

The eHealth Strategy for South Africa 2012-2016: how far are we?

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This chapter reviews progress made by the health sector in implementing the eHealth Strategy 2012–2016, which was approved by the Ministry of Health and published in July 2012. The finalisation of this Strategy following several attempts, and its placement in the public domain, created optimism that a clear vision for improving health information systems in South Africa had been successfully articulated. While this development was an important milestone in the evolution of Health Information Systems, actual achievement will depend on the effective implementation of the Strategy and the extent to which its implementation is monitored and evaluated. We examine the milestones reached towards each of the 10 pillars (or key priorities) of South Africa's eHealth Strategy, as well as constraints and barriers to its implementation.

The chapter concludes that a year after the publication of the Strategy, some progress has been made albeit modest, since key milestones have been attained towards only five of its 10 strategic priorities while limited progress has been made in the remaining five priorities. This highlights the need for consistent monitoring of the implementation to ensure that the achievements made are consolidated, and that barriers are identified and addressed early on.

The implementation of the eHealth Strategy has received solid support from the leadership of the health sector, through its national governance and management structures, as well as the Technical Advisory and Policy Committees of the National Health Council. However, the acquisition of the requisite human resources with the technical expertise and capacity to provide strategic leadership is critical for steering the country towards the goals envisaged by the eHealth sector. Greater investment of effort and resources is required to accelerate progress towards establishing and activating all the pillars of the Strategy.

While the development of an eHealth Strategy was an important milestone in the evolution of Health Information Systems, actual achievement will depend on the effective implementation of the Strategy and the extent to which its implementation is monitored and evaluated.

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ii South African Medical Research Council

iii Council for Scientific and Industrial Research

Introduction

The World Health Organization (WHO) defines eHealth as:

The use of Information and Communication Technologies (ICTs) for health to, for example, treat patients, pursue research, educate students, track diseases and monitor public health.¹

eHealth is thus about improving the flow of information, through electronic means, to support the delivery of health services and the management of health systems.² In 2005, WHO member states recognised the potential of eHealth to strengthen health systems and to improve quality, safety and access to care, and supported efforts to incorporate eHealth in health systems and services. In 2012, the WHO and the International Telecommunications Union (ITU) observed that healthcare delivery was increasingly reliant on information and communication, and on technologies that enable these resources, whether to deploy personnel, conduct research or support humanitarian action, at every level and in every country.²

Efforts to develop an eHealth Strategy for South Africa date back several years. In July 2010, the National eHealth Steering Committee, consisting of senior managers from the National and Provincial Departments of Health (DoH), produced the 16th version of the draft Strategy, which covered the five-year period from 2010 to 2015.³ Although the quality of the draft Strategy was commendable, it did not enjoy widespread support as it was seen to be too resource-intensive to implement. The Strategy required the establishment of a Schedule 3A Public Entity to manage eHealth, which would be the organisational vehicle with the basic capabilities and competencies required to deliver the proposed eHealth programme. This public entity would require an annual budget of between R2 billion and R3.5 billion, and the appointment of over 60 additional officials, including six Deputy Directors-General, 11 Chief Directors and 22 Directors.³

Through a new process led by the National Health Systems Committee of South Africa (NHSSA), which is a substructure of the Technical Advisory Committee of the National Health Council (TAC-NHC), a new version of the eHealth Strategy was produced in 2012.⁴ The process of developing the Strategy was consultative and iterative. Following its endorsement by the National Health Council, which consists of the Minister of Health and the Provincial Members of the Executive Council for Health, the national eHealth Strategy for South Africa was authorised by the Ministry of Health on 9 July 2012. In so doing, South Africa joined other African countries that have produced eHealth Strategies, including Kenya (2011), Mauritius (2010), Nigeria (2007), Rwanda (2009) and Ghana (2011).⁵ However, there is a paucity of published literature on the evaluation of the effectiveness of the eHealth strategies produced by other African countries. Such deficiency of evaluation is a pitfall that South Africa should take steps to avoid.

This chapter aims to trace the progress made by the health sector with the implementation of the South African eHealth Strategy, to reflect on key factors facilitating and impeding access, and to propose a suite of interventions to accelerate progress.

