Electronic Health Record Interoperability as a Pathway to Advancing Universal Health Coverage in the South African Healthcare System

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Abstract

Electronic health record (EHR) interoperability is widely considered the backbone of a sustainable health system and the foundation of achieving universal health coverage (UHC), as it facilitates the seamless exchange of patient information across various levels of care. Despite the South African healthcare commitment to UHC through reforms like the National Digital Health Strategy, EHR interoperability remains a persistent challenge for public hospitals across the country. This study explored EHR interoperability for advancing UHC in the South Africa healthcare system. A qualitative exploratory approach was adopted, utilising a multiple case study design. Data were collected through semi-structured interviews with system developers, healthcare managers, information technology (IT) officers, and policymakers. Data were thematically analysed using ATLAS.ti software. Findings revealed that EHR systems in public hospitals operate in silos, leading to fragmented care, duplication of services, and delayed health delivery, all of which undermine the goal of achieving UHC. Major obstacles identified include inadequate digital infrastructure, lack of interoperability standards, limited digital literacy among healthcare staff, and absence of a clear strategic roadmap and policies. The study recommends the implementation of a national digital health strategy with clear guidelines, timelines, and evaluation metrics. Investing in robust infrastructure and fostering multi-stakeholder collaboration are vital to successful EHR deployment. A policy is proposed to support scalable and sustainable EHR interoperability across hospitals. This study underscores the urgent need for an inclusive and coordinated digital health strategy to accelerate progress towards UHC in South Africa, ensuring equitable access to quality healthcare for all citizens.

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Keywords: electronic health record (EHR) interoperability; Sustainable Development Goals (SDG); healthcare systems; public hospitals; South Africa; universal health coverage (UHC)

Introduction

Universal health coverage (UHC) is recognised as a key priority in global health policy and embedded in the Sustainable Development Goals (SDGs), and aims to ensure that all people can access quality health services when needed without financial hardship. According to the World Health Organisation ([WHO] 2022), UHC plays a vital role in advancing global health by expanding access to essential services through a primary healthcare model, with the capacity to save up to 60 million lives and boost life expectancy. Subsequently, the goal of UHC is expressed in the United Nations 2030 Agenda as part of the SDGs, specifically in goal 3, which focuses on health under target 3.8. As a matter of agency, the WHO urges developing countries, including Nigeria, Zimbabwe, Congo, Uganda, and South Africa to achieve UHC and provide quality health services for all (Al-Worafi and Ming 2024). Indeed, South Africa, like many developing countries, has demonstrated a strong commitment to achieving UHC and SDGs through health system reforms such as the National Health Insurance (NHI).

South Africa has embarked on health system reforms towards UHC through the implementation of the NHI (Langat et al. 2025). Consequently, a central pillar of these reforms is an integrated healthcare system that relies on digital health technologies, including electronic health records (EHRs). EHRs are digital patient records that enhance decision-making, enable data-driven insights, and improve provider communication (Tertulino, Antunes, and Morais 2024; Ullah et al. 2025). However, the true value of EHRs lies with interoperability, enabling seamless data exchange across healthcare systems.

Similarly, Shen et al. (2025) assert that interoperability is the contextual building block of EHRs. Interoperable EHR systems support coordinated care and provider collaboration, which are critical for archiving UHC across diverse healthcare settings. Iyamu and Chitsa (2025) stress that EHRs interoperability is a prerequisite for achieving UHC in South Africa and Africa. Aligned with this conceptualisation, interoperable EHR systems have the potential to improve patient health outcomes and advance UHC in South Africa. However, despite this potential, the country continues to face challenges in ensuring the inclusive implementation of EHR interoperability.

A major barrier to progress is the fragmented dual public-private healthcare system and unsustainable EHR implementation across provinces (Ntsobi et al. 2025). Furthermore, many hospitals depend on legacy systems that hinder data sharing and care coordination, resulting in duplication of services, inefficiencies, and gaps in care (Chuma and Sibiya 2022). These challenges are most acute in rural, under-resourced areas where public facilities depend on paper-based systems or standalone digital systems that are not integrated with national health databases (Wright et al. 2022). Without a coordinated

and inclusive approach to interoperable EHR deployment, the South African healthcare system risks widening the digital divide and delaying the progress towards UHC.

