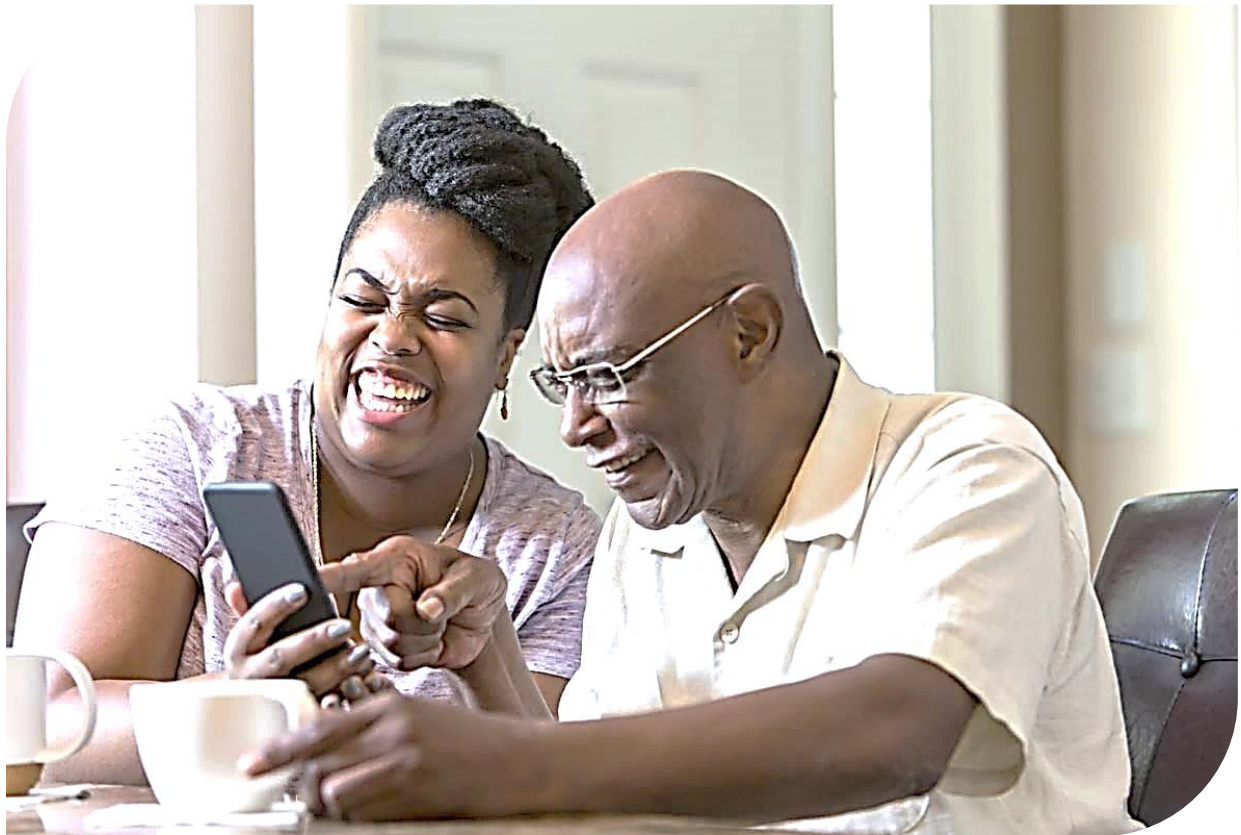




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Strategic ICT Plan

2020-2025

Document history

Version	Date	Amended by	Changes
	04/07/2019	K. Vallabhjee	ICT Project Kick-Off
0.1	18/08/2019	R. Dyers	Draft – alignment to WCG's Strategic Transformation Plan (Draft)
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1.3	12/08/2021	K. Vallabhjee	Final updates to IT Governance structure and corrections

WESTERN CAPE GOVERNMENT: HEALTH STRATEGIC ICT PLAN 2020-2025

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Executive Summary

Information Technology has become a strategic necessity in all aspects of health service delivery. The Western Cape cabinet endorsed the Department's *IT Vision* in August 2017.¹

The vision of the department is to have an optimally efficient, effective and affordable IT system that enables patients to receive information so that they can be better informed of their health status and empowers them to self-manage where feasible; provides clinicians with good access to relevant patient level data in real time to optimise clinical management through electronic medical records; enables management to have good quality integrated data to better plan, implement and monitor health service delivery as well as corporate support services; and allows researchers to have access to routine data to improve the knowledge and evidence base that informs policy development and practice. The cumulative benefit of the IT vision and strategies is to improve health outcome and the patient experience of the health service over their life-course engagement with the service platform.

On reflection of the past five years of IT in the Department, key stakeholders acknowledged the significant progress that was made in the implementation of core systems and a foundation of governance and oversight structures and the embedding of engagement processes. There was concern on the proliferation of projects where, at the time of engagement, the IT team were managing 66 projects at various levels of abstraction of the underlying activities. While there was marked improvement in the supporting infrastructure, there was still inadequate medical grade network coverage to support the increasing number of digitised clinical transactions.

COVID-19 certainly caused a shift in the paradigms and established modus operandi for eHealth system design and implementation. It provided the Department with an opportunity to cut through red tape, test rapid deployment methods and to rethink its approach to change management. However, the rapid proliferation of systems and solutions pose new challenges for governance, co-ordination, and system integration. This challenge is further compounded by the R40 million cut to the 2020/21 IT budget in trimmed human resource capacity. Despite these challenges the team had demonstrated the ability to do more with less and respond to the growing need for the efficiency gains from eHealth strategies.

This 5-year ICT Plan provides more detail on how the Department will achieve this in the medium term. The ICT plan aligns to the Department's 5-year Strategy to ensure coherence in the

language and thinking within the Department, the broader Western Cape Government strategy, as well as the National direction.

Service delivery capability: A high quality health system for people

- Secure access to digital patient health information to enable continuity of care.
- Patients can view their key health status information and request changes to their care plans.
- Patient can authorise and control access to their health data by 3rd parties, including private health care providers. There is seamless patient-mediated passing of digital assets, such as radiographic images, between public and private service providers for optimal use of all digitised patient information for optimal health outcomes.
- Seamless care between community-, NPO-, and facility- based settings.
- Ability to interoperate across Whole of Society (WoSA) and whole of government (WoGA) systems.
- eHealth interfaces include clinical Decision Support algorithms aligned to local clinical governance and service delivery governance policy.
- Enterprise eHealth systems support local customisation to enable decentralised models of care.

People and Systems capability: High performance health system

- eHealth systems are reliable, secure, capable of failover and have robust disaster recovery plans.
- End-users participate in the design and enhancement of eHealth systems i.e. a User Experience Design (UXD) approach.
- Smarter predictive digital stock control systems ensure efficient uninterrupted supply chain of health goods and services.
- Activity, workload and utilisation data inferred from digitised clinical processes inform workforce planning and resource allocation.

Governance and Learning capabilities: A resilient learning health system.

- eHealth systems are governed by efficient and well-aligned internal structures that are responsive to service needs.
- Health managers access real-time user-friendly service delivery information within an Operational Data Store to inform equitable efficient, effective and fair allocation of resources.

Approach to developing the Strategic ICT Plan

Method

Given the multiple dynamic variables in which we operate, the social nature of our organisation, and the rapid pace of technology innovation one must recognise that we cannot predict the future reality nor our performance with certainty. While we map out broad strategic direction, goals and principles, we must be constantly mindful of the changing internal and external environment. This is underpinned by Simon Sinek's *Golden Circle*, starting with the 'why' (Fig.1) .¹

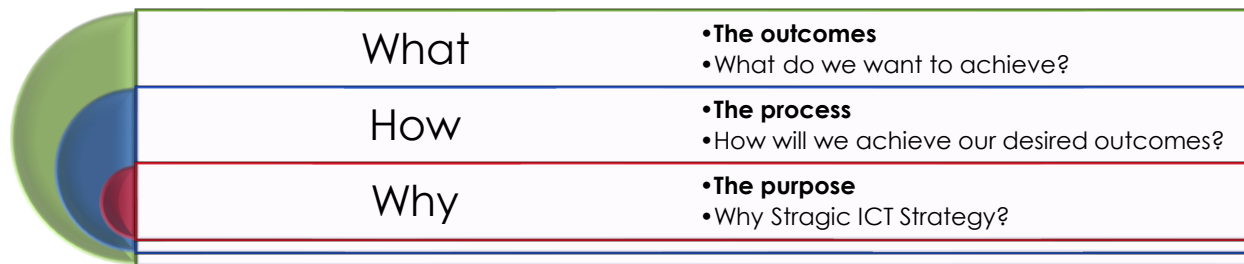


Figure 1: Simon Sinek's Golden Circle, starting with the 'why'.

The approach from modified Business Capability Model (Fig. 2) was used to craft a process of linking business needs to the IT response and identifying gaps in our current trajectory.

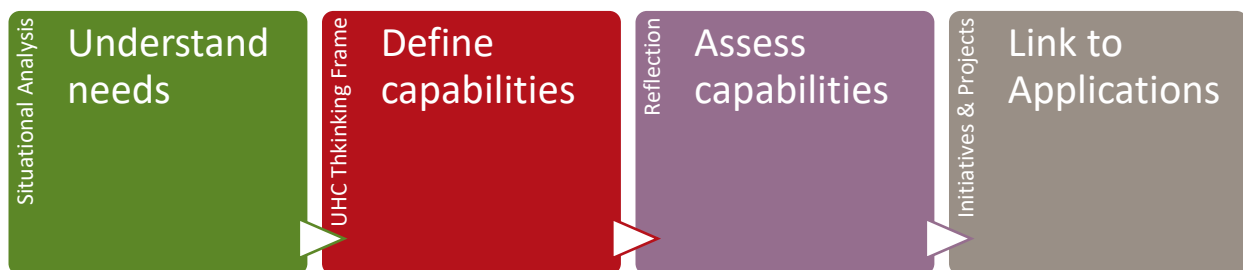


Figure 2: Modified approach to creating a Business Capability model (LeanIX)²

At a more practical level, the figure below illustrates the steps that were followed to develop this strategic plan.



Figure 3: Planning Steps

The ICT planning team were briefed by the Chief Director: Strategic Cluster of the business need and strategic thrust of the department. The ICT Planning team reviewed a total of 151 policy and technical documents. This included case studies from other countries / regions. Key stakeholders identified by the Director: Information Management of the department were interviewed. Interviews were conducted to identify high-level IT requirements per department Key Results Area (KRA) and ICT initiative. Interviewees were from the department and Ce-I subject matter experts were also consulted where necessary. Each identified desired IT outcome was aligned to the department's ICT initiatives as outlined in this Strategic ICT plan as well as the 5-year Business Strategic Plan.

Policy Landscape

A total of 151 documents were referenced in drafting this IT Strategic Plan. The following key documents were included:

- Healthcare 2030: The road to wellness.
- A Vision for the Development and Use of Information Technology in Health Care Within the Western Cape – 2016
- WCGH Strategic Plan 2020 - 2025
- Toward Universal Health Coverage: A Framework for Action; WCG Health IT Project Plan for 2019/20
- A discussion document towards developing a departmental transformation strategy - 2019
- Integrated Provincial Strategic Planning Approach and Process – 2019
- WCG Digital transformation plan roadmap - 2019
- National Digital Health Strategy for South Africa: 2019-2024
- WHO National eHealth Strategy Toolkit

Global

The WHO Global Strategy on Digital Health 2020-2024 is rooted in the Sustainable Development Goal 9: *Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation*.^{3, 4} This includes target 9.c to *significantly increase access to information and communications technology and strive to provide universal affordable access to the internet in least developed countries by 2020 (sic)*.³

The purpose of the Global Strategy is to advance and apply digital health towards achieving the vision of *health for all*.