In July 2012, the WHO and the ITU produced a National eHealth Strategy Toolkit providing guidance to countries as they develop and implement their eHealth strategies.² Although the South African eHealth Strategy was developed before the publication of the Toolkit, researchers found that the processes followed in development of

the Strategy conformed to the recommendations provided by the Toolkit.⁶

International developments in the eHealth arena

The production of the eHealth Strategy was not an initiative unique to South Africa, but was consistent with developments globally. Over the seven-year period from 2005 to 2012, the international community, led by United Nations (UN) and agencies such as the WHO and ITU, adopted far-reaching resolutions on the implementation of eHealth. In May 2005, the Fifty-eighth World Health Assembly adopted Resolution WHA58.28 on eHealth.⁷ The Resolution urged member states to draw up long-term strategic plans, including an appropriate legal framework and infrastructure, for developing and implementing eHealth services, public and private partnerships, and ICT for health infrastructure to promote equitable, affordable and universal access to its benefits. Governments were also urged to continue to work with information telecommunication agencies and other partners in striving to make eHealth successful. Countries are advised to collaborate closely with the private and non-profit sectors in information and communication technologies, in order to advance public services for health and for effective reach into communities, including vulnerable groups, with eHealth services appropriate to their needs; multi-sector collaboration for determining evidence-based eHealth standards and norms was further envisioned. eHealth activities should be evaluated and the knowledge of cost-effective models be shared, to ensure quality, safety and ethical standards.

In 2010, the Regional Committee for Africa adopted an eHealth resolution that urged member states to promote, inter alia, national political commitment to and awareness of eHealth. Recommended planning involves creating an enabling policy environment by conducting a national needs assessment for eHealth, developing national policies, strategies, norms and appropriate governance mechanisms, and drawing up long-term strategic frameworks for eHealth. This resolution also urged member states to build infrastructure and establish services for eHealth, to systematically develop human capacity for eHealth by introducing an Information and Communication Technologies curriculum in health training institutions, and to establish monitoring and evaluation systems to measure progress in the implementation of the national eHealth strategic plans.⁸

Another pertinent development was the January 2013 resolution of the Executive Board of the WHO on eHealth standardisation and inter-operability.⁹ This resolution urges member states to consider options for collaboration with relevant stakeholders, including national authorities, ministries, healthcare providers and academic institutions, in order to devise a roadmap for implementation of health data standards at national and subnational levels. Such alliances should develop policies and legislative mechanisms linked to an overall national eHealth strategy that underpins compliance in the adoption of health data standards by the public and private sectors and the donor community, to ensure the privacy of personal clinical data.

Development of health information systems in South Africa

The vision

As early as 1997, the White Paper for the Transformation of the Health System in South Africa identified the development of a comprehensive National Health Information System (NHIS) as an important priority. The White Paper observed:

Analysis of the 1994 status of health information systems in South Africa conducted by the NHISSA Committee found that existing information systems were fragmented and incompatible. They were unco-ordinated and not comprehensive; software and hardware were incompatible and not user-friendly; most systems were manually driven, with minimal computerisation, and there was inadequate analysis, interpretation and use of data at the local level. It is anticipated that new attitudes and tools will have to be developed to improve the collection and use of data for the effective management of available resources.¹⁰

The White Paper envisaged that the new NHIS would comprise various components, and that “individually and collectively, these components would provide the various types of information needed to support the healthcare delivery system in South Africa”.¹⁰ In the White Paper, the NHIS was conceived as a parent system encompassing various sub-systems, including the following:

- Management information
- National Health Care Management Information System
- Human Resources Management Information System
- Financial Management Information System
- Facilities Management Information System
- Equipment Management Information System
- Transport Management Information System
- Pharmaceutical and Other Consumables Management Information System
- Service Coverage (i.e. utilisation, coverage, access).

Despite the clear vision encapsulated in the White Paper, a review conducted in 2004 identified key weaknesses in health information systems, noting that a uniform patient information system – enabling the tracking of patients regardless of where they present – had not been developed.¹¹ The review also noted that implementation of the National Health Care Management Information System had been uneven, with provinces implementing the system in selected hospitals; this constrained the capacity of the public health sector to track patients using the facilities across various provinces.¹¹

Some achievements

Over South Africa’s 20 years of democracy, there have been some positive developments. The routine District Health Information System (DHIS), which was first developed in 1996 in a partnership between the University of the Western Cape, the University of Oslo and the Western Cape Department of Health (WCDoh), has since evolved into a District Health Information System (DHIS), that facilitates organised processes of gathering, sharing, analysing and using

health-related data for decision-making. The DHIS now contains routine data representing around 1,4 billion patient encounters.¹² The WCDoh uses an information system known as SINJANI for data collection and collation, but like other provinces, submits data to the national level through the DHIS.

