mHealth Strategy

2015-2019

South Africa

health
Department:
Health
REPUBLIC OF SOUTH AFRICA

A long and healthy life for all South Africans

health

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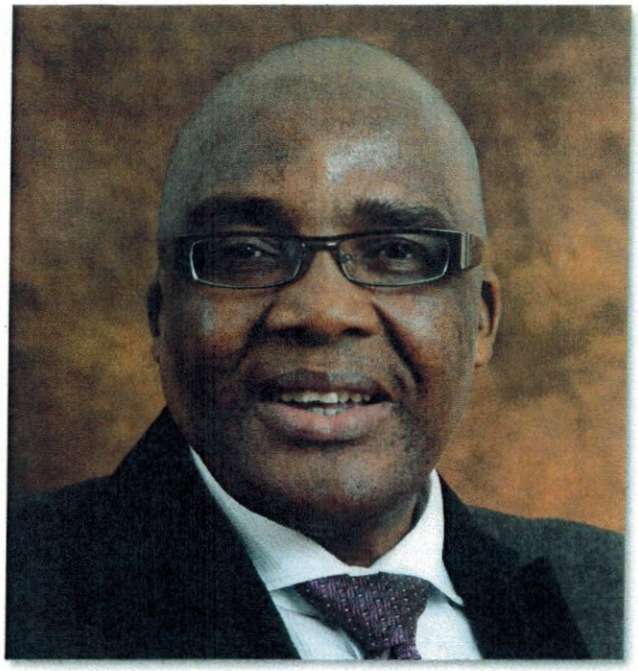
ACRONYMS

AIDS	Acquired immune deficiency syndrome
ART	Anti-retroviral treatment
BAS	Basic Accounting System
DHIS	District Health Information System
EA	Enterprise Architecture
eHealth	Electronic Health
EHR	Electronic Health Record
EPR	Epidemic Preparedness Response system
EMS	Emergency Medical Services
GSMA	Global System for Mobile communications Association
HCT	HIV counselling and testing
HEI	Higher Education Institution
HIV	Human immunodeficiency virus
HMIS	Health Management Information System
HR	Human Resources
HRM	Human Resource Management
ICASA	Independent Communications Authority of South Africa
ICT	Information and Communications Technology
M&E	Monitoring and Evaluation
mHealth	Mobile Health
MNO	Mobile Network Operator
NDoH	National Department of Health
NGO	Non-governmental organisation
NHI	National Health Insurance
NHISSA	National Health Information System South Africa
NSDA	National Service Delivery Agreement
PHC	Primary Healthcare
PMTCT	Prevention of Mother to Child Transmission
PPP	Public Private Partnership
SMS	Short Messaging Service
SOP	Standard Operating Procedure
TB	Tuberculosis
USSD	Unstructured Supplementary Service Data
VCT	Voluntary Counselling and Testing
WHO	World Health Organisation
WBOT	Ward-Based Outreach Team

FOREWORD BY THE MINISTER OF HEALTH



The evolution of the Mobile Technology Platform provides an opportunity to deliver improved health services to the population of South Africa. Linked to the objectives of the eHealth Strategy the mHealth strategy focuses on leveraging the existing mobile footprint to amongst others; empower patients with information, improve access to health services and real time data management to assist addressing the current inefficiencies in the Health System service delivery.

The mHealth Platform has the potential to bring better quality of health services to the people and has an array tools to facilitate communication. The uncoordinated nature and the lack of standards across platforms result in multiple initiatives reaching maturity without interoperability being considered. Therefore, a need exists for mHealth interventions in South Africa to be co-ordinated in a manner that does not contribute to the fragmentation of health information systems.

The successful implementation of the NDOH flagship mHealth initiative, MomConnect, saw a tremendous response of pregnant mothers being registered via a mobile platform and receiving an SMS that provides appropriate information and advice throughout their stages of pregnancy. It also provided the pregnant mothers an opportunity to being active participants in monitoring the quality of health service they received at healthcare facilities.

However, this process could not have been possible without acknowledging the fact that the penetration of mobile technology and access to mobile phones, in South Africa, continues to grow apace with the investment to infrastructure and connectivity being leveraged mainly through private sector investment.

The concept of leapfrogging is used for many years in the context of economic growth. The World Economic Forum recently applied the model to health systems. The South African health system can leapfrog by using new technology, operating model or pattern of behaviour to accelerate the development of the system through the implementation of its flagship project of implementing National Health Insurance to achieve universal health coverage as required by the National Development Plan. It is in this context we believe that the implementation of the mHealth strategy contribute to the creation of an enabling environment for the implementation of the National Health Insurance (NHI).