The vision of the global strategy is to improve health for everyone, everywhere by accelerating the development and adoption of appropriate digital health solutions towards achieving the health-related Sustainable Development Goals (SDGs) and the GPWs triple billion targets. The guiding principles of the Strategy are to:

- i. acknowledge that the digital health adoption process is a country decision.
- ii. recognise that successful digital health initiatives require a unified strategy.
- iii. promote the appropriate use of digital technologies.
- iv. recognise that there is a pressing need to address the major impediments that least-developed countries face in engaging with and accessing digital health technologies.

Their four strategic objectives are:

1. to promote global collaboration and advance the transfer of knowledge on digital health.
2. to advance the implementation of National digital health strategies
3. to strengthen governance for digital health at global and national levels
4. to advocate for people-centred health systems that are enabled by digital health.

The Strategy **Framework for Action** includes four major actions:

Commit, Catalyse, Measure, Enhance & Iterate

The WHO is collaborating with the International Organization for Standardization (ISO) and the International Telecommunication Union (ITU) to respond to countries' digital health needs by building evidence base, disseminating knowledge, and facilitating collaboration.

In 2013, WHO Member States have endorsed a resolution that urged countries to "to collaborate with stakeholders to draw up a roadmap for implementation of eHealth and health data

standards at national and subnational levels” and “to develop policies and legislative mechanisms linked to their national eHealth strategies”.⁵

National

The National Department of Health (NDOH), in collaboration with the Council for Scientific and Industrial Research (CSIR), responded to the WHO 2013 resolution by having the National Health Normative Standards Framework for Interoperability in eHealth in South Africa gazetted in 2014.^{5, 6} This document provides comprehensive referencing to the aforementioned ISO- and other internationally recognised standards. It is based on rigorous local research as well as pragmatic considerations for selecting standards appropriate for our setting.⁷

More recently, the NDOH developed a National Digital Strategy for South Africa that will create robust integrated platforms for the development of information and supporting infrastructure and governance.⁸ It builds on the lessons learnt during the implementation of the eHealth Strategy 2012-2016 which included strengthening of governance structures, creating integrated platforms for information systems and the use of a common unique identifier for patients. A key collaborative intervention is the implementation of Health Patient Registration Number (HPRN) across the country. This number interoperates with the Western Cape's Patient Master Index (PMI) and with furthermore be included in the Enterprise Master Client Index (EMCI) system. The Province will participate in the development and implementation of the Health Normative Standards Framework.

ICT Governance

ICT Governance is a process that ensures effective and efficient use of IT in enabling the organisation to achieve its objectives. Focus is specifically directed to Information and Technology; Performance and Risk Management to ensure value is delivered to stakeholders.

The ICT Strategic Plan is aligned to the Business Strategic Plan of the department with the objective to enable success of business objectives on a strategic level. Furthermore, the ICT Operational Plan, with the Implementation Plan being an annexure of the document, outlines the project level of IT activities within the department.

WESTERN CAPE GOVERNMENT: HEALTH STRATEGIC ICT PLAN 2020-2025

IT functions within the department are managed through Project Management of System Analysis, System Development, Infrastructure Technology, Support, Training and Reporting. The department has adopted the phases of the Software Development Life Cycle (SDLC) as the approach to achieve project success and ensure sufficient governance.

With the national introduction and implementation of the Corporate Governance of ICT (CGICT) Policy and Framework, ICT Governance accountability resides within each department. Governance structural committees have been established in the department to oversight and drive the implementation of the governance framework. Figure 4 shows the departmental governance structural committees and their relationship with the Provincial structural committees.

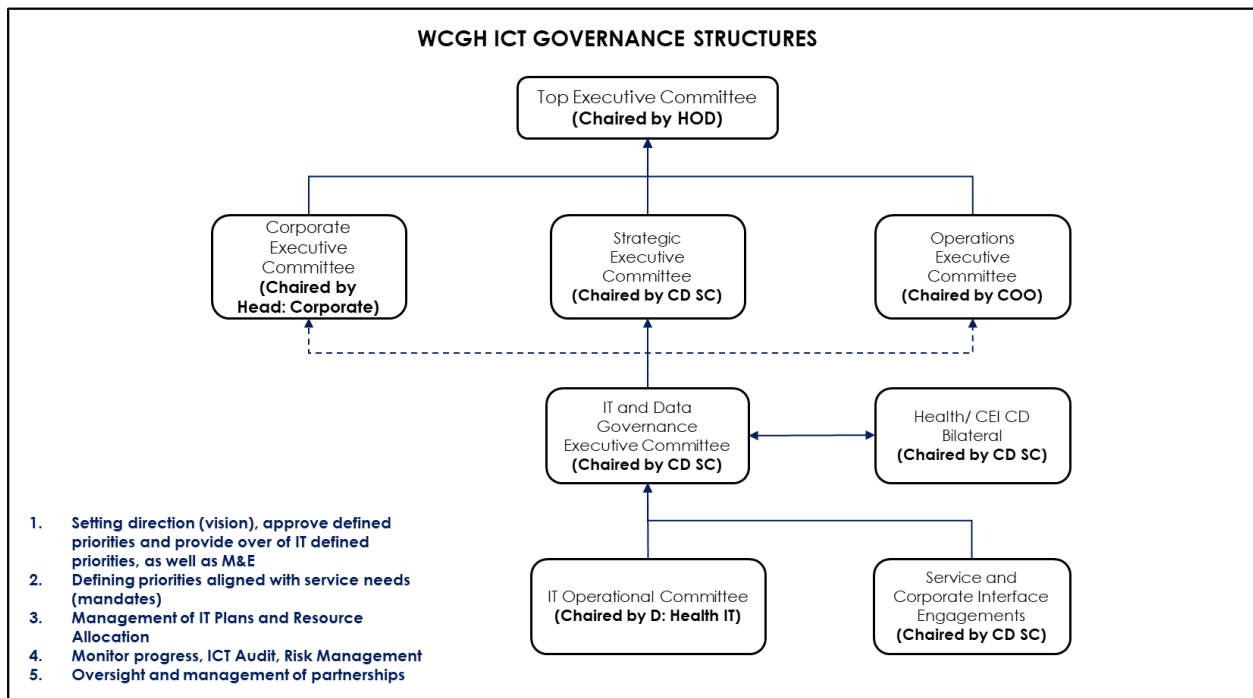


Figure 4: WCGH ICT Governance Structures

WCGH ICT Governance Structure committees include:

- IT and Data Governance Executive Committee directs and monitors departmental IT projects and manages the departmental interaction with strategic partners. The committee is chaired by the CD: Strategic Cluster with delegates which includes DOH Directors and Deputy Directors involved in IT projects as well as Ce-I representatives which includes DGITO.
- IT Operational Committee focusses on IT project progress, chaired by the Director: IM. Delegates include departmental Project Managers and Ce-I representatives which includes DGITO.

Other committees operating to support success of departmental IT projects and achieving IT objectives include:

- CD-Bilateral: delegates include Health and CEI senior managers.
- Weekly IT project coordination meetings: departmental and Ce-I representatives.
- IT Project and Governance engagement sessions to link with Service needs.

Monthly Data Governance has been introduced into the department's ICT governance process to advise on the data management planning and control activities within the department.

Stakeholder Map

1. The Department stakeholder map (Fig. 5) below, illustrates the relationship between the Department and the various stakeholder entities that it interacts with. The stakeholders are government entities, suppliers of services to, citizens any other stakeholders identified by the department.
2. There is generally a two-way flow of information between the Department and its stakeholders. These information flows vary in type and frequency and can have different associated business values.

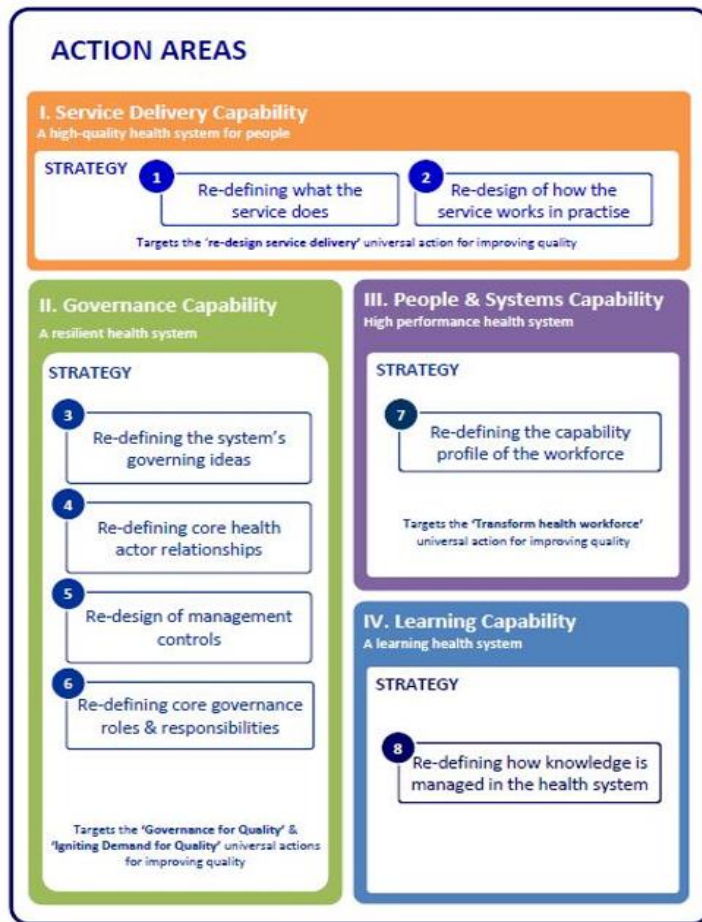


Figure 5: Stakeholder Map

Why a Western Cape Government: Health Strategic ICT Plan now?

Background and purpose

Digital health is understood to mean “the field of knowledge and practice associated with the development and use of digital technologies to improve health”.^{4, 9} Digital health expands the concept of eHealth to include digital consumers, with a wider range of smart-devices and connected equipment. It also encompasses other uses of digital technologies for health such as the Internet of Things, artificial intelligence, big data and robotics.⁹



Part of the department's vision is that the patient files will be stored electronically, which reduces the incidence of lost folders and production of duplicates, reduces the physical space for storage of folders and, most importantly, reduces the waiting times for patients at facilities. The electronic record will be available across facilities and will help in the communication and referral between health professionals and the provision of continuity of care in the life course of patients.¹⁰

The Department is also seeking to incrementally digitise Corporate functions to improve staff efficiency and user experience. A Framework for Action (Fig. 6) will guide the Department in terms of focus areas as it enters its next 5-year planning cycle.

Figure 6: UHC Capability Frame

Problem Statement

- 1) IT development has been piecemeal and not systematic.
- 2) Lack of a coherent vision and framework
- 3) Need for IT enablement of the HC 2030 vision and the emerging transformation agenda.
- 4) Need to capitalise on unique identifier to maximally enable the continuity of care of patients.
- 5) IT priorities to be aligned to service priorities.
- 6) The administrative burden of manual processes both within service delivery and support services
- 7) Need to strengthen internal and external IT governance.
- 8) There are serious backlogs in IT network infrastructure within the Department which is more prone to faults and failures.

Single View of the Business

It is estimated that there are 6.6 million people living in the Western Cape Province in 2019.¹¹ The Province is divided into two health service chief directorates (Rural and Metro), and furthermore into six districts, and thirty-three sub-districts that are aligned to municipal boundaries. The Department has:

- 52 hospitals with 10 024 beds
- An average of 46 000 admissions and 240 000 outpatient and emergency headcounts per month
- 182 fixed primary health care facilities with on average 890 000 headcounts per month.