Diverse efforts to develop some form of electronic medical record keeping have also been implemented in the country. These include:

- a national Electronic TB Register, which is used across all nine Provincial Departments of Health;
- the national three-tier monitoring and evaluation system for antiretroviral therapy, which was developed in the Western Cape and subsequently endorsed by the National Health Council for implementation across all nine provinces;
- the Western Cape Primary Healthcare Information System (PHCIS) and Patient Master Index – a government-owned system that has won two awards: the 2008 the African ICT Achievers Award for the Best ICT Project in Africa, and first place in the IT@Networking Awards 2012 in Brussels;⁶
- different hospital information systems used in provinces include Meditech (Free State), Delta 9 (Eastern Cape and Western Cape), and Clinicom (Western Cape);
- the government-owned Patient Administration and Billing System is used in three provinces: Gauteng, North West and Mpumalanga; and
- the TrakCare Lab system is used by the National Health Laboratory Services at more than 190 sites across all nine provinces.

At the level of governance and regulation, various legislative instruments have been developed, including:

- Minimum Information Inter-operability Standards (MIOS)¹³
- State Information Technology Agency Act (88 of 1998)¹⁴
- Minimum Information Security Standards¹⁵
- National Archives and Record Service of South Africa Act (43 of 1996)¹⁶
- National Health Act (61 of 2003)¹⁷
- Policy of Free and Open Source Software Use for South African Government¹⁸

Persistent challenges

While these efforts have yielded some significant successes for the geographic areas in which they are used, they have been bedevilled by various challenges, including:

- the lack of a national eHealth strategy (until July 2012);
- widely differing levels of eHealth maturity across and within provinces;
- a large number of disparate systems between which there is little or no inter-operability and communication;
- inequity of eHealth services provided and expenditure on eHealth across Provincial and National Departments of Health;
- expensive broadband connectivity;

- the absence of a national master patient index;
- the absence of a national unique identification system of patients; and
- limited capacity within the public sector for implementation.

The health sector's Negotiated Service Delivery Agreement (NSDA) 2010–2014, produced in 2010 observed:

Although large sums of money have been used to procure health ICT and HIS in South Africa in the past, the ICT and HIS within the health system, are not meeting the requirements to support the business processes of the health system thus rendering the healthcare system incapable of adequately producing data and information for management and for monitoring and evaluating the performance of the national health system. This results from the lack of technology regulations and a lack of policy frameworks for all aspects of infrastructure delivery.¹⁹

The eHealth Strategy for South Africa 2012–2016

Against the backdrop of the foregoing challenges, the eHealth Strategy for South Africa 2012–2016 was produced. In the foreword to the Strategy, the Minister of Health explains that a decision was taken by the National Health Council in 2009 to halt the acquisition of software solutions that were not inter-operable, until an eHealth strategy for the country was finalised. He also pointed out that the vision for the Strategy was to provide a blueprint for moving from the current fragmented situation to a well-functioning national patient-based information system, based on scientific standards for inter-operability (which essentially refers to the ability and capacity of different information systems to access information and harmonise different data sources). The potential role and importance of this system in the context of the implementation of National Health Insurance was also stressed by the Minister.⁴

The aims of the eHealth strategy are to:

- provide a single, harmonised and comprehensive e-Health strategy to support the medium-term priorities of the public health sector;
- pave the way for future public sector eHealth requirements; and
- lay the requisite foundations for the future integration and co-ordination all eHealth initiatives in the country (both public sector and private sector).⁴

The eHealth Strategy presents 10 pillars or strategic priorities with attendant rationales (Table 1).

Progress to date

The eHealth Strategy sets out several targets with ambitious short-term timeframes, due to the urgent need to introduce policy coherence and harmonisation in an environment characterised by fragmentation, lack of co-ordination, a prevalence of manual systems and a lack of automation. Medium- to long-term targets were also included to lay a solid foundation for the development of a well-functioning and nationally integrated information system for National Health

Insurance. A year after the publication of the Strategy, progress has been made with respect to five strategic priorities, namely: Strategy and Leadership; Stakeholder Engagement; Standards and Inter-operability; Governance and Regulation; and Monitoring and Evaluation. These developments are reviewed below.

Strategy and leadership

The eHealth Strategy has received endorsement by the executive and administrative leadership of the health sector. In September 2012, the National Department of Health commissioned the Meraka Institute of the Council for Scientific and Industrial Research (CSIR) to develop a Health Normative Standards Framework, which would provide guidance to the health sector in the choice of eHealth standards, assist in the assessment of the applicability of international eHealth standards to health information systems currently deployed in South African health institutions, and serve as a national guideline for the selection and use of eHealth standards in the country, with which all information systems used in the public sector should comply.