Globally, several countries have shown interest in adopting EHR interoperability to advance UHC. For instance, countries such as Poland, Spain, and Estonia have implemented national integrated digital health ecosystem supported by secure data exchange infrastructures and legal frameworks to enable seamless information sharing (Białczyk et al. 2024). Similarly, the Kanta health services in Finland has coordinated governance, mandatory interoperability standards, and sustained public investment to facilitate access to interoperable health records (Repka 2025). Based on these countries, it is evident that achieving scalable EHR interoperability requires strong political commitment, robust legal frameworks, and standardised technical architectures and continuous capacity building.

South Africa has made notable progress towards articulating national policies and frameworks to support EHR interoperability, such as the *National Digital Health Strategy for South Africa* (South Africa 2019), the *National Health Normative Standards Framework for Interoperability in eHealth* (Department of Health and Council for Scientific and Industrial Research 2014), and the *National Health Insurance Reforms.* However, despite these efforts, translating these policy intentions into coordinated, facility-level implementation remains a significant challenge, constraining scalable EHR interoperability across the healthcare system. A notable shortcoming of these policy frameworks is that they lack clear, actionable guidelines and practical implementation plans for achieving full interoperability of EHR systems at facility, provincial, and national levels. Consequently, many hospitals and clinics in South Africa continue to operate in silos, with limited integration of health information systems. There is however a noticeable empirical and policy gap in understanding how to ensure inclusive and coordinated deployment of interoperable EHR systems across all healthcare settings.

Given the urgency to address local implementation gaps, the study sought to explore EHR interoperability for advancing UHC in the South Africa healthcare system, with a view to proposing a policy to guide scalable, effective, and sustainable implementation. This study has the following objectives:

- assess the current state of EHR interoperability in South African public hospitals;
- examine digital infrastructure required for the deployment of interoperable EHR systems to support UHC in South African public hospitals;
- identify barriers hindering the deployment of interoperable EHR systems to support UHC in South African public hospitals; and
- establish facilitators to support the deployment of interoperable EHR systems to accelerate UHC in South African public hospitals.

Problem Statement

EHR interoperability is widely recognised as a crucial prerequisite for achieving UHC, as it allows for the seamless exchange of patient information across different levels of care. To accelerate progress toward UHC by 2030, healthcare systems must adopt interoperable digital health solutions that ensure accessible, coordinated, and equitable care for all (Ezoe 2020; Wilson et al. 2021). Despite South African policy commitment towards UHC and the existence of national digital health policies and frameworks, the implementation of interoperable EHR systems in public hospitals remains fragmented and uneven (Chuma and Ngoepe 2024a).

While the importance of EHR interoperability for coordinated, efficient, and equitable healthcare delivery is well established, there is limited empirical evidence explaining why interoperability has not been realised at facility level despite the presence of enabling policies and frameworks. Existing research studies focus on technical or policy dimensions in isolation, with insufficient attention to the interaction between infrastructure, organisational capacity, human factors, and governance mechanisms that influence implementation in public hospitals.

As a result, policymakers, regulators, and healthcare stakeholders lack guidance on how to translate national interoperability ambitions into scalable, operational practice. This persistent implementation gap undermines continuity of care, contributes to inefficiencies, and delays progress towards UHC in Africa (Chuma and Ngoepe 2024b; Kalita et al. 2023). Therefore, this study addresses this gap by exploring the barriers affecting EHR interoperability in South African public hospitals and proposes a policy framework to support coordinated, scalable, and sustainable implementation aligned with UHC objectives.

Conceptual Framework

A conceptual framework is an analytical structure that clarifies constructs and their interrelationships to explain a phenomenon (Chukwuere 2021). This study adopted a conceptual framework underpinned by socio-technical systems (STS) theory and the theoretical domains framework (TDF) (figure 1). STS theory examines the dynamic interplay and dependence between social elements, including people, organisational structures, and technical components (Kemp et al. 2024). Van Lier and Hardjono (2011) advocate that scalable interoperability depends on the interaction between technology, organisational processes, and contextual factors.

STS theory was applied as a lens to conceptualise the technical infrastructure required for scalable EHR interoperability in hospitals. The theory provided a framework aligning technology systems with organisational structures, human capabilities, and institutional processes to support sustainable implementation. In contrast, TDF explains how behaviour is shaped by cognitive, social, and environmental factors (McGowan, Powell, and French 2020).

