverage of papers including coverage of the poorest countries and those in transition;
- Encourage and support researchers from low- and middle-income countries to publish in HPP ;
- Ensure papers reflect a broad range of disciplines, methodologies and topics;
- Ensure that papers are clearly explained and accessible to readers from the range of disciplines used to analyse health policies; and
- Provide a fair, supportive and high-quality peer review process.

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Page 1: Title Page – as above.

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Page 3: Introduction. The Introduction should state the purpose of the investigation and give a short review of the pertinent literature, and be followed by:

Materials and methods. The Materials and methods section should follow the Introduction and should provide enough information to permit repetition of the experimental work. For particular chemicals or equipment, the name and location of the supplier should be given in parentheses.

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For acknowledgements, figures and measures see above.

PART D: POLICY BRIEF

PRIMARY HEALTH CARE SERVICES IN SOUTH AFRICA AND THE 'IDEAL CLINIC': Is quality improvement program associated with better clinic performance?

RESEARCHER: Caitlin van Rensburg, University of Cape Town

POLICY BRIEF March 2024

KEY POINTS

- National Health Insurance (NHI) will require a well-functioning and high-quality system of primary health care (PHC) as the 'gateway' to the health system.
- The Ideal Clinic Realisation and Maintenance programme (ICRMP) was established as a systematic means for the assessment and improvement of PHC facilities in anticipation of NHI.
- The usefulness of the ICRMP is predicated on its scoring being reflective of quality of care.
- While clinic scores under the ICRMP have improved across years of implementation, we found limited evidence of an association between Ideal Clinic scores and other measures of access and quality of care.
- We recommend further research into ICRMP component and element associations with access and quality of care to isolate factors more closely associated with improved quality and for these to inform framework revision and individualised quality improvement plans based on clinic needs.

INTRODUCTION

The health system of South Africa is undergoing a period of significant change to reduce the vast inequities currently entrenched in its tiered system of public and private care. National Health Insurance (NHI), as a new system for the financing and strategic purchasing (buying) of health care, has been developed to reduce such inequities. After many years of preparation, implementation of NHI appears imminent.

The ambitious goals of NHI will require a well-functioning and high-quality system of primary health care (PHC) as the 'gateway' to care [1]. NHI is strongly informed by the principles of Universal Health Coverage (UHC), which requires both improved access and quality of care for all [2]. The Ideal Clinic Realisation and Maintenance programme (ICRMP) was introduced as a tool for quality improvement in PHC facilities in anticipation

of NHI, particularly informed by the findings of a 2012 facilities audit report that found less than 50% of public health facilities complied with vital measures for health care [3]. Under the programme, clinics are routinely assessed according to 10 components and 238 underlying elements which are considered necessary for a clinic to be "Ideal". As a tool primarily for quality improvement rather than accreditation, these assessments should theoretically inform plans to systematically improve quality of care delivered at PHC facilities.

What is an 'Ideal Clinic'?

"a clinic with good infrastructure, adequate staff, adequate medicine and supplies, good administrative processes, and sufficient adequate bulk supplies. It uses applicable clinical policies, protocols and guidelines, and it harnesses partner and stakeholder support." [4]

While PHC assessment tools and accreditation are increasingly being introduced as measures for quality improvement globally, there remains little research into the efficacy of these tools to improve quality of care [5, 6].

The usefulness of the ICRMP is predicated on its scoring being related to good quality of care. However, few empirical studies have sought to assess ICRMP impact on or association with PHC quality. One published study found a positive association between patients' good experience of care and Component 3 of the framework (good signage, staff dress code, service organisation and appointment management) but not with other components nor Ideal Clinic status itself [7], while another found the ICRMP to have mixed impacts on patient waiting time [8] (although both studies only considered a small purposively selected sample of clinics). In the only study to consider impacts of ICRMP implementation on quality of care at PHC facilities across the country, Stacey et al. found limited association between clinic scores and four proxy indicators of quality of care (a small magnitude positive impact on early antenatal care (ANC) usage contrasted with a small negative impact on HIV positive clients being initiated on Izoniazid preventive therapy). The authors did, however, suggest that improvements to quality may require a longer period than their one year of analysis (2015/16) to be evident [6].

The objective of our study was to build on this body of literature with a longitudinal assessment of the associations of the ICRMP with access and quality of care across clinics in South Africa. Implementation of the ICRMP began nationally in 2015, although the Western Cape only joined in 2016. Nationally representative data is thus available from 2017 to date.