Dr PA Motsoaledi, MP

Minister of Health

STATEMENT BY THE DIRECTOR-GENERAL

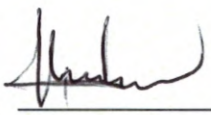
This strategy aims to support the strategic objectives of the Department of Health in a way that is comprehensive, pragmatic and innovative. The eHealth strategy defined mHealth as a subsidiary of eHealth, which includes applications to provide health education and awareness; facilitate remote data collection and remote monitoring of health programme implementation; communication and training for healthcare workers; disease and epidemic outbreak tracking; and diagnostic and treatment support.

According to the International Telecommunication Unit (ITU) South Africa has over 76 million mobile phone subscribers, an average of 146 mobile cellular telephone subscriptions per 100 persons, and 75% of mobile phone owners, being in low income groups, are 15 years or older. Using this medium, mHealth is seen as a catalyst in the strengthening of health systems and has the potential to transform the health service delivery, within South Africa, whilst creating a socio-economic impact by improving the effectiveness and efficiency of care.

The mHealth strategy recognizes the dynamics of building on public private partnerships and coordinating the efforts across mHealth partners and stakeholders. The mHealth strategy provide us with an opportunity to guide us from the current status to an environment where mobile solution providers conform to a set of normative standards that will ensure data collection is unified that benefits monitoring public health programme implementation and operational functioning of the health services. The strategy adopts a set of principles which include getting the basics right, taking an incremental approach, building on what already exists and looking for early wins.

This strategy is a product of a concerted effort by a team of officials from the Health Professions Council of South Africa (HPCSA), Department of Science and Technology (DST), Department of Public Service and Administration (DPSA), Department of Telecommunications and Postal Services (DTPS), Medical Research Council (MRC) in constant consultation with the National Health Information Systems Committee of South Africa (NHIS/SA) under the leadership from National Department of Health.

The Technical Advisory Committee of the National Health Council (NHC) led by myself will provide the technical oversight required to ensure successful implementation of this strategy



Ms MP Matsoso

Director-General: Health

1. INTRODUCTION

1.1 What is mHealth?

mHealth refers to mobile computing, medical sensor, and communications technologies used for the delivery of health-related services and the support of medical and public health practice. Employing mobile telecommunication and multimedia technologies such as mobile phones, patient monitoring devices, PDAs, and other wireless devices, mHealth is a fast growing subset of eHealth.

With the rapid convergence of mobile and fixed information and communications technologies (ICTs), there are increasing trends towards the migration of eHealth applications to mobile platforms and the development of new mobile technologies and solutions for healthcare.

The following definitions show that is not always possible to clearly distinguish between mHealth and eHealth, and between mHealth and Telemedicine:

eHealth: "the delivery of health-related services via information and communication technology"

mHealth: "a subset of eHealth referring to the delivery of health-related services via mobile communications technology"

mHealth solutions: "designed expressly to employ elements of mobile communications technology as a means of providing remote health care services"

Telemedicine solutions "designed expressly to deliver a clinical 'presence' in remote health services" (when such telemedicine solutions overlap with mHealth solutions delivered via mobile communications technology)

For the purposes of this strategy it is practical to see these as interacting parts of a whole rather than as separate domains.

The implementation of this strategy for mHealth forms an essential part of the realisation of the South African eHealth Strategy published in 2012.

1.2 The scope of mHealth

mHealth has several applications including: education and awareness; remote data collection; remote monitoring; communication and training for healthcare workers; disease and epidemic outbreak tracking; and diagnostic and treatment support. The report notes that the collection of data where people live and in real time is essential for public health and that, by enabling this, mobile technologies have the potential to make health programmes more effective and efficient.

WHO identifies the following uses of mHealth:

- Emergency response systems (e.g. road traffic accidents, emergency obstetric care).
- Disease surveillance and control (e.g. Malaria, HIV/AIDS, TB, Avian Flu, chronic diseases).
- Human resources coordination, management, and supervision.
- Synchronous and asynchronous mobile telemedicine diagnostic and decision support for clinicians at point-of-care.
- Remote patient monitoring and clinical care.
- Health extension services, health promotion, and community mobilization.
- Health services monitoring and reporting.
- Health-related m-learning for the general public.
- Training and continuing professional development for health care workers.

This list is not exhaustive and other categorisations will have to be applied as new components and dimensions are added over time. However both existing and future mHealth initiatives and projects will generally fall into three broad groups: those that focus on the patient or citizen, those that focus on providing support to health professionals (e.g. nurses, doctors, community health workers) and those that support healthcare institutions in healthcare delivery. It is also useful to distinguish between the use of mobile technology for the delivery of healthcare and the use of mobile technology as a service supporting daily tasks such as phoning to make doctor appointments.