TDF is applicable across disciplines for systematically identifying organisational, technical, and contextual barriers and facilitators to change (Cane, O'Connor, and Michie 2012). TDF was applied to assess technical, environmental, and organisational factors influencing the inclusive deployment of interoperable EHR systems to advance UHC in South African public hospitals.

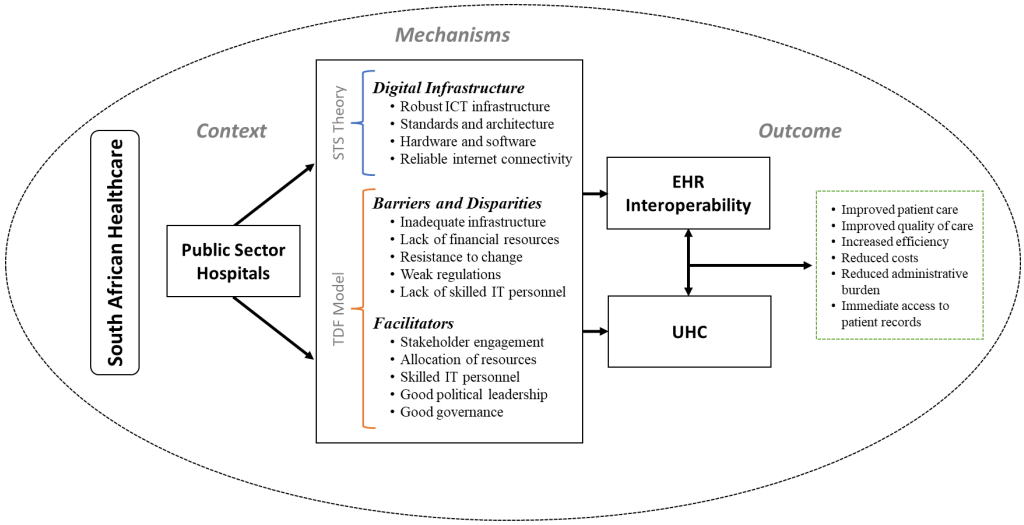


Figure 1: The conceptual framework of the study.

Methodology

Study Setting and Design

A qualitative exploratory approach, using multiple case study research design was applied to gain an in-depth understanding of the complex social, organisational, and technological dimensions associated with the deployment of EHR interoperability in the South African healthcare system. The use of a multiple case study design was justified by the need to explore similarities and differences across hospitals and stakeholder roles within Gauteng.

Population and Sampling

The study population comprised records managers, information and communication technology (ICT) officers, and health information managers, clinical managers, administrative managers, policymakers, and vendors of EHR systems in Gauteng, South Africa. Purposive sampling was used to select participants with direct experience in managing EHR systems in hospitals. The researcher selected participants based on the data required for the phenomenon. The study involved a total sample of 20 participants. Data saturation was achieved by the 16th interview.

Data Collection and Procedures

Data were collected through individual semi-structured interviews conducted in hospitals from September to November 2022. The researcher developed an interview schedule to collect data. All interviews were conducted through Microsoft Teams or face-to-face interaction, and each interview lasted between 20–30 minutes. Interviews were audio- and digitally recorded with the consent of participants and later transcribed verbatim. Field notes were taken during the course of the interviews. The collected data, along with the data-gathering log, audio recordings, and notes, were securely stored in password-protected digital files on a password-protected computer to ensure confidentiality and data protection.

Data Analysis and Synthesis

Data were analysed thematically following Miles and Springgay (2020), involving data familiarisation, coding, and theme development. ATLAS.ti (version 9.0) was used to organise and code the data. Trustworthiness was ensured through prolonged engagement, data triangulation across diverse stakeholder groups, member checking with selected participants, thick description of the study context and participant roles, and the maintenance of an audit trail. Reflexivity was supported through reflective journaling to minimise researcher bias. The study was conducted by a single researcher without formal inter-coder reliability.

Ethical Considerations

Ethical clearance was obtained from the College of Human Science Research Ethics Committee from the University of South Africa (reference: 50119869_CREC_CHS_2022), with gatekeeper permission granted by Tshwane Research Ethics Committee (reference: GP_202207_097). Informed consent was obtained from participants, and confidentiality and anonymity were ensured through the use of pseudonyms.

Results

Demographic Information of the Participants

Of the 20 interviewees, 12 were male, and eight were female. Their work experience ranged from five to 30 years (table 1).