METHODS

Our study sourced data from two health information platforms: the ICRMP and the District Health Information Software 2 (DHIS). We restricted our analysis to clinics (excluding community day centres and community health centres, the latter now assessed under a different ICRMP framework) from 2017/18 to 2022/23. We considered the impact of aggregate ICRMP scores for each clinic rather than the binary ICRMP status outcome. We tried to include a broad range of process, output and outcome indicators as proxy measures of access and quality of care, covering maternal and child health, infectious diseases and non-communicable diseases. We were, however, limited to indicators reported on the DHIS at the clinic level and with low levels of missingness. Table 1 lists DHIS indicators used in our study.

TABLE 1 Quality of care indicators

DHIS Indicator
1. PHC Utilisation Rate Total (N)
2. PHC Utilisation Under 5 Years Rate (N)
3. Immunisation Under 1 Year Coverage (%)
4. ANC 1st Visit Before 20 Weeks Rate (%)
5. ANC Client Start on ART Rate (%)
6. DS-TB Client LTFU Rate (%)
7. HIV Postive New Client Start on IPT Rate (%)
8. Cervical Cancer Screening Coverage (%)

PHC: primary health care; ANC: antenatal care; ART: antiretroviral therapy; DS-TB: drug-susceptible tuberculosis; LTFU: loss to follow up

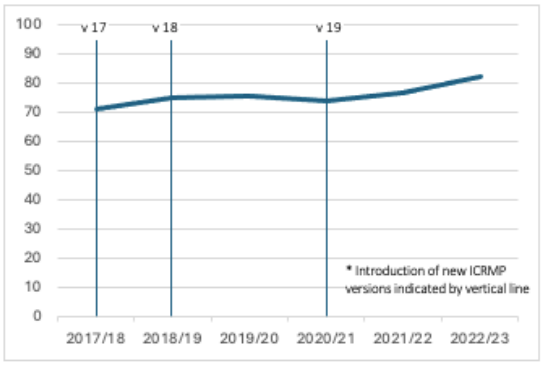
To investigate association between ICRMP scores and our quality of care indicators, we used panel data regression which is designed to analyse data that spans both cross-sectional (individual year) and time-series (across years) dimensions. We ran statistical tests which indicated a fixed effects model was specifically suited to our panel data. This model can control for differences among the clinics that do not change over time but that might impact our outcome variables, thus better isolating the association between the ICRMP and our quality of care indicators. We further included a year factor which can control for shocks that impact certain periods within the study span, such as the impact of the COVID-19 pandemic which caused facilities to redirect time and human resources from routine activities.

Our DHIS-sourced data included a large degree of outlier values and values exceeding logical parameters for rate/proportion data. Panel data regressions models can handle data that is not normally distributed, particularly in large samples such as ours, but they remain sensitive to outliers. We thus ran parallel models against trimmed DHIS data (where outlier values were excluded from analysis) as well as the raw data and winsorized data (where low and high outlier values were imputed with 5th and 95th percentile values, respectively).

FINDINGS

Aggregate clinic ICRMP scores have improved from 71% in 2017/18 to 82.48% in 2022/23 (see figure 1).

FIGURE 1 Clinic ICRMP scores 2017/18 to 2022/23



Highest scoring clinics achieved perfect, or close to perfect scores, while lowest performing clinics scored under 20% in four of the six years we considered in our analysis. This indicates that while some clinics have been improving, others may be getting left behind.

Results of our fixed effects panel regressions (see Table 2), controlling for year, reveal increases in ICRMP scores over time to be associated with very small magnitude improvements in PHC utilisation of young users under 5 years and early ANC usage before 20 weeks of pregnancy, although our results did not reveal any statistically significant associations with other access and quality of care indicators. Our sensitivity analyses provide similar results against the raw and winsorized versions of our data. These findings echo those of Stacey et al. who found similar positive associations between ICRMP scores and early ANC usage but poor evidence overall of the ICRMP being associated with good quality of care.