There are 31 914 potential internal ICT users on the WCGH staff establishment. Clinical staff make up 20 892 (65%) of the Department, while the rest play management, administrative, critical support and technical roles, collectively referred to as "non-clinical" in Fig. 7 below.

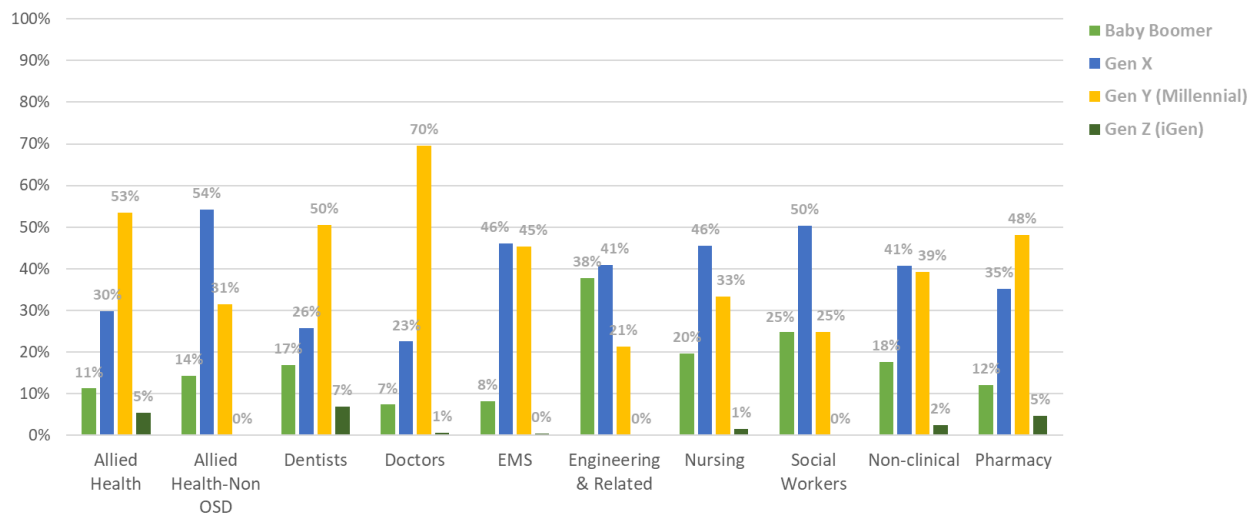


Figure 7: Percentage of users by generation within broad job categories.

As the Department deals with the complexity of service delivery, the reducing budget and the growing burden of disease, the process of sense-making and prioritisation inevitably leads to the emergence of terminology and high-level concepts that strategy stakeholders want to see reflected in documents such as these. The systems approach has been the preferred above programmatic approaches for problem-solving for the last decade. However, the language from the burden of disease (e.g. chronic conditions of lifestyle), specific modalities of interventions

(prevention, medicine, surgery, rehab), and conceptualisations of the service delivery platform (COPC) cannot be avoided. While the Department has learnt that transposing lessons and tools from one vertical focus area to another seldom yields coherent results, we still endeavour to identify high-leverage interventions that will have cascading effects across the health system.

However, care should be taken that ICT interventions not wholly mimic service priorities by architecting digital systems in silos so as match these. This would lead to unjustifiable duplication of technology, development effort and efficiency losses.¹² Alternate approaches could include:

- 1) mapping the value-add of technologies and systems with transversal impact to the aforementioned priorities, so that it is explicit to stakeholders and end-users.
- 2) Identifying the unifying generic or unifying business processes and architecting IT solutions around these.

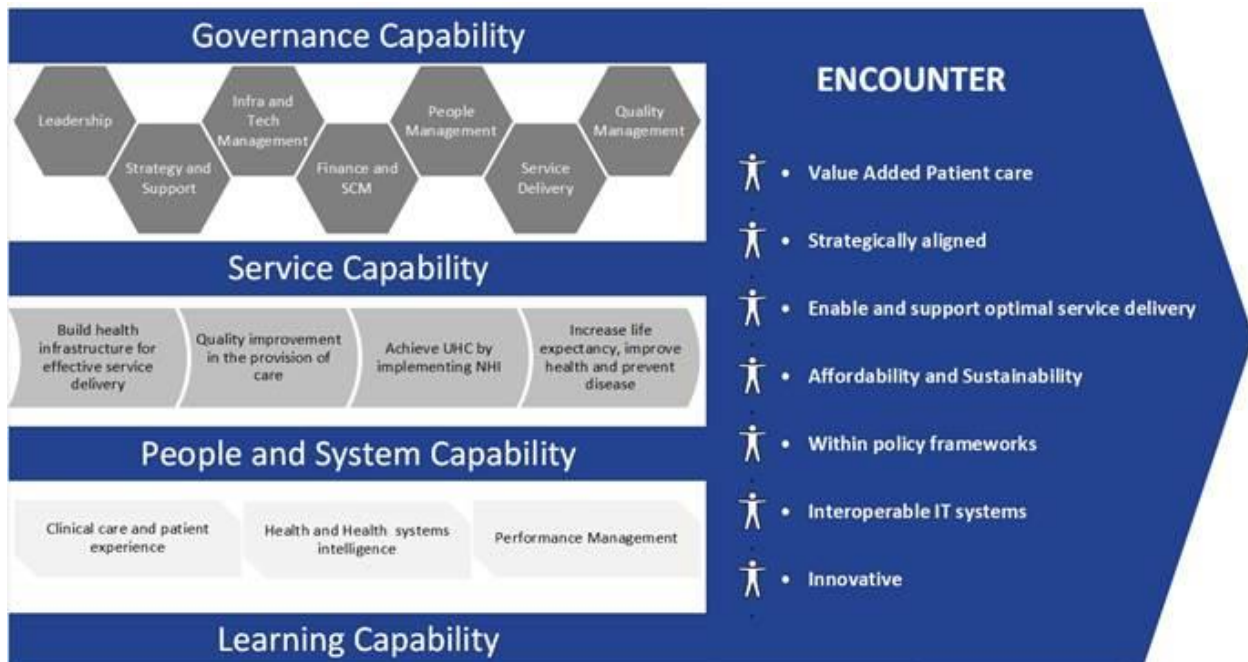


Figure 8: Single view of the Business

In terms of governance, the generic KRAs for line managers are informed by a health systems approach, as articulated in the WHO systems building blocks, the Departmental macro-structure.

The following 7 generic KRAs are in use:¹³

- Leadership

- Strategy & Support
- Infrastructure and Technology Management
- Finance and Supply Chain Management
- People Management
- Service Delivery
- Quality Management

The core business of the Department is to treat patients, promote wellness and keep healthy persons healthy. This plays out within the Patient Encounter. A generic model that guides the logic and flow of an encounter at a health service point (Fig. 9). This logic applies to all categories of frontline health care workers and multi-disciplinary teams.

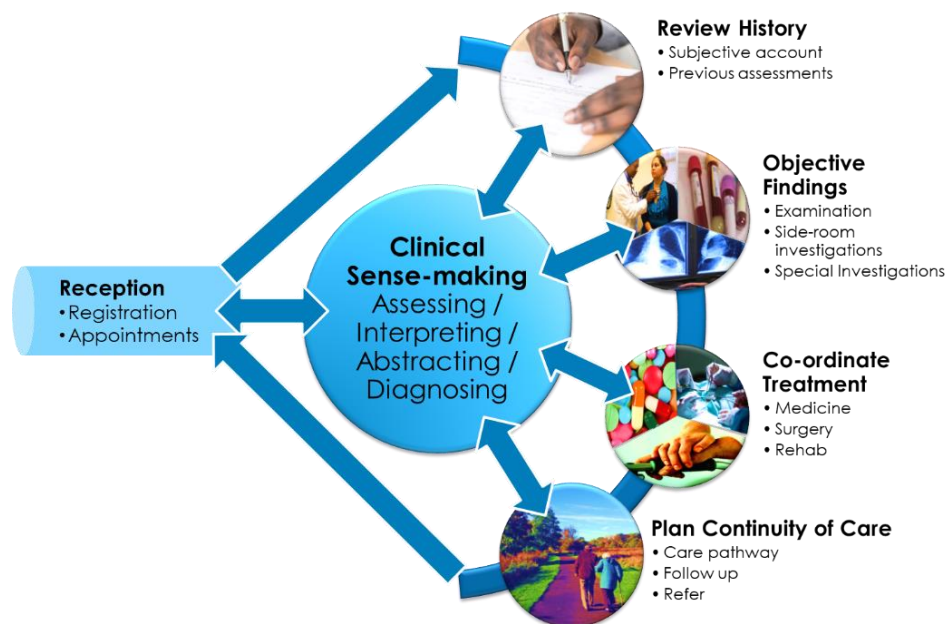


Figure 9: Clinical practice model modified from WCG Clinical Governance Framework.^{14, 15}

After acknowledging the visit at reception services, the patient's clinical picture starts emerging when the presenting complaint and history are given to the health care worker. This informs a focussed approach to the physical examination and investigations. The patient diagnosis emerges from multiple sources of data; and may only be confirmed when there is a response to treatment and further management. Therefore, providing a health service is not a linear, generic step-by-step process, but rather the application of a honed skill of assessing, interpreting, integrating and abstracting a rich picture.

ICT in health therefore must support the clinical sense-making process through coherent interfaces, access to key clinical data and a superior end user experience.

Where are we now?

Our strategies and technologies must adapt, and we must be responsive accordingly. In this process we must reflect and learn from our history and our experiences in eHealth, consider the local and global knowledge and experiences of others, and use the best evidence available to inform our decisions and actions.

What have we learnt from the past 5 years? (identifying the Business and ICT Challenges)

On reflection of the past five years of IT in the Department, key stakeholders acknowledged the considerable progress that was made in the implementation of core systems and a foundation of governance and oversight structures and the embedding of engagement processes. There was concern on the proliferation of projects where, at the time of engagement, the IT team were managing 66 projects at various levels of abstraction of the underlying activities. While there was marked improvement in the supporting infrastructure, there was still inadequate medical grade network coverage to support the increasing number of digitised clinical transactions. It was acknowledged that additional capacity would be required at the strategic Meso levels to add value to IT governance.

COVID-19 certainly created shifts in the paradigms and established modus operandi for eHealth system design and implementation. It provided the Department with an opportunity to cut through red tape, test rapid deployment methods and to rethink its approach to change management. However, the rapid proliferation of systems and solutions pose new challenges for governance, co-ordination, and system integration. This challenge is further compounded by the R40 million cut to the 2020/21 IT budget in trimmed human resource capacity. Despite these challenges the team had demonstrated the ability to do more with less and respond to the growing need for the efficiency gains from eHealth strategies.

IT Vision & Strategy

The IT Vision, adopted in 2017, could have been better communicated through the Department and to key stakeholders.

There remains a perception of inequality between IT resource allocation between the Rural and Metro health services.

Western Cape's Digital Government Strategy

Technology is revolutionising how the Province interacts with citizens and how citizens experience services. There is increasing use of mobile digital devices and mobile platform-based services. The Western Cape Government maintains a strategic focus on innovation for impact to drive and improve service delivery to its citizens.

In November 2017, the WCG Digital Government Strategy (DGS) was approved by Cabinet. The WCG Digital Government Strategy (DGS) seeks to develop and implement integrated solutions that move away from the traditional internal process related systems to developing citizen-centric models.