Current State of EHR Interoperability to Accelerate UHC in Public Hospitals

Participants were asked to describe the current state of EHR interoperability in their hospitals. They revealed that EHR interoperability is in a very poor state, primarily because their systems are disconnected and operate in silos. For instance, participant ICT3 stated:

> The state of interoperability in our hospital is poor and characterised by many challenges. The biggest problem is that our EHR systems are not integrated and there is no interoperability between hospitals, clinics, and the district health office. This makes it difficult for us to track and monitor patient history across departments and hospitals and slows down service delivery. It is unfortunate that this directly undermines UHC goals.

Table 1: Socio-demographic information of the participants.

Code	Roles	Gender	Experience
ICT1	Health information manager	Male	10 years
ICT2	Health information manager	Female	13 years
ICT3	ICT officer	Male	17 years
ICT4	ICT officer	Male	15 years
ICT5	ICT officer	Male	20 years
CRM1	Clinical manager	Female	9 years
CRM2	Clinical manager	Male	11 years
RM1	Records manager	Female	6 years
RM2	Records manager	Male	9 years
RM3	Records manager	Male	12 years
AD1	Administrative manager	Female	18 years
AD2	Administrative manager	Female	22 years
AD3	Administrative manager	Female	20 years
AD4	Administrative manager	Male	14 years
PM1	Policymaker	Male	23 years
PM2	Policymaker	Male	30 years
PM3	Policymaker	Female	16 years
SD1	System developer	Male	8 years
SD2	Integration specialist	Female	5 years
SD3	Integration specialist	Male	10 years

Other participants provided similar responses:

> Our hospitals across the Gauteng province are still confronted with poor interoperability and fragmentation. In a nutshell, there is no real interoperability between hospitals. The EHR system that we use is not integrated and connected with the clinics or even with other hospitals. We end up duplicating tests and wasting time and resources. Without integrated systems, we can't provide continuous care, which is a basic requirement for universal health coverage. (RM3)

> Our EHR system is basically fragmented. For instance, our clinical, pharmacy, laboratory, and administrative systems function in isolation, resulting in redundant data entry, incomplete patient histories, and delays in service delivery. So, to get medical information about a patient from another facility, we still use phone calls or handwritten notes. That is not interoperability; I can say it's a breakdown. This makes it impossible for us to deliver coordinated and equitable care, which completely undermines the idea of UHC. (AD1)

> The biggest challenge that we have is that … our government is frequently emphasising eHealth and UHC, but the reality is that at the facility level, we have no functioning interoperability between our EHR systems. Our healthcare system is indeed fragmented and chaotic. Unless this is fixed … UHC will remain a dream instead of a reality. (AD4)

Digital Infrastructure Required for Inclusive Deployment of EHR Interoperability to Accelerate UHC in Public Hospitals

Participants were asked to identify the core digital infrastructure necessary to support fully interoperable EHRs in public hospitals. Several participants highlighted key infrastructure components they believe could help their hospitals achieve EHR interoperability. For example, participant AD3 stated: "The first thing we need is stable internet connectivity across all public hospitals and clinics. Without connectivity, no system can communicate. It's the backbone of interoperability, and we can't talk about UHC without it."

Other participants responded as follows:

> The challenge that we have is our hospitals in the Gauteng region use different software and systems that don't align. We need standardised EHR systems, or at least systems that comply with the same national standards so we can exchange data freely and consistently. (ICT2)

> I think a secure cloud-based environment would help store and access records centrally, especially for mobile clinics and rural facilities. It supports scalability and data sharing, both essential for achieving UHC in South Africa. (CRM2)

> As we know … loadshedding is a common problem in South Africa and most of our hospitals do not have sufficient power backup. We need uninterrupted power supplies and backup systems to keep the digital infrastructure running. No system can be dependable if it's offline half the time. (PM2)

> Digital security is one of the crucial aspects of healthcare. As a result, strong access control and user authentication are critical. If we're going to share health data across the system, we need to ensure only authorised users access it. To achieve this, our government should provide funding and necessary resources to enable our hospitals to use multi-factor authentication to protect the privacy of our patients and build trust in the system for UHC. (SD3)

Barriers Affecting the Inclusive Deployment of EHR Interoperability to Accelerate UHC in Public Hospitals

Participants were asked to indicate the barriers they think could be hindering their public hospitals to successfully deploy an interoperable EHR system. During the interviews, several barriers were identified by participants:

> Infrastructure gaps are one of the major challenges hindering our hospitals from achieving interoperable systems. Most of our facilities have a limited number of computers; some are still relying on paper-based processes, and others are using outdated or legacy hardware, let alone having reliable internet connectivity. How can we talk about EHR interoperability or universal health coverage when entire regions are digitally excluded? (ICT1)

> We don't have a dedicated budget for digital health. I personally think that [a] lack of funding and capital resources from the government makes it impossible for our hospital to successfully achieve interoperable EHR systems that are capable of sharing data from [one] facility to another. (CRM1)

> What makes it a challenge is that each province or facility uses a different EHR, and they weren't built to communicate and share data with each other seamlessly. Without consistent national standards, integration is a nightmare, and patients fall through the cracks. (AD2)

> I think digital skills gaps [pose] a serious challenge for hospitals to achieve interoperability. It has been notable that most of our clinical and administrative support staff are not comfortable with digital tools. Even when systems are installed, they go underused. This digital illiteracy is a hidden barrier to UHC. (PM3)

> There is no clear national roadmap or policies driving interoperability. We are all doing our own thing, and that fragmentation is slowing down UHC implementation. (SD1)

Facilitators for the Successful Inclusive Deployment of Interoperable EHR Systems to Accelerate UHC in Public Hospitals

Participants were asked to indicate the facilitators that could assist their public hospitals to attain EHR interoperability. Participants responded as follows:

> Our public hospitals together with the Department of Health need to adopt a unified set of national interoperability standards. If every EHR system could speak the same language, it would make information-sharing seamless. Secondly, we need adequate infrastructure that can work in both rural clinics and major hospitals. If we had systems designed to scale across contexts, we could include more facilities in the digital network and ensure no one is left behind. (ICT5)

> I think the government needs to establish and implement a national digital health strategy with clear timelines and guidelines on how to achieve interoperability between systems. A solid framework would give us the guidance we need to align our systems and reach UHC. (RM2)

> There is a real need for robust policy and legal frameworks around data sharing and system integration. If policies could clearly define what is allowed and what is protected, it would help us move forward with confidence. Another thing is that the Department of Health should roll out digital literacy training and educational programmes for all clinical and administrative staff. Many are eager but untrained. Building their skills is

> essential for successful implementation of EHR interoperability and sustainable UHC. (SD2)
>
> The government of South Africa must allocate [an] adequate budget for public hospitals to upgrade their systems to support EHR interoperability. If we are serious about achieving UHC, the government must invest in technical resources and digital tools and prioritise budgeting for health ICT systems if they want to see real progress. (ICT4)
>
> I personally believe that the South African government should make digital health a top political priority. High-level political will could unlock the funding, coordination, and urgency we need to finally make interoperability and UHC a reality. (PM1)

Discussion

The study revealed that EHR interoperability in public hospitals is critically poor due to disconnected and siloed systems. Hospitals, clinics, and district offices often lack integration, making it difficult to track patient histories, coordinate care, and deliver timely services. This fragmentation leads to duplicated tests, inefficient resource use, and delays as facilities still rely on manual methods like phone calls and handwritten notes to share patient information. It was found that the lack of integrated clinical, pharmacy, laboratory, and administrative information systems significantly hampers service continuity. Despite national commitments to eHealth and UHC, interoperability remains limited, undermining UHC objectives. These findings align with those of Adeniji et al. (2022), who reported similarly fragmented and weak interoperability in the Nigerian healthcare system.

The study identified key infrastructure requirements for achieving EHR interoperability in public hospitals, including stable internet connectivity, standardised EHR systems compliant with national interoperability standards, secure cloud-based environments, reliable power supply, and robust security measures. These findings concur with those of Pantuvo and Oluwarore (2024), who emphasised that interoperable healthcare systems require robust technological infrastructure, including computer systems, reliable internet connectivity, standardised interfaces, data storage, and security protocols.

The findings revealed several barriers to EHR interoperability in public hospitals, including limited computer resources, reliance on paper-based systems, poor internet connectivity, inadequate government funding, and the absence of national standards and a clear strategic roadmap. These barriers undermine progress toward UHC and are consistent with findings from similar contexts. For instance, Denhere et al. (2024) in Zimbabwe, and Musabi and Kipkebut (2024) in Kenya, reported insufficient funding, weak policy and governance frameworks, inadequate infrastructure, and limited digital skills as key obstacles to healthcare interoperability.