LIMITATIONS OF OUR STUDY

- We relied on secondary data. Quality of data collection and reporting could not be controlled.
- While factoring for year may control for pandemic-related shocks, sensitivity of our results to impacts of the pandemic may persist to some extent.
- While a fixed effects model controls for heterogeneity (differences) across clinics, it assumes differences in characteristics of clinics to be consistent over time. Explicitly controlling for these, like socio-economic conditions, could strengthen our model.
- Four indicators (immunisation, early ANC usage, ANC patient initiation on ART and TB defaulter rate) were added as ICRMP elements (in principle, with some variation) in 2020. Each element only accounts for 0,42% of total ICRMP score. We thus consider the potential correlation effect to be minimal. Elements also differed marginally across framework versions. Our model could be strengthened by revising ICRMP scores to include only elements assessed across all years and excluding elements associated with our dependent variables.

TABLE 2 Associations between ICRMP scores over time and indicators of access and quality of care

	PHC Utilisation Rate Total (N)	PHC Utilisation Under 5 Years Rate (N)	Immunisation Under 1 Year Coverage (%)	ANC 1st Visit Before 20 Weeks Rate (%)	ANC Client Start on ART Rate (%)	DS-TB Client LTFU Rate (%)	HIV Postive New Client Start on IPT Rate (%)	Cervical Cancer Screening Coverage (%)
ICRMP score (%)	0.0001	0.0007*	0.0008	0.0306***	-0.0010	-0.0041	0.0043	0.0160
	(0.0002)	(0.0004)	(0.0165)	(0.0071)	(0.0043)	(0.0059)	(0.0071)	(0.0168)
Number of clinics	3130	3126	3115	3123	3017	3106	3072	3085
Observations	18,190	18,075	17,765	18,112	12,935	17,041	15,415	8,656
R2	0.4547	0.4402	0.0546	0.0163	0.1068	0.1490	0.0280	0.0988
Adjusted R^2	0.3412	0.3228	-0.1468	-0.1891	-0.1656	-0.0411	-0.2144	-0.4009
F Statistic	2,092.2500***	1,958.0340***	140.9548***	41.3791***	197.4544***	406.4694***	59.2279***	203.3685***
	(df = 6; 15054)	(df = 6; 14943)	(df = 6; 14644)	(df = 6; 14983)	(df = 6; 9912)	(df = 6; 13929)	(df = 6; 12337)	(df = 3; 5568)

Notes: All specifications include time fixed effects, although these control coefficients have been omitted for ease of reading. Analyses on all indicators of access and quality of care include 6-year panels 2017/18 to 2022/23 (with 2017/18 as reference year) save for Cervical Cancer Screening Coverage which is based on a 3-year panel 2020/21 to 2022/23 (with 2020/21 as reference year). Robust standard errors reported in parentheses. PHC: Primary Health Care; ANC: Antenatal Care; DS-TB: Drug Susceptible Tuberculosis; ART: Anteretroviral Therapy; LTFU: Lost to follow up
*p<0.1; **p<0.05; ***p<0.01

RECOMMENDATIONS

- While prior research has shown perceptions among both staff and users that the ICRMP can improve PHC facilities and services, our study reveals little evidence that improvements in ICRMP scores over time are associated with improved quality of care in clinics. Implementation of the ICRMP through assessments, including cross-district reviews, is time and resource intensive and must be supported by evidence that the programme can achieve its stated ends – the improvement of public sector clinics in anticipation of NHI.
- We recommend further research that considers associations between individual ICRMP components and elements (and further factors not yet included in the framework, if necessary) with access and good quality to inform potential rework of the framework. Such factors evidenced to be more closely related to improvements in quality should be included in targeted quality improvement plans for clinics as currently envisaged under the programme, particularly for the worst performing, to avoid the ICRMP becoming merely a tick-box exercise.
- The ICRMP offers an opportunity for the betterment of South Africa's clinics and there is evidence in the literature that stakeholders feel positive about the programme and that it has helped facility managers quantify need [9]. From our analytical point of view, the relationship of ICRMP scores with good quality of care appears limited, although we recognise the benefit of the programme in assessing clinics and identifying those performing well and those most in need of improvement. Our study hopes to improve upon the ICRMP's potential as a tool for quality improvement (not only assessment) to achieve the ambitious goals of NHI in reducing inequity in health by providing all with access to good quality care.
- A study like ours would benefit from more person-centred measures of quality, such as patient experiences of care, and a wider range of proxy indicators, like mental health care and NCD screening. We were restricted to indicators routinely collected and reported on the DHIS at the clinic level with low levels of missingness and inaccuracy. We further recommend new DHIS indicators reflective of person-centred PHC goals be developed along with stronger information management measures on the DHIS to limit errors in reporting. This will enrich research on PHC performance and enhance evidence-informed policy making.

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