The WCG Digital Government Strategy comprises of five goals through which it aims to impact citizens and our service delivery environment and position us to exploit opportunities to be presented by the Fourth Industrial Revolution. The DGS Goals are expressed in the illustration below:

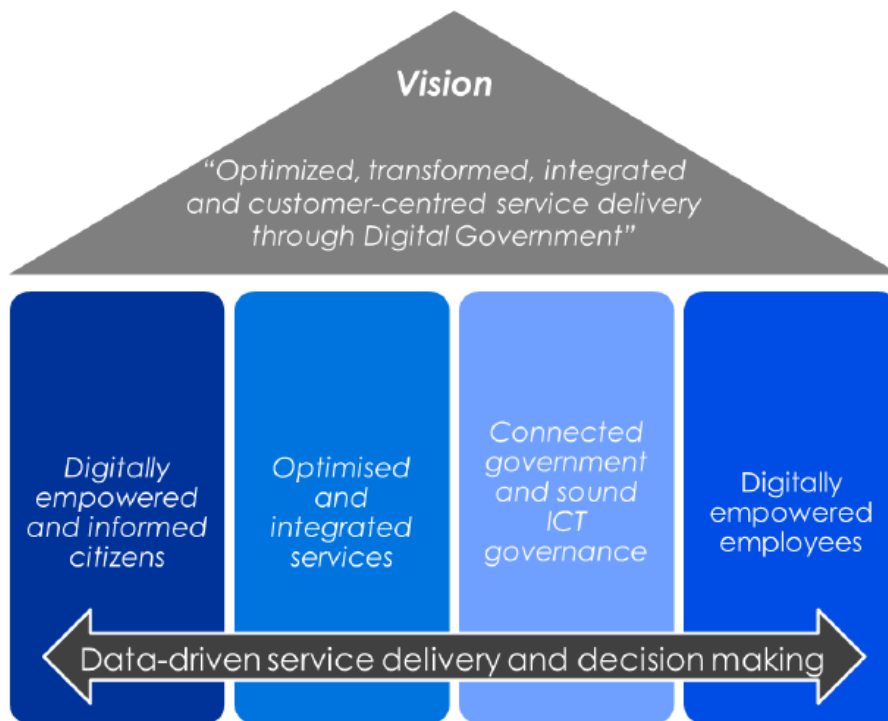


Figure 10: WC Digital Government Strategy Goals

Governance

Despite technical work on decision spaces within health IT,¹⁶ and the creation of oversight and co-ordination structures there is still uncertainty as to where IT decisions are made. This may be indicative that the recommendation to move from hierarchical structures to wirearchy may have been over-ambitious in relation to the maturity of the governance structures.

Furthermore, it was noted that implementers and project champions also formed part of the governance structures. The blurring of roles and responsibilities may have undermined the oversight role that structures should play and may also have contributed to the uncertainty around where decisions get made. There should be a separation between implementers and oversight bodies.

Priority Setting

The Health IT team is currently formally managing and reporting on 66 projects plus other projects that are in conceptualisation, proof of concept or pilot phase. This broad scope, per project manager, requires trade-offs between to delivering outputs on time, project cost and ensuring excellent quality outputs (Fig. 11).

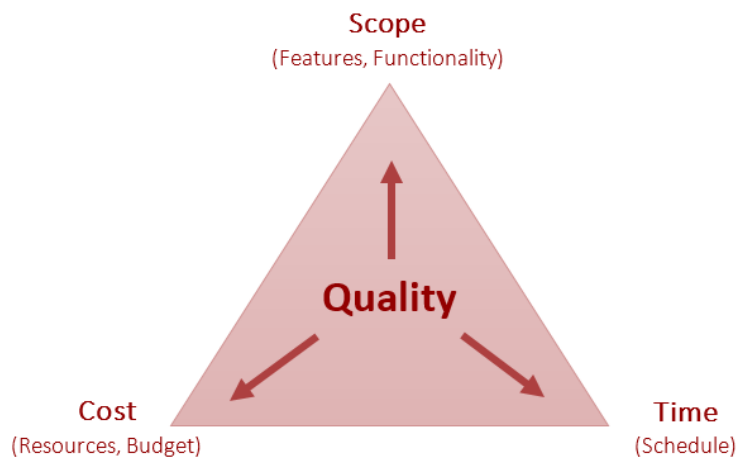


Figure 11: Iron Triangle – Triple Constraints of Project Management¹⁷

This is further compounded by a list of projects required to digitalise corporate functions, using the current available resources.

User Engagement

The Department has more than 31,000 employees geographically dispersed across the Western Cape Province – each a potential user of health IT systems. Users have varying functions including clinical, administrative, managerial, technical and maintenance duties. While it may not have been feasible to engage each end-user in a meaningful manner, there was a general sense that the voices from the coalface of service delivery were not adequately represented during software development consultations. Furthermore, managers at the Meso level of the Department have also expressed a need for more meaningful engagement. The formation of user groups and effective dissemination of information from engagement sessions will be key to ensuring health IT project success.

Data Use

Health IT governance structures have frequently been reminded that the creation of IT systems is not an end in itself, and that there should be emphasis on the effectiveness and efficiency gains in service delivery from these systems. This particularly applies to decision support for managers and clinical staff alike. This, however, requires a culture of data use, critical appraisal, and action.

What is our ICT Vision?

A Vision for the Development and Use of Information Technology in Health Care within the Western Cape, commonly referred to as our *IT Vision*, was endorsed by provincial cabinet in 2017.¹⁸ The vision sought to address the following:

Vision:

- 1) Optimally efficient, effective, and affordable IT system
- 2) Significantly automated and digitised processes within clinical and corporate services
- 3) Enables patients to self-manage through access to information.
- 4) Improve the use of IT to deliver greater public value: better services, better outcomes and WCG Health that continues to retain the trust of citizens.
- 5) Provides clinicians with good access to relevant patient-level data in real time.
- 6) Enables management to have good quality integrated data to better plan, implement & monitor service delivery.
- 7) Allows researchers to have access to routine data to improve the knowledge and evidence base.

Enablers:

- 1) IT leadership and management
- 2) Clear Policy, Norms and Standards
- 3) Department takes primary responsibility for management of technical capacity.
- 4) Optimal governance arrangements
- 5) Maintenance and support
- 6) Innovation

The priorities:

- 1) Roll out basic systems.
- 2) Digitisation of selected prioritised processes:
 - a. Electronic Continuity of Care Record (eCCR)
 - b. Platform wide referral - appointment system
 - c. Emergency Centre Tracker with Triage
 - d. e-Scripting /e-Prescribing
 - e. Order Entry & Results Viewer
 - f. Theatre Information Management System
- 3) Automation of frontline data collection and other clinical and corporate prioritised processes
- 4) Integrated Data Systems:
 - a. Provincial Health Data Centre
 - b. Master Data Systems
 - c. Facility Management Viewer
- 5) IT at the point of care:
 - a. Single Patient Viewer
 - b. Ever-greening of current platforms
 - c. Gradual shift to electronic capture platforms
- 6) Address Corporate IT system priorities.

These priorities complement Ce-I's Transversal Initiatives which is to provide transversal application development services. There is a marked shift from the previous strategy, which was largely focused on making traditional services available online. The digital transformation of the department is putting data as its core for innovation and improvement of its service delivery to both WCG Employees, and WCG citizens.

What does it mean for patients?

A patient comes to the health service because he or she has made an appointment (unless this is an emergency) using their own mobile device and is greeted on entrance by a staff member, who is friendly, helpful, empathetic and caring.

The staff have access to live digital data to respond to any queries of the patient or family member and to direct the patient to the necessary sections of the facility.

Patient files will be stored electronically, which reduces the incidence of lost folders and production of duplicates, reduces the physical space for storage of folders and, most importantly, reduces the waiting times for patients at facilities.

The electronic record will be available across facilities and will help in the communication and referral between health professionals and the provision of continuity of care in the life course of patients.

Patients will have their own App / portal to create / modify their future appointments, view key health status information, latest medication, members of care team, and request changes to their care plans.

What does it mean for health staff?

Staff will be supported by ICT solutions in the public and private health service. Staff are better connected to management, critical support services, patients and communities through digital platforms.

The staff will innovate and form part of the co-creation of intuitive and user-friendly digital solutions to daily challenges in service delivery. Staff can self-manage their electronic profiles, performance reviews, leave, and assigned assets.

Staff will feel part of a wider whole-of-society community practice for universal health coverage and will be encouraged to participate in online engagements. Staff will feel empowered using electronic decision support tools to make the lives of their patients better and will be willing to go the extra mile in their jobs. They feel supported through instant communication and notifications from managers and technical support staff. They will feel 'heard' as requests and suggestions are tracked digitally, and their problems will be efficiently addressed. Staff will feel that their personal information, as well as patient's information are safe and secure in the custodianship of the Department.

Systems will be created to ensure that staff have access to e-Learning networks. They will be eager to learn and improve their knowledge and skills on an on-going basis.

What does it mean for the community?

Community leaders and citizens can access up-to-date profiles of their communities that include user-friendly data visualisation of the local health status, determinants of health, and health system performance. This includes data from Whole-of-Government and local stakeholders to inform community diagnosis as part of Community Oriented Primary Care.

There will be digital platforms to enable effective communication between the community and health management. The team of community care workers (CCWs) will be supported by m-Health applications when they access households in the community. They are a digital link between the family, community and the health service and disseminate messages of healthy living to the people. They access records of visits and appointments to ensure that pregnant mothers attend the antenatal clinic, babies are immunised, and patients take their medication regularly and correctly. They also have access to health care advice on a range of issues including health prevention and promotion. Patients are referred to the clinic when necessary or managed at home. CCWs identify social problems and liaise with local social services on electronic platforms, when necessary.

How will we get there?

Principles

The following strategic principles were outlined in the IT Vision to guide WCGH in the planning, investment, and execution of IT-enabled health outcomes.¹⁸

- 1) Must add value to patient care and improving health outcomes.
- 2) Alignment with the strategic direction and principles of Healthcare 2030
- 3) Must enable and support the internal client to deliver services optimally.
- 4) IT systems must be interoperable.
- 5) Affordability and sustainable in the long term
- 6) Operate within the national and provincial policy frameworks and norms and standards.
- 7) Innovation will be encouraged and managed within the parameters of the above principles.

Critical Success Factors for eHealth

(Ben-Zion's article)

Critical Success Factor		Maturity
External Environment		
alignment with the external environment	ongoing analysis of the external environment and dynamic adaptation to it	Initiated
IT integration with external networks	adoption of protocols and standards for data exchange across the organisation and its external environment	Initiated
	implementation of web portals to engage, educate, and serve patients	Gap
IT innovation	leverage commercial off-the-shelf solutions when possible	Maturing
	partnership with healthcare innovation companies, consulting firms, and industry peers	Maturing
Firm Strategy		
IT alignment with firm strategy	collaboration and partnership between clinical staff and IT executives	Maturing
IT impact on economic competitiveness	implementation of EHR-enabled process improvements to gain competitive advantage	Maturing
Executive management support	executive engagement via a governance structure that enables informed and effective decision making	Maturing
Knowledge management	inclusion of a knowledge management aspect within the EHR strategy to address data quality, data mining, and knowledge discovery	Maturing
Business Processes		
process change	fostering physicians and staff to champion the IT innovation	Maturing
	alignment of all in the organisation (e.g., people, technologies, roles, routines, training, incentives) around the EHR innovation through effective communication	Maturing
	emphasis on an ongoing training program coupled with user support	Maturing
scope and project controls	setting upfront clear, measurable business objectives coupled with continuous evaluation of system outcomes	Maturing
	phased implementation with incremental gains to build support and consensus	Maturing
	employment of project management processes to control the schedule, tasks, resources, risks, and quality of the project	Maturing
Structure and Culture		
culture change	studying the socio-technical synergies in existing business processes and avoiding radical redesign of working practices	Maturing
	fostering a culture of innovation, exploration, and continual improvement where positive and negative impacts of EHR use are communicated openly	Initiated
interactions across communities within the organisation	identifying organisational issues and team dynamics early on and accommodating social, political, and technical subsystems	Initiated
shared language and narratives	adoption of a standard medical taxonomy	Initiated
motivation to collaborate	setting the right expectations by educating frontline clinical and administrative staff about the direct benefits of EHR to their work function	Maturing