Furthermore, the study revealed several key enablers for achieving EHR interoperability in public hospitals to support UHC, including standardised national interoperability frameworks, scalable infrastructure for rural and urban settings, and a clear national digital health strategy with defined timelines. Strong policy and legal frameworks were viewed as essential for secure data sharing, while upskilling healthcare staff through digital literacy training, dedicated government funding for health ICT, and high-level political commitment were identified as critical drivers of interoperability. While prior studies in Kenya, Nigeria, Uganda, and Zimbabwe identify inadequate infrastructure, weak policy implementation, and limited digital literacy as barriers to EHR interoperability, this study extends the literature by revealing a persistent disconnect between national policy frameworks and facility-level implementation in South Africa. It shows that fragmentation endures despite established digital health strategies and legal frameworks. This study offers a scalable, multistakeholder-informed policy framework applicable to other low- and middle-income countries (LMICs) facing similar implementation gaps.

Recommendations

Based on the analysis and findings, the following recommendations are proposed to support the effective adoption of EHR interoperability in public hospitals, thereby advancing progress towards UHC:

- government should establish a standardised national framework for EHR systems to eliminate fragmentation and enable seamless sharing of patient health data across hospitals;
- public hospitals must invest in scalable digital infrastructure such as stable and fast internet connectivity, secure cloud-based data storage, adequate computing hardware and software, and reliable power backup systems to support uninterrupted digital operations;
- the government must allocate sufficient budget for digital transformation, particularly for EHR interoperability projects;
- government should develop and implement a National Digital Health Strategy with clear guidelines, timelines, roles, and monitoring metrics to achieve EHR interoperability aligned with UHC objectives at national, provincial, and facility levels;
- public hospitals should organise training programmes to equip healthcare professionals with the digital skills and competencies needed for adoption of EHR interoperability systems; and
- hospitals should foster multi-stakeholder collaboration involving the Department of Health, National Treasury, ICT providers, academic institutions, researchers, and civil society to ensure coordinated implementation and accountability in deploying EHR interoperability systems.

A Proposed Policy for Scalable EHR Interoperability in South African Hospitals

The proposed policy framework is designed to support the government, policymakers, and legislators towards scalable adoption and implementation of EHR interoperability as a critical vehicle needed for achieving UHC in South Africa. The framework is directly informed by empirical findings and literature synthesis, which highlight key infrastructural, technical, and human resource barriers to EHR interoperability. While the framework provides a structured and evidence-based foundation to guide policy formulation and institutional practice, its operationalisation, contextual refinement, and formal adoption require further development and endorsement by relevant health stakeholders, including the National Department of Health and associated regulatory bodies.

Policy title: Policy for Scalable EHR Interoperability for Public Hospitals in South Africa

Background: EHRs are central to modern healthcare, improving patient care, clinical workflows, and data access while reducing errors. However, South African public hospitals face fragmented systems, weak legal frameworks, inadequate digital infrastructure, and lack of standardisation, hindering EHR interoperability and progress toward UHC.

Policy objective: To establish a robust framework for standardised, efficient, and scalable deployment of EHR interoperability between public hospitals and systems in South Africa.

POLICY

1. Standardisation and Regulatory Framework

Mandate the adoption and strict adherence to national and international interoperability standards, including ISO, DICOM, HL7, IETF, OASIS, W3C, CEN, SNOMED, and CDISC. Develop comprehensive technical guidelines for system integration and coordination and ensure their enforcement through alignment with South African legal frameworks for data protection, such as the Protection of Personal Information Act 4 of 2013 (South Africa 2013), the Promotion of Access to Information Act 2 of 2000 (South Africa 2000), the Electronic Communications and Transactions Act 25 of 2002 (South Africa 2002), and the Cybercrimes Act 19 of 2020 (South Africa 2020).

2. Infrastructure and Technology Investments

Establish secure cloud storage for health data with high-speed internet and health information exchange platforms for seamless sharing. Standardise ICT infrastructure across public hospitals and promote the lawful use of open-source EHR solutions.

3. Digital Health Workforce Development

Implement digital health training programmes to equip healthcare staff with the skills needed to use interoperable systems effectively. Public hospitals should collaborate with universities and research institutions to build local capacity and establish certification and continuous professional development frameworks tailored to healthcare.