A partnership led by the CSIR, together with the Medical Research Council (MRC) and the Nelson Mandela Metropolitan University, provided technical support to the health sector to produce an inter-operability framework that would facilitate data exchange and transfer between different information systems at all levels of the health system. The partnership conducted a landscape analysis of all health information systems used in the public health sector, in consultation with NHISSA, and produced the study report in February 2013.²⁰ This partnership subsequently completed the Health Normative Standards Framework for Inter-operability in eHealth and presented its report to the National Department of Health in March 2013.²¹ The report was noted by the Technical Advisory Committee of the health sector, and the CSIR was requested to pursue a modular approach in the development of the Health Normative Standards Framework, and incrementally produce modules for different aspects of health service delivery, such as Diagnostic Related Groups, pharmacological classifications, patient identification, the distinction between suppliers and providers of health care, and identification of key equipment used in the public sector.

Stakeholder engagement

A national eHealth Strategy Conference convened jointly by the MRC and the NDoH in September 2012 attracted diverse participants, drawn from stakeholder formations such as the private health sector, academic institutions and non-governmental organisations. The event was widely accepted as a forum for participatory development of an important roadmap for the evolution of eHealth in South Africa. Crucially, the Conference also emphasised that the Strategy needed to be translated into a detailed implementation plan, with concomitant cost implications.

Much more remains to be done to enhance stakeholder engagement around the eHealth Strategy. It was anticipated in the Strategy that Provincial Health Information Systems Committees would have been established by Provincial MECs for Health in all provinces by May 2013, as required in terms of section 74 of the National Health Act (61 of 2003), to establish, maintain, facilitate and implement the envisaged health information systems at provincial and district level, so as to create a comprehensive national health information system. It was also expected that these

Table 1: Strategic Priorities of the eHealth Strategy

Strategic Priority	Core content
Strategy and Leadership	<ul style="list-style-type: none"> Recognises that the successful implementation of eHealth is complex and requires a strong national eHealth strategy. Locates the Strategy within the broader context of the NDoH's strategic aims and is aligned with the priorities of the Department. Recognises importance of political, executive and clinical leadership to its successful realisation.
Stakeholder Engagement	<ul style="list-style-type: none"> Notes that effective collaboration can be achieved by engaging with all stakeholder groups affected by eHealth, including mHealth and Telemedicine. Examples of such stakeholders include the South African Telemedicine Association, the South African Health Informatics Association and the South African Medical Association. eHealth structures can assist in mobilising support, identifying opportunities, highlighting priorities, and managing and mitigating risk in relation to eHealth. Takes into account the (future) establishment and potential role of the Provincial Health Information Systems Committees whose brief is to establish, maintain, facilitate and implement, at provincial and district level, health information systems envisaged by the NDoH in order to create a comprehensive national health information system.
Standards and Inter-operability	<ul style="list-style-type: none"> Regards standards as the cornerstone of successful implementation. Notes that, apart from inter-operability standards, which are essential for the accurate exchange of data, there is a requirement for national standards for procurement (hardware and software), software accreditation, data structure, terminology, clinical coding, security, messaging and electronic health records.
Governance and Regulation	<ul style="list-style-type: none"> Takes into consideration that eHealth affects multiple stakeholder types and extends across multiple domains including personal health, healthcare provision, ICT and management. Identifies a need for a governance structure, such as an eHealth Standards Authority, which would be accountable to the Minister of Health. Notes that, while the potential benefits of eHealth implementation are highly desirable, realisation could be risky, costly and challenging.
Investment, Affordability and Sustainability	<ul style="list-style-type: none"> Accentuates the importance of securing and protecting financing for any eHealth project prior to its commencement to ensure sustainability over the duration of the project. This requires proper planning and identification of benefits, so that value for money and affordability are balanced and results are delivered as quickly as is feasible. Observes that there is a paucity of economic assessments of potentially beneficial eHealth solutions in the developing world that would assist in supporting policy-makers and health departments in making informed decisions when allocating scarce resources.
Benefits Realisation	<ul style="list-style-type: none"> Refers to the identification and quantification of the anticipated benefits of eHealth implementation for all stakeholders. Key activities include developing a benefits realisation plan which specifies health outcome benefits expected at local level for all eHealth interventions, and establishing a mechanism for conducting usability assessments to ensure that the public health sector is an "informed buyer" of ICT solutions. New ICT solutions to be tested at an eHealth laboratory, as an essential measure to ensure that benefits are demonstrated within a realistic timeframe and funding envelope.
Capacity and Workforce	<ul style="list-style-type: none"> Recognises that adequate human resource capacity is crucial to successful delivery of the eHealth Strategy. Commits to developing career path frameworks, and training and skills retention strategies, in order to build up a workforce that can innovate, develop, deploy, maintain and support all eHealth interventions, especially health information systems and health management information systems. Key activities include developing a workforce development strategy for Health ICT, Information and Knowledge Management that is aligned with the National Health Workforce Strategy, seeking professional accreditation for Health Informatics professionals with the Health Professions Council of South Africa (HPCSA), and leveraging partnerships with local academic institutions towards collaboration for Health Informatics training.
eHealth Foundations	<ul style="list-style-type: none"> Aims to deploy eHealth capability in a step-wise manner. Four areas identified as providing the foundations for all other eHealth activities: infrastructure, connectivity, registration of patients, facilities and providers, and a basic national electronic health record.
Applications and Tools to support Healthcare Delivery	<ul style="list-style-type: none"> Notes that there is a wide range of digital applications and tools available with the potential to support and improve healthcare delivery. These include electronic medical record systems, healthcare information systems, surveillance systems, business intelligence for health, electronic content management, decision support, and knowledge management. Tools include software and hardware devices, such as those used in mHealth and Telemedicine. Cautions against the further fragmentation of health information systems, especially at the level of health application. Stresses the importance of all systems complying with the Health Normative Standards Framework. Highlights the importance of integration of health applications and recommends a single system for population identification at national level. Stresses that primary health care, which includes preventative mechanisms, be supported by appropriate electronic tools and applications, and highlights the possibilities that exist with regard to using mobile devices in this regard. NHISSA to lead the prioritisation of eHealth application implementation and will submit its recommendations to the Technical Advisory and Policy Committees of the National Health Council (TAC-NHC).
Monitoring and Evaluation	<ul style="list-style-type: none"> Stresses the importance of consistently monitoring and evaluating the performance of the Strategy implementation. Key activities include developing a Monitoring and Evaluation (M&E) Strategy for eHealth, aligned with the overarching M&E Strategy of the health sector. NHISSA to monitor the M&E strategy.