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Critical Success Factor		Maturity
	building appropriate incentive and penalty structures to motivate those who do the work to reap the appropriate rewards with the right balance of “carrots” and “sticks”	Initiated
System Architecture and Infrastructure		
system architecture and infrastructure	development of a scalable, secure, mission-critical infrastructure that can easily be integrated with all relevant sources	Gap
IT resources and cost of ownership	analysis of costs and benefits of own IT infrastructure compared with a cloud solution	Initiated
accessibility and usability	continuous evaluation of the user interface for optimal usability	Maturing
	setting the right balance between accessibility needs and security and privacy requirements	Initiated
	utilising mobile end-user computing devices to improve accessibility	Initiated

Business Priorities: Toward Universal Health Coverage

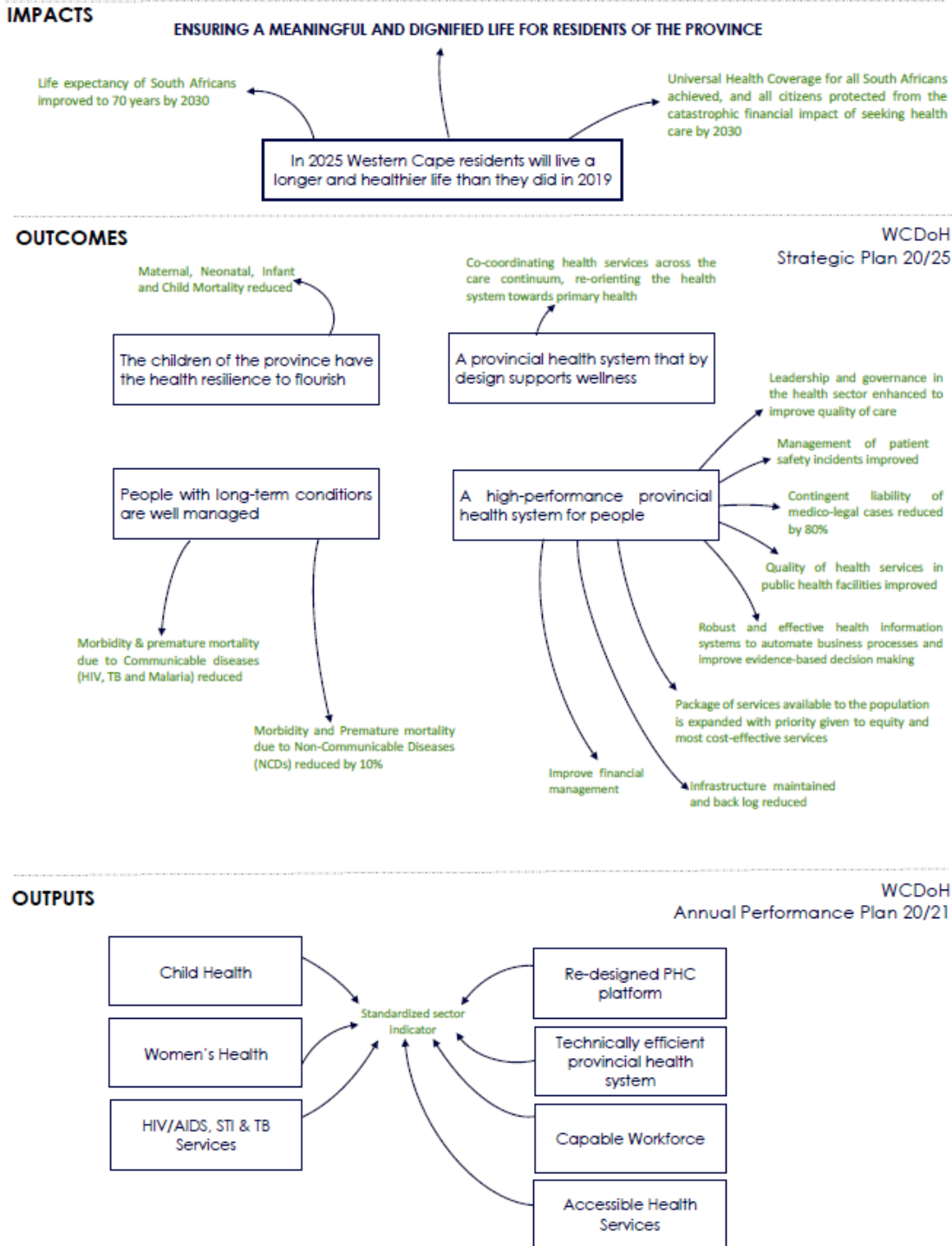


Figure 12: Mapping the journey to a healthier Western Cape and ultimately a healthier South Africa in 2025

In seeking to ensure that Western Cape residents live longer and are healthier by 2025, the Department has identified four core outcomes as detailed below; in line with the service and system priorities over the next five years. The service priorities focus on drivers of the disease burden for children and residents with long-term health conditions. While the system priorities focus on the redesign of the PHC services to support wellness and then in preparing for UHC, the focus is on enhancing technical efficiencies, ensuring a capable workforce and improved access to care. Fig. 12 illustrates how the Department's plans align with NDoH identified MTSF impacts and outcomes.

From Framework to Action: Strategic ICT Initiatives

This strategy is integrally linked with the Department's IT Vision as well as the Western Cape's Digital Government Strategy. All three of these strategies will ensure that WCGH is striving to facilitate the highest standards of quality care that is person-centred, safe, and effective. The Department will continue adopting the Initiatives as per the last review done in 2019/20 which was changed because of the IT Vision.

ICT Initiative	Description
ICT Initiative 1: Roll out of basic systems	Basic system being the 4 core systems includes PAS, Radiology, Labs and Pharmacy.
ICT Initiative 2: Digitisation of selected prioritised processes	The Department identified the gaps within the core systems and has initiated digitising these systems to plug the gaps.
ICT Initiative 3: Automation of frontline data collection and other clinical and corporate prioritised processes	Utilising automation to relieve the burden of clinical and corporate administration
ICT Initiative 4: Integrated Data System	Delivering actionable intelligence from multiple IT systems in an integrated manner.
ICT Initiative 5: IT at the point of care	This initiative focuses on the ICT components utilised when peripheral testing is done close to the location where clinical care is administered.

ICT Initiative 6: Address Corporate IT system priorities	This initiative is to simplify and automate core administrative functions by using IT to integrate corporate business functions into the service delivery aspect of the department to assist the frontline staff to deliver better efficient and effective quality care to the patients.
ICT Initiative 7: Technology Refresh	Technology Refresh of ageing Infrastructure (Computer hardware) IT Governance Charter specifically requires each department to implement and maintain a departmental technology refresh
ICT Initiative 8: Governance	Governance is the foundation stone of the Department. The departmental ICT strategies will be aligned within the governance charter and policy frameworks of the province.

ICT Initiative 1: Roll out of basic systems

Brief Description of the initiative

The basic systems for IT Health are made up of 4 Core Systems:

1. PAS [Patient Administration System]
2. Radiology
3. LAB
4. Pharmacy

The Department will continue prioritising **the roll-out and strengthening of these basic systems** for patient administration, digital laboratory, radiography, and medicine dispensing.

Business Owner:

In order to identify the owners, listing the staff who would benefit from this Initiatives is important.

Doctors, Reception Clerks, nurses, pharmacists, radiologists, radiographer, Lab technicians, etc are but a few and whoever deal with the patients.

Service leads that will benefit from the Front-Line Services are thereby identified as the Business Owners: Chief Operations Officer; CEO of Hospitals; Meso structures.

Background and Scope of ICT Initiative

By international standards, patient administration-, medicine management-, radiology-, and laboratory systems are the four pillars of electronic health records. This is due to the high volume and technically verbose nature of these health transactions. These four types of systems should be well-established on robust digital platforms within the business.

Business and ICT challenges linked to this Initiative.

While substantial progress has been made in ensuring interoperability standards adherence, the integration and user-friendly presentation of information from these four key systems to end-users remains a challenge for the Department.

ICT Information Requirements linked to this Initiative.

The following Information Requirements are required to be linked to this Initiative:

- Ensuring that the systems are all aligned to the Health Normative Standard Frameworks.
- For Radiology, ensuring that it is Diacom compliant,
- For the LAB, ensuring it aligns to the LOINC (Logical Observation Identifiers Names and Codes) and IHE profiles.
- For the PAS ensuring it has HL7 (High Level Seven) FHIR (Fast Healthcare Interoperability Resources (FHIR, pronounced "fire")) Standards for Interoperability.

Besides the correct standards, this Initiative will need to have the infrastructure to support this. We need to have the ability to extract and load the data from the source systems into the data analytics platform. The data being captured must be useful for clinicians to be able to do assessments and diagnosis and have the ability to register the patient, as well as track the history of the patient in terms of admission and discharges, episodes, and encounters.

Benefits

Tangible benefits for this Initiative comprise of the following:

- Departmental / Service Benefits – It provides history of patients' activity in terms of episodes and encounters that can be linked to the care being provided (Lab / Radiology Tests, diagnoses from previous encounters, types of drugs that were dispensed). It also shows the patient profile (acute vs chronic).
- The PAS generates the unique patient ID which is the glue that holds all the information together within the system. The PAS will create the EMCI record which is shared with all other clinical systems.

The following Intangible benefits are anticipated for the public sector:

- Having a digital process helps with audits of Head Counts- If it were a manual register, then auditors would need to physically count the records.
- It helps with analysing and sharing of data rapidly across platforms, clinicians and all those that have authorised access.
- Integration to BI:
 - Automation of reports that reduce the burden on frontline staff.
 - Assist with Stock Management.
- Radiology results – If it were not digital then it would be expected that the patient carries a physical image to the next hospital whereas the transfer of digital images could be seamlessly sent to many.
- LAB results will be digitally available on the phone. It will also be pushed to the parent of a minor.

ICT Initiative 2: Digitisation of selected prioritised processes

In August 2017, the Department started the process of identifying the gaps within the core systems and selected prioritised processes that would plug those gaps.

The gap analyses revealed that not only did they have to accommodate the patients with appointments but also those coming into the EC (Emergency Centre). HECTIS (Health Emergency Centre Tracking Information System) then became a core system (which included the Triage

Component.) HECTIS was implemented last year as part of the GAP as well as Theatre Information system.

Background and Scope of ICT Initiative

This ICT Initiative forms the premise of the Electronic Health Record.