4. Financing and Sustainability

Allocate sufficient funding for digital health, prioritising under-resourced facilities, and integrate it into hospital budgets and national health plans. The government should also promote strategic public-private partnerships to enhance the scalability and sustainability of EHR interoperability initiatives.

5. Governance and Coordination

Establish a digital health steering committee comprising IT staff, cybersecurity experts, researchers, academics, policymakers, and healthcare decision-makers to coordinate EHR interoperability initiatives. The committee should set clear goals, develop a strategic technology plan, address interoperability challenges, ensure compliance with policies and standards, and operate under a designated chairperson with defined reporting structures to support accountability and collaboration.

6. Monitoring, Evaluation, and Learning

Key performance indicators (KPIs) must be established to guide and assess EHR interoperability implementation in hospitals, supported by enforcement mechanisms and automated reporting systems to monitor progress, identify gaps, and ensure accountability.

7. Review and Update

The policy should undergo an annual review and revision process to ensure alignment with evolving technological advancements, regulatory changes, and emerging best practices within the healthcare industry.

8. Cost Implications and Feasibility

Implementing interoperable EHR systems in public hospitals entails significant costs, including digital infrastructure upgrades, system integration, cybersecurity, and capacity-building for healthcare staff. To enhance feasibility and sustainability, a

phased, scalable approach is recommended, prioritising under-resourced hospitals and enabling incremental resource allocation and adaptive learning. Leveraging existing national digital health platforms, open-source EHR solutions, and health information exchange infrastructures can reduce duplication and improve cost efficiency. The policy incorporates cost-awareness and feasibility considerations, while future phases should include formal budget and cost-effectiveness analyses to guide resource allocation.

9. Approval and Review

The Department of Health shall be responsible for the annual review, revision, and formal approval of the policy to ensure its relevance and alignment with national health priorities and technological developments.

10. Policy Administration

The Department of Health remains responsible for implementing the policy and enforcing compliance across all healthcare institutions.

11. Contact Information

For further information about the policy, contact:

[Name and surname]

[Title]

[Email address]

[Tel no.]

Limitations of the Study

This study has a fundamental limitation in that it lacks a comparative analysis with healthcare systems in other countries, such as European and Asian countries, where EHR interoperability has been implemented successfully for the advancement of UHC. In the absence of these global benchmarks, the proposed policy may lack broader contextual relevance or may be unable to provide insight into best practice. Ideally, future research should conduct a comparative study to evaluate the feasibility and effectiveness of the proposed policy, exploring how it can be refined and adapted to ensure the sustainable deployment of EHR interoperability in South Africa. A further limitation of this study is that it focused exclusively on public hospitals within Gauteng, which may limit the generalisability of the findings to other provinces or healthcare contexts in South Africa. Future studies should consider extending this study by conducting comparative national-level analyses to capture broader contextual variations

and strengthen the evidence base for nationwide EHR interoperability policy implementation.

Conclusion

This study explored the EHR interoperability for advancing UHC in the South African healthcare system. The findings revealed that the state of EHR interoperability in public sector hospitals is critically poor due to disconnected systems operating in silos. This situation results in duplicated tests, inefficient resource use, and delays in care delivery that undermine the continuity of care essential for achieving UHC. The study further discovered that poor internet connectivity, reliance on legacy systems, and the absence of national EHR interoperability standards are major obstacles to the successful adoption of EHR interoperability in hospitals. Therefore, the study proposed a policy to serve as a guiding framework to assist hospitals in achieving EHR interoperability, with the aim of improving healthcare accessibility and supporting the realisation of UHC.

The findings offer actionable guidance for provincial health departments by identifying the infrastructure, policy, and workforce enablers for EHR implementation. Aligning these strategies with local capacities can support effective digital transformation and service delivery. The study contributes to SDG 3, particularly target 3.8, which aims at achieving UHC by emphasising how digital health infrastructure can enhance service accessibility, continuity of care, and health system efficiency.

The findings have practical implications for nurses and midwives, who are central to healthcare delivery. Interoperable EHR systems can improve continuity of care by providing access to complete and accurate patient information across departments and facilities, enhancing clinical decision-making, reducing duplicated assessments and documentation, and easing administrative burden. Scalable EHR interoperability can directly strengthen nursing and midwifery practice while supporting equitable, quality healthcare in pursuit of UHC. The study underscores the need for policymakers to prioritise a comprehensive national policy framework to guide the sustainable adoption and standardisation of EHR interoperability to ensure equitable access to health services across public facilities.

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