Source: National Department of Health, 2012.⁴

Committees would have incorporated the eHealth Strategy into their work with districts and local communities, and that key stakeholder groups at all levels of the health system would have been identified and consulted on the impact of implementation of the eHealth Strategy. Progress with these initiatives has not yet been made.

Standards and inter-operability

The most significant progress made to date has occurred in the area of Standards and Inter-operability. As indicated, the CSIR and its partners have:

- completed a landscape analysis – which identified a total of 42 health information systems being used in the public sector;²⁰
- completed the Health Normative Standards Framework – which will be published once the technical work requested by the TAC-NHC has been completed;²¹ and
- developed proposals for an inter-operability framework for South Africa for consideration by the TAC-NHC.²¹

On 23 April 2014, the Ministry issued the National Health Normative Standards Framework for Inter-operability in eHealth, in terms of the National Health Act (61 of 2003).²² This Standards Framework prescribes eight provisions, four of which are aimed at enforcing the adoption and use of normative standards in patient information systems used in the public sector. These are:

- any patient information system that is used and/or intended for use in the health sector in South Africa should comply with National Health Normative Standards for Inter-operability in eHealth;
- any patient information system that is used and/or intended for use in the health sector in South Africa must be subjected to conformity assessments to ascertain its level of compliance with the National Health Normative Standards for Inter-operability in eHealth;
- such conformity assessments must be carried out independently; and
- certificates of conformity in compliance with National Health Normative Standards for Inter-operability in eHealth must be issued.

The other four provisions of the Standards Framework commit the National Department of Health to allocate resources for the implementation of eHealth infrastructure, to ensure compliance with the Framework by establishing a Standards Board, and to update the Standards Framework regularly. These provisions specify that the National Department of Health must:

- allocate a budget to establish and maintain the foundational national shared eHealth infrastructure (e.g. health information exchange, demographic registries, shared clinical repositories, and security and audit services);
- allocate a budget to establish and maintain a “connectathon” which will be used for compliance assessment;
- establish a National eHealth Standards Board to govern and maintain the implementation of the National Health Normative Standards Framework for Inter-operability in eHealth, as well as the standards referenced in the Framework; and

- publish and update, when necessary, the National Health Normative Standards Framework for Inter-operability in eHealth.