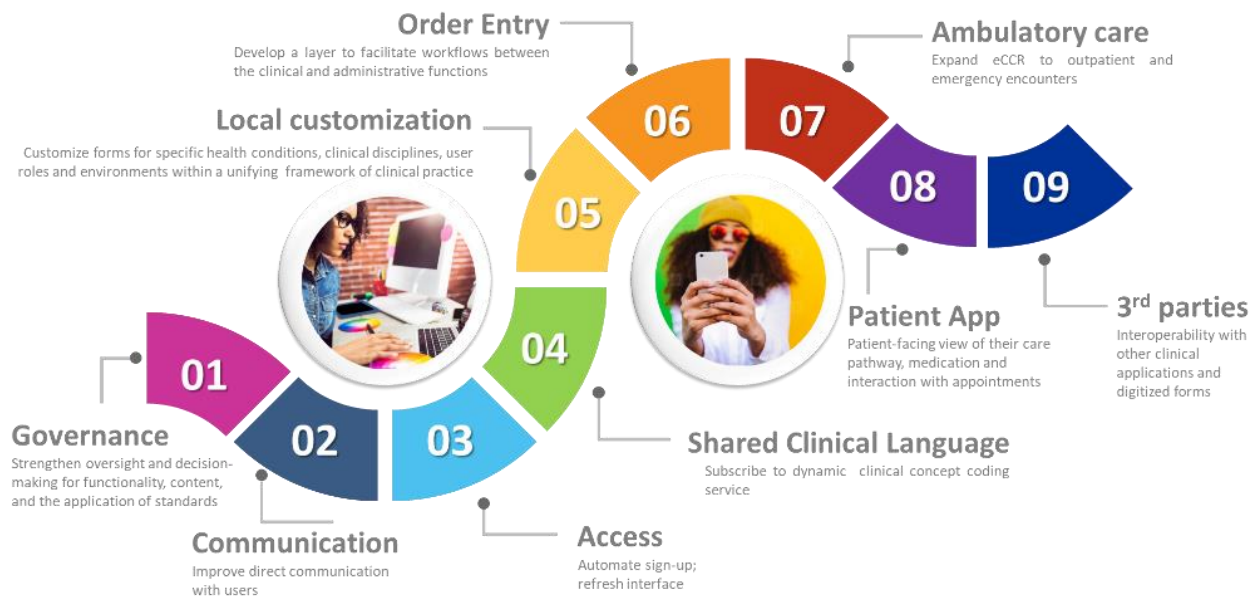


Figure 13: Roadmap of key capabilities to an EHR System for WCGH

As is common international practice, an Electronic Health record starts with the development of a digital discharge summary. This would start with Registration (PAS) and end with Discharge Summary and identifying everything that happens in between is key. One such activity is Order Coms which will eliminates all the loose pieces of papers that is being used in the Wards at the hospitals. The aim is to try to ensure that every engagement will have a digital transaction.

Business and ICT challenges linked to this Initiative.

Multiple challenges faced as per the background and scope of this Initiative.

ICT Information Requirements linked to this Initiative.

Data being generated here is critical for continuity of care.

Benefits

The following benefits will be realised with the implementation of this Initiative:

- improve continuity of care by making records digitally available and via mobile technology will increase access to quality healthcare particularly for the digitally excluded. It will improve access to health information (patient records, clinical images, etc.)
- improve health information communication to the public
- improve access to ongoing medical education and training for communities.
- provide efficient patient & household wellness data collection through use of mobile devices.
- improve patient referral and appointment scheduling at healthcare facilities.
- Standardise source record for ICD-10 coding.
- improve capability to diagnose and track diseases.
- Improve the discharge summary capturing process.

ICT Initiative 3: Automation of frontline data collection and other clinical and corporate prioritised processes

Brief Description of the initiative

Relieving the clinical and corporate administration burden through automation.

Business Owner

Chief Director: Strategic Cluster

Background and Scope of ICT Initiative

It became known during the MEAP process that frontline staff are burdened and overwhelmed by the plethora of paper-based workflows that are considered inefficient, tedious, and slow. As a result, there is an urgent need for an increased automation in the process of everyday administration, maintenance and support tasks in the clinical and corporate space.

A paradigm shift is required from manual registers to an electronic health record for clinical processes and similarly shift from paper based administrative corporate processes to electronic processes. This would involve capturing directly on an electronic system with minimal dependence on paper-based records. However, as the infrastructure matures in capability and stability, especially with the migration to cloud computing environments, primary record-keeping & data collection would itself increasingly become based on automated processes.

Business and ICT challenges linked to this Initiative.

- **Lack of system interoperability** and **limited collaboration & double handling of forms.** Currently multiple copies need to be printed, all ending up with their separate annotations which then still need to be changed on the original document. Once the initial document is updated, more copies need to be printed, approved, and then filed. This lengthy process slows down staff with their current workload, which there is no time for. The lack of interoperability is not new and is mainly due to outdated legacy systems. The Department will reap the benefits of modern technology with system upgrades that support interoperability.
- Paperless record-keeping & regulatory reporting compliance requires stable infrastructure available at all points of care in the system.
- Good, reliable network with 24/7 uptime in all areas of the province is not currently available.
- Insufficient PC's with adequate computing power.
- Inadequate funding to supply and timeously refresh PC's.
- Poor staff computer literacy and training environment/modules with insufficient trainers
- Not all staff have access to pc's and email accounts.

- Currently using manual processes or systems that do not interoperate – need fast, smart software that interoperates thereby reducing duplication of capturing and the risk of inconsistent information.

ICT Information Requirements linked to this Initiative

- Regulatory reporting (e.g. quarterly and annual reports, grant reporting, NIDS monthly reporting)
- Internal business analysis for monitoring, evaluation and planning (budget, resources, infrastructure etc)
- External reporting and queries (media and parliamentary queries, HEI research, private sector)

Benefits

- **Enhanced Data Quality:** Automated data capture will reduce errors due to oversight and transcription when compared to manual entry. It will bring more effective controls in several core business processes and will result in cleaner audits. Also, in the current resource constrained environment, it's important to take note of the cost of quality. The 1-10-100 rule states that it makes more sense to invest \$1 in prevention, than to spend \$10 on correction & lastly than to incur the cost of \$100 in failure (downstream cost if a problem isn't fixed).
- **Reduction in costs:** Less paper > cost savings.
- Briefly, **eliminate redundant business processes, automate patient support functions, and reduce costs.**
- Efficiency
- Improved clinical care
- Improved access to information
- Improved integration of information
- Reduced audit risk

ICT Initiative 4: Integrated Data Systems

Brief Description of the initiative

Delivering actionable intelligence from multiple IT systems in an integrated manner. Identified projects- Provincial Health Data Centre (PHDC), Patient Master Index (PMI) also known as Enterprise Master Client Index (EMCI) / , Master Data Management

Business Owner

Chief Director: Strategic Cluster

Background and Scope of ICT Initiative

The Department realised during the MEAP transformation journey the importance of being governed by facts and using data to drive decisions. Currently all the facts that are required to build a meaningful picture of clinical operations and business are being collected & controlled in various source systems. Some of these systems are outdated and do not accommodate interoperability. Further to this, it became clear that maintaining the current status quo and keeping legacy systems will stifle IT outcomes in the era of digital business. Health systems that are serious about continuous improvement need to build / strengthen integrated electronic systems to ensure that the patient stays at the centre of the equation. The Department therefore envisage to migrate from legacy systems to support new types of integrated workloads and workflows for the digital era.

The aim is:

- To **combine disparate sets of data** into meaningful information.
- To have an **optimally efficient, effective and affordable IT system** that enables patients to receive information, be better informed of their health status and empower them to self-manage where feasible.
- To provide clinicians with **good access to relevant patient level data** in real time to optimise clinical management.
- To enable management to have **good quality integrated data** for better planning,
- To **implement and monitor** the impact of health service delivery.

- To allow researchers to have access to routine data to **improve the knowledge and evidence base** that informs policy development and practice.

Business and ICT challenges linked to this Initiative

- Data is locked into separate silos running on multiple platforms resulting in complex and huge data volumes.
- Lack of readiness to understand the value of integrated data.
- Lack of training and incentives for staff to want to adopt a new integrated data approach.
- Lack of a consolidated approach to systems and data integration.

ICT Information Requirements linked to this Initiative

Mobile ready environment.

Benefits

- Decision makers at all levels will have **access to timely, integrated information** out of various systems.
- This will **allow the organisation to ask new types of analytical questions**, focused on measuring the processes of clinical care.
- It will allow for more efficient care through **less duplication of services**.
- This will **enhance the clinical management of patients** through the Single Patient Viewer (SPV).
- The capacity for **monitoring of patterns of disease (epidemiological surveillance) will be strengthened**.
- Will be **able to launch Master Data Management** allowing for the sustaining, strengthening and optimising of business processes.

ICT Initiative 5: IT at the point of care

Background and Scope of ICT Initiative

This initiative is one of the strategies which is used to achieve the IT Vision and focuses on the ICT components utilised when doing peripheral testing and patient data inputs close to the location where clinical care is administered. The results of IT at the point care are timely and allow rapid treatment to the patient. Clinicians can restructure their method of operation by utilising technologies and provide tailored care to the needs of the increasing numbers of patients with long term conditions. Using a wide range of ICT platforms and systems will lead to both better value and improve personalisation of patient care.

The initial scope for this Initiative, as documented by the IT Vision for WCGH lists the following solutions:

- Single Patient Viewer
- Ever-greening of current platforms
- Gradual shift to Electronic Capture Platform

In addition to the above the department also looked at the following 2 solutions:

- Medicine Administration
- PICU Bedside Solution

1. Single Patient Viewer

An application will be created that will retrieve clinical information from a range of systems in a single patient viewer that will enable and support the clinician to have the appropriate history and data in real time to make the optimal clinical decisions at the point of care. This will include, but not limited to, demographic data, patient registration data, the morbidity history, the lab results, the radiology images and medicines prescribed from recent visits. This is enabled by the creation of the provincial health data centre that draws data from a range of interoperable systems and having a unique identifier that connects it to the same patient.

2. Electronic Capture Platform

Paperless clinical record-keeping requires stable infrastructure available at all points of care in the system. As the infrastructure matures in capability and stability, evidenced through

reliable integrated retrieval of digitised integrated clinical information as described above, primary clinical record-keeping would itself increasingly become based on electronic medical records. This would involve capture directly on the system with minimal dependence on paper-based records. Globally there are substantial perceived benefits to full digitisation of medical records, although even in the best resourced contexts the evolution has been slow and benefits slow to accrue, especially where this has been done piecemeal or with the requisite interoperability and infrastructure in place. There will also be increased digitisation in the corporate support services.

3. Evergreening of current platforms

Ever-greening in the technology context refers to the approach of maintaining and refreshing technology to remain appropriate and responsive to changing needs. Given the strong platform created over the past 15 years with the implementation across the entire hospital platform of a single Hospital Information System (HIS), there are opportunities to refresh that environment rather than completely replace it through a new procurement process with associated costs and implementation timelines. The Electronic Continuity of Care Record (eCCR) embodies this approach in that it provides a modern web-based clinical interface which populates the HIS. This approach enables a focus on the areas of functionality which are likely to be used and supportable from an infrastructure perspective, without the costs of functionality, which is not required in the local context, is already provided for by other systems, or which would require extensive localisation to be workable.

4. Medicine Administration

Medicine Administration is linked to e-prescribing. A Clinician will prescribe medications and a nurse at the point of care will administer the drugs as per the guidance of the Clinician. The system will monitor the administration with recording in real time, no back date and then someone else corroborate the issue of the drugs. Not mature enough to do that as there is not enough staff (not two people on one shift).

5. Paediatric Intensive Care Unit (PICU) Bedside Solution

Phase 1 of the solution has been implemented. It consisted of a Bed Side Monitoring System in the Paediatric Intensive Care Unit Section which is located at Red Cross War Memorial Children's Hospital.

The system allows for real-time data entry which is not limited to physical input but generates data as well, e.g. If patient is on a heart monitor or ventilator it records the time of information into the database of how long they have been on the machine and what was the outputs; it also records what drugs are being administered; Who visited the Patient: what time and at what intervals, etc.

The system also allows data to be captured by the nurse of who visited a patient. This could assist in tracing how a patient contracted a viral infection which could be contracted from patient-to-patient or visitor who did not take their coat off or wash their hands when they came into the ward. The Nurse monitors and noted that the visitor has omitted to sterilize their hands.

Business and ICT challenges linked to this Initiative.

- Having a holistic view of a patient's health record
- Improvement in quality care means fewer errors,
- reduced delays in care delivery.
- improvement in efficiency.

ICT Information Requirements linked to this Initiative.

- One source of Electronic record of patient
- History record of the patient

Benefits

- The benefits of having a Single Patient View in place:
 - Reduces the risk of errors in applications and processing.
 - Increases efficiency.
 - Helps secure data privacy.
 - Reduces admin costs.
 - Improves patient satisfaction levels due to decreased waiting times.
- Electronic data capture will be instantly retrievable and readily available.
- An electronic form of Medicine Administration will contribute to improved patient use and administration of all medications.

ICT Initiative 6: Address Corporate IT system priorities

Brief Description of the initiative

As a department, naturally we are focused on the quality care that we deliver. But finance, supply chain management, people management and facilities management are important aspects of our business, too. Simplifying and automating core administrative functions by using IT to integrate these corporate business functions into the service delivery aspect of the department to assist the frontline staff to deliver better efficient and effective quality care to the patients.

Business Owner

CFO and Head of Corporate Services

Background and Scope of ICT Initiative

This Initiative was updated in the Department's 2019/20 Strategic ICT plan as a result of the newly endorsed IT Vision for the Department. It encompassed the following two old Initiatives: ICT Innovation and ICT Human Strategy as per the previous 5 years Strategic ICT Plan.

For the next 5 years this initiative aligns to all 4 focus areas of the UHC Thinking Framework. Corporate IT systems touches the 4 Capabilities listed in the Framework. This initiative is to **automate and digitalise Corporate IT Systems** to simplify and automate core administrative functions by using IT to integrate corporate business functions into the service delivery aspect of the department to assist the frontline staff to deliver better efficient and effective quality care to the patients.

This Initiative would encompass the following clustering of functions within the focus areas of the Department's Business Strategy:

- **Service Delivery Capability** – staff has readily access to data whether it is VPN, APN; Communication Method (MS Teams; VOIP; Zoom)
- **People and Systems Capability** –
 - will look at digitalization of Human Resources. This will improve processes within recruitment, performance management, talent management, employee commitment and HR analysis, which are involved in human resources processes.

- The integration of financial information like budgets and expenditure and patient related information will enable a better titration of costs with services and clinical outcomes.
- **Governance and Learning capabilities** such as Organisational Learning for e.g. Western Cape College of Nursing Accreditation

Business and ICT challenges linked to this Initiative.

- Not having a full understanding of new medical equipment may lead to errors, which is why it's vital that medical facilities plan training for new processes or technology.
- Poor data quality can often cause problems throughout an organization. This impact includes everything from treatment quality to policy-level decision making. Patient frustration and mistreatment.
- The care of patients now almost inevitably involves many different individuals, all needing to share patient information and discuss their management.

ICT Information Requirements linked to this Initiative.

Staff employment records

Benefits

- By readily giving employees access to the tools and technologies they need to do their jobs and let them use them in the way that works best for them, they will be more efficient and engaged—and therefore much happier.
- Skilled ICT officials within WCG Health - The availability of skilled human resources is a prerequisite for the success of any Health project or undertaking. Training of staff within the health service on an on-going basis is important to be able to manage the basic challenges and support the systems, especially at local level. All healthcare professionals should have access to basic ICT training facilities to improve their skills and foster positive attitudes towards information technology.
- Digitalization of Human Resources can improve efficiency and productivity while increasing competitiveness and employee loyalty.

- Streamlined, efficient recruitment processes deliver higher-quality, more engaged hires, providing a competitive advantage that directly affects the Department's performance.

ICT Initiative 7: Technology Refresh

Brief Description of the initiative

Technology Refresh of ageing Infrastructure (Computer hardware) IT Governance Charter specifically requires each department to implement and maintain a departmental technology refresh. This initiative will incorporate the following:

- Replacement of out-dated departmental operational equipment
- Replacement of desktop and laptop computers in alignment with accepted provincial standards
- Improvement/upgrade of the wireless connectivity
- Departmental network improvement as part of the Provincial WAN upgrade
- Improvement of Data backup, archiving and storage.
- Infrastructure to support the convergence of communication technologies.

Business Owner

Director: Information Management and Ce-I Partner.

Background and Scope of ICT Initiative

A policy decision was taken by Provincial Top Management (PTM) that all computers older than 5 years will not be supported as of 01 April 2014. WCG Health has since embarked on an initiative to address these requirements in attempt to refresh aging infrastructure. In addition, this initiative is also aimed to address the business and service requirements of WCGH by providing basic working tools at all levels of the organisation, employing the latest technology to improve communication and work collaboration and to enhance network performance and stability within the Department of Health.

Business and ICT challenges linked to this Initiative.

- Insufficient funding to meet increasing demand for ageing computers.
- Procurement challenges (items need to go out on IPS, fluctuation in prices and rate of exchange. Improved and more efficient procurement processes are required especially for IT infrastructure via SITA.
- Items on the WCG Product Catalogue becoming obsolete, new product replacement hinders procurement because of new specifications.
- Hospital do not procure within the timeframes.
- Original Equipment Manufacturer (OEM) cannot meet demands (shortages in processors)

ICT Information Requirements linked to this Initiative.

None

Benefits

- Address ageing infrastructure
- Address the business requirements for improved communication and collaboration tools,
- Improved network performance and stability within WCGH.

ICT Initiative 8: Governance

Governance is the foundation stone of the Department. The departmental ICT strategies will be aligned within the governance charter and policy frameworks of the province. Furthermore, National Government has a State Information Technology Agency (SITA) that handles the national architecture for ICT systems and policy frameworks that govern the public sector such as the procurement of ICT hardware. Historically there have been many challenges. The department will continue to advocate through the province for more efficient systems and responsive processes in this regard.

There is a need for clear definition of roles and responsibilities within the Department and partners. There is also a need for clear organisation arrangements, mandating decision-making processes and lines of accountability.

Background and Scope of ICT Initiative

The Department has recognised the central role of IT in enabling the achievement of the strategic intent of Healthcare 2030. Thus, the profile of IT has been raised. The department is moving towards mainstreaming the planning, prioritising, budgeting, a Monitoring and Evaluation (M&E) processes in relation to IT.

The department has also recognised the importance of proper governance arrangements as part of Health Systems strengthening. This includes internal and external governance arrangements. This also applies to IT.

It is important to constantly recognise that health service needs should be primary in driving the IT priorities, and that governance arrangements ensure the interface between services and IT support is well embedded.

Business and ICT challenges linked to this Initiative.

The department has inherited, developed, or procured a range of IT systems and applications historically. The cumulative effect has been a piecemeal development of IT systems that was not systematic, poorly governed and did not speak coherently to a long-term vision of the core business of the department.

The environment in which WCGH health operates is highly regulated by legislation and health policies, highly dependent on the macroeconomic environment for funding and is substantially influenced by political considerations.

IT innovation is rapidly occurring within the department and externally with exciting potential to improve quality of care and efficiencies in the health service. The department needs to gear up its organisational arrangements to be able to respond to the challenge of nurturing and managing innovation. This is a steep learning curve for the department. On the one hand we need to develop a systematic and structured approach and on the other hand to learn in the trenches by responding to idea authors who have already developed potential solutions to defined problems. We recognise that currently we are in reactive phase to innovations coming at us and over time we would like to become proactive in guiding the innovation space within the department and beyond.

The Department has in recent times surfaced challenges in contract management of external vendors and governance arrangements in this regard. This poses significant risk to the Department and a process to strengthen this area has begun.

IT risk management processes and capability is also being systematically strengthened.

ICT Information Requirements linked to this Initiative.

Regular policy review and a pragmatic adaptive to monitoring the effectiveness of governance structures are key to ensuring effective governance of ICT in the Department.

Benefits

- Maintain high-quality information to support business decisions.
- Achieve strategic goals and realise business benefits through the effective and innovative use of ICT.
- Achieve operational excellence through reliable, efficient application of technology.
- Maintain IT-related risk at an acceptable level.
- Optimise the cost of IT services and technology.
- Support compliance with relevant laws, regulations, contractual agreements, and policies

User Experience Design

While a separate Health IT Directorate and several governance structures and coordination forums are emerging from MEAP, Services have expressed a need for clarity on the governance and decision-making processes for eHealth in the Department. Furthermore, it has been asserted that Services should take the lead on priorities and decisions that affect the effectiveness and efficiency with which patients can be serviced, including critical support functions (people management, finance, etc.) While eHealth should be regarded as a critical support function, the service level agreement that recognises the Centre for e-Innovation as the implementing agent for IT for all WCG departments and the authority for setting standards, means that WCGH has less autonomy in IT innovation and implementation.

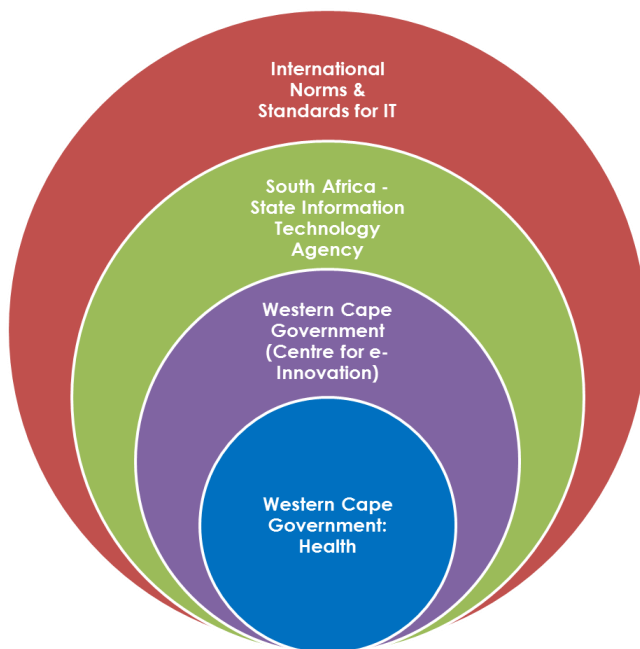


Figure 14: Structural context for eHealth policy

Local eHealth policy resides within broader policy contexts (Fig. 14). The Centre for e-Innovation (Ce-I) is the implementing agent for all departments (Health included) within WCG for cost-saving. Ce-I, in turn, brokers requests between WCGH and SITA.

Furthermore, WCGH has a hierarchical structure and clearly defined lines of accountability from frontline service delivery staff, support staff via management channels to Accounting Officer (HOD).¹⁹ IT structures have also been organised to ensure coordination needs and implementation happen in a coherent manner. However, the reality is that some decisions are made outside the

hierarchical structure, and sometimes difficult to reverse steps may be set in motion. There are several factors that may be attributed to this:

1. There may be difficulty in accessing decision-making structures and mechanisms.
2. Managers struggle with decision-making in the face of the complexity of Health as a Complex Adaptive System compounded by rapidly changing technology landscape.
3. Oversimplified, unrealistic, and often polarising, narratives from strongly held personal views are generated, and decisions are tabled for decision e.g. Whether or not the Department should continue using a particular eHealth system, whether or not to use external vendors.
4. End users have experienced frustration with historically deficient performance of internal and external health-related systems. While this prompted innovations and home-grown solutions, this often occurred within a vacuum of clear parameters and decisions in which to innovate or a dissonance between the prescribed innovation parameters within WCG and those readily available to users on the internet.
5. Gaps in knowledge about the IT standards and processes of Ce-I and SITA.
6. Due to the considerable investment of time and resources into home-grown solutions while waiting for decisions from the centre, end-users become reluctant to adopt enterprise cost-effective, scalable solutions.
7. We work in times of increased rates of corruption being uncovered in government and private sector, including the IT industry.^{20, 21} This is compounded by the “Fear, Uncertainty and Doubt” (FUD) of misinformation generated both internal and external to the Department.²²

While decision-making power confers accountability for eHealth system performance, that accountability must have “teeth” by being able to impose sanctions on contraventions to decisions that have been made.²³ Thus, the Information Management directorate now has a new sub-directorate to co-ordinate issues of eHealth governance and keep the various project teams on track within regulatory and policy frameworks.