The development and publication of this legal framework is another important milestone in the evolution of eHealth in South Africa.

Governance and regulation

To support governance and regulation, the Ministry of Health has approved the creation of an eHealth Standards Board for South Africa. Advertisements for the nomination of members with the relevant expertise to guide the evolution of eHealth in South Africa were placed in the media in 2013, and the appointment process is underway. This is an important first step.

Monitoring and evaluation

The development of the M&E strategy for eHealth aligned with the overarching M&E strategy of the health sector, which was expected to be complete by September 2012, has not materialised. However, the second activity in this priority area, namely the submission of quarterly progress reports to the National Health Council, has occurred. The TAC-NHC has provided consistent oversight for the implementation of the eHealth Strategy, for instance, by ensuring that from the outset of the project of developing the eHealth Normative Standards Framework, the CSIR and its partners regularly provided progress reports to meetings of the TAC-NHC.

A systematic monitoring of the eHealth Strategy should measure performance along several dimensions, including the impact on patients, citizens, health workers, healthworker teams, health managers and healthcare provider organisations. For each of these, benefits from eHealth solutions should contribute to better performance in health service delivery and demonstrably contribute to the improved health status of the population, more effective health resource utilisation and efficiency, increased quality of care, improved outcomes for patients, and higher levels of health worker satisfaction. Generally, the more sophisticated the eHealth architecture, the greater the opportunities for improved performance, albeit over a longer timescale.

Areas of limited progress

Limited progress has been made towards five priority areas of the eHealth Strategy namely: Investment, Affordability and Sustainability; Benefits Realisation; Capacity and Workforce; eHealth Foundations; and Applications and Tools to support healthcare delivery.

Investment, affordability and sustainability

Momentum for several key activities in this priority area, which were to be completed by December 2012, has ebbed and requires acceleration. These activities include:

- development of an enterprise architecture that is aligned to the eHealth strategy and is used to guide planning, procurement and standardisation;
- costing the eHealth strategy and development of a 10-year budget, decoupled from political cycles, that addresses the issue of affordability and sustainability;

- development of rules (guidelines) for financing of eHealth enterprise architecture, as well as for eHealth procurement aligned to the Health Normative Standards Framework. It was anticipated that these would be completed by August and December 2012 respectively, guided by the information needs of National Health Insurance implementation; and
- the alignment of provincial ICT plans and procurement for the enterprise architecture was to commence in December 2012 and be conducted annually until 2017. This is an important condition to be met prior to the lifting of the moratorium on the acquisition of large ICT solutions. Inter-operability of new information systems across the health sector must be a non-negotiable goal for the future.

Implementing a national eHealth programme requires a multi-year commitment to a series of investments, as well development of the required governance, policies, legislation, skilled human resources, infrastructure and performance management necessary to sustain the eHealth programme and to optimise (and measure) the resultant accrual of benefits for the health system. eHealth financing entails securing the extra finance needed, and funding not only ICT solutions, but also the resources that should be reallocated from existing activities, such as health workers' engagement and time for training. These requirements change over time, so a medium-term financial plan is needed to assemble and provide for these functions.

Generally, the more sophisticated the eHealth architecture, the greater the requirement for extra and redeployed finance and the increased exposure to risk. Developing an overarching comprehensive budget estimate allows politicians, health authorities and citizens to understand the full extent of the eHealth initiative. This will equalise expectations around this politically sensitive area of investment and will help to obviate stressful ad hoc decision-making. Provisions and methods for periodical revision of the budget should also be established, taking into account several factors such as performance, new opportunities and changes in the eHealth environment.

The increased costs of strategic investment in eHealth initiatives and architecture should be offset by the increased benefits from improved health system performance and the associated benefits over the longer term, such as the next decade. However, realisation of these benefits requires a disciplined approach, strategy and application, with a focus on managing the related investments and sustaining the benefits post-implementation.

Strategies for financing and ensuring the performance of eHealth investments typically include:

- continually ensuring that the eHealth Strategy is not only aligned with, but is also seen by the public, politicians and health leaders as an important enabler for health system reform and priorities;
- establishing a target benchmark (e.g. 3–5%) for eHealth spending as a proportion of overall healthcare spending, as well as the metrics for tracking ICT spending, and reporting against this target. Reported achievements must be supported by evidence, for example from high-performing health systems (and other industries that have undergone positive transformative change) that can attribute achieving their

business goals to a sustained ICT investment of at least this benchmarked rate;

- ensuring that eHealth strategies are multi-year in nature and that funding commitments include both out-year capital and operating cost impacts for all stakeholders (national and local), so that projects do not commence and cease with fiscal year-ends and changes in government, or falter once implemented and depend on local organisations for sustainability; and
- incorporating an adoption and benefit realisation component in all major projects. It is important to be able to provide clear evidence of both direct financial benefits as well as more indirect or downstream impacts on patient care and, whenever possible, on population health. It is also important to recognise that benefit realisation in health care typically requires a sustained investment in change management for processes and people, since transformative change rarely happens immediately after a system is activated.