Given the complex and dynamic nature of eHealth, communication, preparation, and consensus-building lie at the heart of eHealth decisions, regardless of the decision-space breadth. The level of trust between stakeholders is directly related to the breadth of decision spaces. Trust is the foundation of a community of practice that fosters innovation. While emphasis is placed on consensus by Authorities and Navigators, care should be taken that experts do not monopolise the possession and creation of eHealth knowledge. Therefore, the first question of “Where are

decisions for eHealth made?" could be rephrased as "How do we build a coherent set of IT solutions as a community?"

Strategic ICT Risk Mitigation

The extended unavailability, impairment, and dysfunction of information technology (IT) systems, databases and networks will undeniably have an impact on service delivery. Robust risk management is essential to address these challenges. Potential risks related to infrastructure and IT systems include the following:

Risk Statement 1	IT Systems Disruption
Risk	Inability to access systems and information in the event of a significant disruption.
Root Cause	Inadequate and ageing technology infrastructure. Inadequate technical capacity within the Western Cape Government.
Impact	Compromised service delivery
Measures to Mitigate Impact	Constantly review and address out-dated infrastructure by conducting regular hardware and IT Audits. Develop robust IT disaster recovery plans for the critical applications.

Risk Statement 2	Resource Constraints
Risk	Inability to render comprehensive quality health services due to budget uncertainty and actual budget cuts.
Root Cause	Escalating costs of labour, goods, and services.
Impact	As the demand for health care increases, the department's ability to respond will be significantly constrained by the shrinking fiscal envelope.
Measures to Mitigate Impact	Establish and embed mechanisms to enhance efficiencies. Applying lean management principles to reduce waste in the system. Strengthen priority setting.

Risk Statement 3	Shortage of Skilled IT Professionals
Risk	Inadequate competency levels
Root Cause	Inability to offer competitive remuneration packages.
Impact	Inability to efficiently deliver the full package of services.
Measures to Mitigate Impact	Development and implementation of recruitment and retention policies.

Risk Statement 4	Weak Contract management
Risk	Inadequate management of external vendors
Root Cause	Lack of clear roles and responsibilities; lack of skills; lack of proper processes and systems.
Impact	Service disruption; increased costs; increased dependency on vendor
Measures to Mitigate Impact	<p>Create a designated component with capacity to manage IT contracts.</p> <p>Use the SCM contract management toolkit to develop capability</p> <p>Develop a contract register and red flag risks as early warning system</p> <p>Create a repository of contract documentation that is easily accessible.</p>

Monitoring and Evaluation

The Department intends to increasingly move towards an **active learning approach and building a learning organisation**.

The IMPROVE-IT framework (Fig. 13) will be used to assist the Department remain on course toward the realisation of the IT Vision and ICT strategy by identifying areas of underperformance and errors in work, also known as single-loop learning.^{24, 25} Reflection on work routines to improve performance will inform double-loop learning while the well-established practice of our challenging the assumptions underlying our processes will support triple loop learning.^{25, 26} In addition to the principles of ideal indicators to be **reliable, acceptable, valid, sensitive, specific and easy to collect (RAVES)**,²⁷ the IT metrics should also:

- Insofar as possible be automated from existing data within IT system databases and transaction logs.
- Be accessible on demand via an enterprise platform for data visualisation.

While we will endeavour to match IT performance metrics to business impact metrics,^{28, 29} it will not always be possible or scientifically sound to infer causality from observed relationships between IT system performance and patient health outcomes, or even the intermediary steps in process of care. Rigorous evaluative techniques and expertise from our academic strategic partners will be sought to reliably gauge the impact of the Strategic ICT Plan.

The metrics will be organised according to a modified IMPROVE-IT framework (Fig. 13).²⁴

1. IT costs (which includes both initial and ongoing investment)
2. IT infusion (system deployment, availability, and adoption)
3. Business performance (health service efficiency, quality, and effectiveness)
4. IT user experience^{30, 31}
5. Must add value to patient care and improving health outcomes.
6. Alignment with the strategic direction and principles of Healthcare 2030
7. Must enable and support the internal client to deliver services optimally.
8. IT systems must be interoperable.
9. Affordability and sustainable in the long term

10. Operate within the national and provincial policy frameworks and norms and standards.
11. Innovation will be encouraged and managed within the parameters of the above principles.

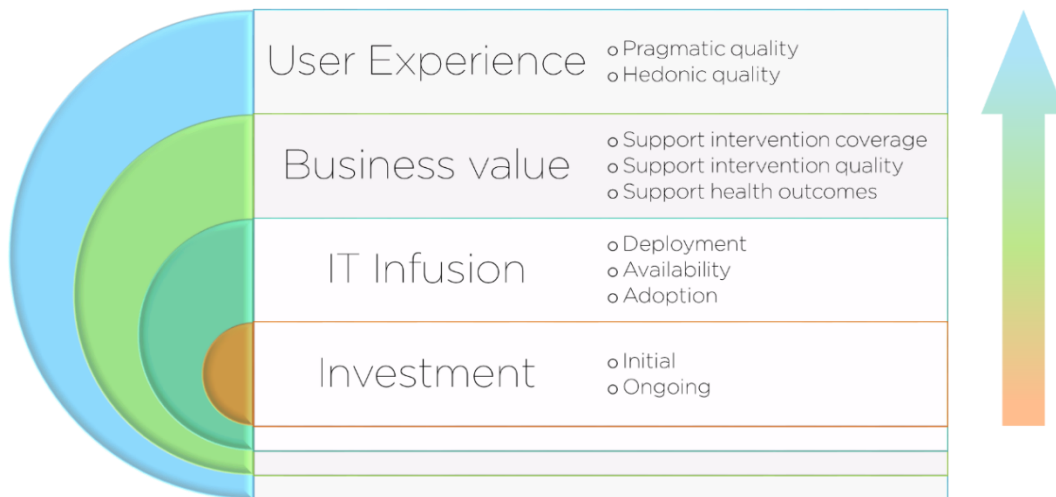


Figure 15: Modified IMROVE-IT Framework for IT metrics

Specific data elements and indicators will, subject to data availability, be selected within the framework (Fig. 13) and validated using construct- and face validation methods.³² Indicators calculations will be performed on-the-fly within the full organisational unit hierarchy (province, district, sub-district, facility) where data are available. IT metric visualisations will therefore allow users to drilldown to local data where relevant.

Impact of the COVID-19 pandemic on healthcare systems

IT Innovations

The COVID-19 pandemic has made innovation more important than ever by demonstrating the criticality of rapid adoption of emerging technologies and new patient-facing digital channels respectively.

COVID-19 and the response to it have created an unprecedented alignment of domains across the healthcare service platform and IT perspectives on the need to accelerate digital transformation. The pandemic has proven to be the ultimate test of not only the human spirit but also the health systems on a global scale. The Department will therefore seize the opportunities that the COVID-19 pandemic has created by embracing and accelerating the implementation of appropriate digital initiatives in line with the Service Redesign project. The “new normal” will include the adoption of a digital-first approach that makes digital interactions the first, the preferred and the pervasive medium for engagement.

It's important to continue to look at innovation and technology in terms of products and services that has the potential to improve health outcomes, increase cost efficiency & the ability to help the Department to transition from technology as a device to technology as practice.

Single Patient Viewer

The Single Patient Viewer (SPV), a consolidated visualization tool for clinicians to ensure continuity of care, helped to inform and coordinate the response to the pandemic. The data enabled the Department to adjust the COVID response strategy in real-time and to create public confidence in the strategy via the public-facing dashboard. This was enabled by the creation of the provincial health data centre that draws data from a range of interoperable systems and having a unique identifier that connects it to the same patient. Its envisaged to strengthen capacity within the Provincial Health Data Centre (PHDC) & to enhance data curation, actionable line listing reports, aggregated reports, and epidemiological surveillance.

Virtual Care

The shortage of medical practitioners, nurses and care givers is growing as the increasing demand for healthcare outstrips supply. The Department will explore alternatives using scalable digital products and services such as telehealth & remote patient monitoring via the Call Centre to meet the increasing demand for healthcare services. The delivery of digital health and digital healthcare services will act as complements to clinical care capabilities and will be held to the same standards and quality measures as in-person care where possible and appropriate. It will also enable healthcare providers to extend the patient care continuum and assist with chronic disease patients, pregnancy, acute advice as well as incidents related to COVID patients. However, further work is required on clinician and patient acceptance, regulatory and technical barriers to achieve sustainable models of virtual care.

Chronic medication delivery

An automated chatbot application system has been developed via the WhatsApp platform, which confirms delivery of chronic medication to patients' homes. It allows high-risk chronic patients to confirm an existing appointment before accessing services at their attending healthcare facility, which means they do not have to wait in long queues when going to a facility. Additional features such as, multiple languages and supporting users in booking appointments will be explored and enabled respectively.

Hospital & Emergency Centre Tracking Information System (HECTIS)

It is envisaged to accelerate the rollout and implementation of the Hospital & Emergency Centre Tracking Information System (HECTIS), an electronic tool to track the number and movement of patients through the Emergency Centre, over the next few months. The triage functionality in HECTIS is the most effective way to assess people entering the emergency units across the Province using the same criteria, irrespective of funding capability or type of emergency. It also helps to prioritize treatment and distribute the workload for better use of resources. The interoperability and effective information sharing functionalities play a pivotal role with decision support during the patient's journey.

Theatre Information System

The Western Cape Provincial cabinet endorsed the IT Vision that is coherent and aligned with Healthcare 2030 & the service priorities of the Department. Cabinet also recognized the importance of IT as a key enabler in addressing the service priorities & gave the Department of Health a mandate to have technical capacity e.g., application developers, business analysts, internally to be more responsive to service priorities. The Department subsequently onboarded the technical resources and efforts are underway to develop a bespoke web-based application to improve the ability to record, monitor and evaluate the surgical-theatre services effective and efficiently.

Interoperability

The multiple IT systems with poor data integration across disparate systems and the lack of more modern communication mechanisms is an impediment to patient care in many ways. Data is the lifeblood of the healthcare industry, and the emerging HL7 (High level Seven) FHIR (Fast Healthcare Interoperability Resources) standards promises streamlined data exchange effectively. The implementation of interoperability standards will contribute towards the electronic health record and will enable IT systems to communicate and exchange usable data seamlessly.

The Department will invest in a fully functional Geographic Information System (GIS) and geocoding at the point of care to better analyse, monitor the prevalence of certain diseases, locate and communicate with patients.

Network Connectivity

The dependency on connectivity and reliance on broadband services will increase as the Department expands the digital footprint. The COVID-19 pandemic has also underscored the need for widespread connectivity.

It is therefore important for the Western Cape Government to continue investing in broadband with the aim of connecting Government, Citizens and Businesses.

More importantly it is important to build a medical grade network with failover to maximize reliability and uptime of critical clinical systems while transitioning to an Electronic Health Record.

Conclusion

The renewed commitment to the ideals of Healthcare 2030, for the next 5 years, reaffirms the need to place people at the heart of the health system. The UHC Framework for Action will guide the Department in terms of focus areas as it enters its next 5-year planning cycle.

This plan has re-affirmed the ICT initiatives that it will undertake to remain aligned to the priorities of the Strategy to the Department which includes the re-design of the care continuum focusing on the PHC and general specialist services; the institutionalisation of collaborative governance; becoming a learning organization, leveraging maximally off technology; and building a capable workforce with the competence necessary for a high-quality, high performance health system that is resilient, can learn and is ultimately for people.

This 5-year Strategic ICT Plan presents the direction to guide future activities and investments in technology across WCGH. It sets principles to guide the design and development of digital health capabilities to support the delivery of safe and high-quality person-centred care.

This document is a living document meaning that its contents can change over time. The review and update of this document will be articulated in an annexure appended to the relevant ICT Operational and Implementation Plan so that it reflects alignment to the Annual Performance Plan.

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5-Year ICT Plan - Health v1.3 16 August 2021


Final Audit Report

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