Benefits realisation

A key aspect of eHealth implementation is the identification and quantification of the anticipated benefits of eHealth implementation for all stakeholders. This is essential to justify continued investment in eHealth projects. The time-frames outlined in the eHealth Strategy required that a benefits realisation plan, which specifies health outcome benefits expected at local level for all eHealth interventions, be produced by October 2012.

The eHealth Strategy also outlined the establishment of a mechanism for conducting usability assessments, to ensure that the public health sector is an "informed buyer" of ICT solutions. This has not yet occurred. However, the Health Normative Standards Framework produced by the CSIR and its partners will provide important checks and balances to ensure that the health sector acquires only health information solutions that comply with agreed norms.

Capacity and workforce

Key activities in this priority area included the development of a Health ICT, Information and Knowledge Management workforce development strategy, aligned with the National Health Workforce Strategy, as well as a Health IT workforce development strategy, which were due for completion by December 2012. With respect to leveraging partnerships and collaborations for Health Informatics training, it was anticipated that by December 2013, Memoranda of Understanding (MoU) would be concluded with relevant institutions to establish partnerships and collaborations for Health Informatics training. Professional accreditation for Health Informatics professionals with the HPCSA is due for completion in December 2014.

eHealth foundations

Several areas in establishing eHealth foundations have fallen behind schedule and require accelerated implementation.

While a national patient master index for unique patient identification has not been fully implemented in the public sector, the NDoH

took an important policy decision in 2012 that the South African Identity number should be the primary identifier for all information systems, and written communication to this effect was sent to all nine Provincial Departments of Health. Effective implementation of this directive requires greater effort at sub-national levels of the health system.

Ensuring broadband connectivity and last mile connectivity remains a critical challenge particularly in primary health care facilities and in rural areas. These were expected to be completed by May 2013. However, a quotation from Telkom for providing connectivity to all primary health care clinics in need of this resource nationally amounted to over R500 million. Cost estimates from Sentech, a state-owned company established under the Sentech Act (63 of 1996),²³ were in excess of R700 million. It is highly likely that the key impediment to executing this work had more to do with a lack of health sector resources for connectivity than with exorbitant service charges levied by the two companies. Collaboration and cost-sharing with other government departments is required to overcome such connectivity challenges. For example, once the required infrastructure has been installed in a local area, it will benefit several other government departments apart from the health sector.

Implementation of a basic national Electronic Health Record (EHR), including an information exchange to support inter-operability, was expected to be completed by May 2013. The work completed by the CSIR lays an important foundation for the design of a basic EHR, and for piloting the model in health facilities across districts.

Applications and tools to support healthcare delivery

This priority area required the finalisation of several health sector strategy and policy documents, including the eHealth policy, Mobile Health (mHealth) Strategy, mHealth Policy, Telemedicine Strategy, and Telemedicine Policy, all of which were due for completion by December 2012. However, most of these documents exist in draft form, and the pace for submitting these documents to the TAC-NHC for approval must be accelerated. It was also expected that eHealth projects and mHealth projects would be undertaken in line with objectives of the eHealth Strategy, commencing in June 2012 and reviewed quarterly.

The ripple effect of the delays in these five priority areas is an overall delay in the implementation of the eHealth Strategy as a whole. Certain narrow time-frames and compressed deadlines reflected in the eHealth Strategy 2012–2016 have not been achieved. This is in part linked to the interdependencies between the completion of the Health Normative Standards Framework and the Inter-operability Framework, and the balance of the eHealth Strategy components. For instance, the development of an enterprise architecture to be used to guide planning, procurement and standardisation of electronic information systems requires that national standards be available for alignment purposes. Additionally, the lack of capacity within the public health sector to drive the development and implementation of eHealth is a barrier to the implementation of the eHealth Strategy. Given this reality, it is also possible that the time-frames set in the Strategy were not realistic. To enhance the implementation of the eHealth Strategy, the health sector should address increasing its human resources capacity significantly, by

recruiting officials with both technical expertise and capability to provide strategic leadership. It is imperative that the implementation of these vital components be undertaken with deliberate speed in 2014 and beyond.

International experience suggests that the development and implementation of eHealth has generated key challenges for several countries, notwithstanding the existence of goodwill and commitment. In South Africa, these challenges were highlighted in the failed implementation of a hospital information system in Limpopo Province. This project began in 1998 with the aim of implementing the system in all 42 hospitals in the province. The total cost of the project was R134 million which, at that time, represented 2.5% of Limpopo's annual health and welfare budget. Challenges with the implementation were experienced soon after the start of the project and when the initial contract for the work ended in 2000, the system was not working as planned. A second contract was entered into with another supplier and this work also failed to meet the project objectives.²⁴

A subsequent review by Littlejohns et al. identified the key reasons for the failure of the project, including a lack of basic infrastructure such as reliable electricity and airconditioning, a poor fit between the functionality of the system and the day-to-day workflow requirements, and inadequate management of the project.²⁵ The Limpopo case study illustrated important considerations that should be taken into account when countries implement information systems for health care. Adequate change management that takes into account the impact of health information systems on complex business processes was identified as critical.

Recommendations

In 2012, the WHO-ITU observed that the global state of eHealth was characterised by:

- a landscape of isolated islands of small-scale applications that were unable to communicate effectively or to share information with other health systems or across geographies, technologies or programmes;
- barriers to scale-up that would support a larger patient and care-provider base;
- decision-makers' inability to understand the actual health situation, drive meaningful planning and guide policy formulation; and
- duplication of efforts, which may lead to integrated solutions being obviated.²

Notwithstanding these concerns, the publication of South Africa's eHealth Strategy 2012–2016 is a significant advancement that should not be marred by challenges of implementation. The TAC-NHC and the Policy Committee of the NHC have provided leadership and support for the production of the Strategy. In this crucial stage of implementation, there is an urgent need for:

- sustaining the momentum gained through the publication of the eHealth Strategy in July 2012 and the development of the Health Normative Standards Framework;
- maximising benefits from the existing support for eHealth provided by the political and administrative leadership of the health sector;

- accelerating the finalisation and adoption of the Health Normative Standards Framework, which is means to an end – the end being the development and implementation of a national, integrated patient-based information system;
- accelerating the development of an Inter-operability Framework for all existing information systems;
- ensuring that all new systems demonstrate compliance with the Inter-operability Framework;
- identifying a laboratory wherein new systems will be tested for compliance with the Health Normative Standards Framework;
- implementing the National Identity number as a Unique Patient Identifier for all users of public health services;
- building capacity across all levels of care in the implementation of the eHealth Strategy, starting with the correct application of the Health Normative Standards Framework;
- raising awareness across the country about the Health Normative Standards Framework;
- identifying catalytic resources, technical resources, skills transfer and change management from diverse sources in a sustainable manner;
- appointing a small team of senior officials with technical skills and expertise to steer the implementation of the eHealth Strategy. This should be a miniscule fraction of the numbers proposed in the Schedule 3A Public Entity;
- identifying best practices and learning from other countries such as Kenya and Rwanda, which, although much smaller than South Africa in population size and Gross Domestic Product, have made good progress with the implementation of eHealth; and
- identifying resources to support research and to assess readiness of provinces, districts and health facilities for the implementation of the eHealth Strategy.

Conclusion

This chapter has provided a critical review of progress made by the health sector with the implementation of the eHealth Strategy 2012–2016, approved by the Ministry of Health and published by the health sector in July 2012. Whereas the publication of the Strategy was an important milestone, this was only the first step in a long journey.

This chapter illustrates the modest progress that has been made, as milestones were recorded towards only five of the 10 key priorities set out in the Strategy. It is imperative that the health sector enhances its investment of effort and resources in all the pillars of the Strategy. Key interventions required include acquiring the requisite human resources, with the capacity and technical expertise to provide strategic leadership.

Finally, the WHO cautions that “the goal of a health information system is often narrowly defined as the production of good-quality data. However, the ultimate goal is more than this – it is to produce relevant information that health system stakeholders can use for making transparent and evidence-based decisions for health system interventions. Health information system performance should therefore be measured not only on the quality of data produced, but on evidence of the continued use of data to improve health system performance, to respond to emergent threats and to improve health. Improving health information systems in terms of data availability, quality and use often requires interventions that address a wide range of possible determinants of performance”.²⁶ This is a caveat that South Africa would do well to observe.

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