[1]United Nations Foundation and Vodafone Group Foundation. (2008) mHealth in the Global South: Landscape Analysis.
[2]Ibid.
[3]Mechael, P. "WHO mHealth Review: Towards the Development of an mHealth Strategy". August 2007.
(Update by D. Sloninsky for the Millennium Villages Project The Earth Institute at Columbia University. August 2008.)

2.VISION, MISSION, AIM AND KEY PRINCIPLES

A long and healthy life for all South Africans

2.1 Vision

This strategy shares the vision for eHealth: enabling a long and healthy life for all South Africans.

2.2 Mission

To apply mHealth as an integral part of delivery of health care services in order to meet information communication, health education and data management needs of the health system in South Africa.

2.3 Aim

The overall aim of this strategy is to provide a single, harmonised and comprehensive mHealth strategy and implementation plan that:

a. supports the priorities of the health sector,
b. addresses and meets the needs of the following groups:
   - Individuals so that they are empowered to maintain and promote their own health as well as that of their families and communities,
   - Providers of health care services, and
   - Managers and policy makers.
c. paves the way for future public sector mHealth requirements,

2.4 Key principles

This strategy follows the needs-driven approach used in the over-arching eHealth strategy within which it is embedded.

This strategy adopts the following principles:

- Adherence to the standards given in the Department of Health Normative Standards Framework.
- Simplicity in design and development of mHealth interventions while still addressing the needs of users
- Build sustainable partnerships which include incentives for continued participation.
- Strengthen the capacity to use mHealth by seeking to converge mHealth initiatives with other ICT initiatives, such as the implementation of healthcare ICT infrastructure and other government department mServices.
- Look for points of intersection with other eHealth programs and complementing eHealth interventions, especially telemedicine.
- Anticipate future areas of technology convergence between mobile and fixed technologies.

In addition to the above principles, the strategy seeks to provide benefits within the seven domains outlined in the "National Core Standards for Health Establishments in South Africa, NDoH, 2011". The domains are detailed below: -

The domain of **Patient Rights** sets out what a hospital or clinic must do to make sure that patients are respected and their rights upheld, including getting access to needed care and to respectful, informed and dignified attention in an acceptable and hygienic environment, seen from the point of view of the patient, in accordance with Batho Pele principles and the Patient Rights Charter.

The **Patient Safety, Clinical Governance and Clinical Care** domain covers how to ensure quality nursing and clinical care and ethical practice; reduce unintended harm to health care users or patients in identified cases of greater clinical risk; prevent or manage problems or adverse events, including health care associated infections; and support any affected patients or staff.

The **Clinical Support Services** domain covers specific services essential in the provision of clinical care and includes the timely availability of medicines and efficient provision of diagnostic, therapeutic and other clinical support services and necessary medical technology, as well as systems to monitor the efficiency of the care provided to patients.

The **Public Health** domain covers how health facilities should work with NGOs and other health care providers along with local communities and relevant sectors, to promote health, prevent illness and reduce further complications; and ensure that integrated and quality care is provided for their whole community, including during disasters.

The **Leadership and Governance** domain covers the strategic direction provided by senior management, through proactive leadership, planning and risk management, supported by the hospital board, clinic committee as well the relevant supervisory support structures and includes the strategic functions of communication and quality improvement.

The **Operational Management** domain covers the day-to-day responsibilities involved in supporting and ensuring delivery of safe and effective patient care, including management of human resources, finances, assets and consumables, and of information and records.

The **Facilities and Infrastructure** domain covers the requirements for clean, safe and secure physical infrastructure (buildings, plant and machinery, equipment) and functional, well managed hotel services; and effective waste disposal.

3. SITUATIONAL ANALYSIS

3.1 Overview

A recent review of mHealth in South Africa examined the potential for mHealth and how it is currently implemented. The review report stressed the need for strategic leadership, "the importance of aligning mHealth with organisational objectives and end user needs, paying attention to issues of interoperability and the security of information, and prioritizing affordability and the sustainability of funding when examining technological options". The review concluded that "the health sector needs to adopt a developmental approach to the implementation of mHealth by encouraging the implementation of smaller, phased and heavily evaluated 'lead 'or 'lighthouse' projects within the mainstream, routine health service environment. The focus should be on creating a learning environment that can grow a country level repository of implementation strategies and evidence of the impact of mHealth".

Based on the developmental approach, a health systems framework to guide decision-making by policy makers and managers on mHealth implementation in South Africa was proposed. The framework focuses on four dimensions: stewardship, organisational systems, technological systems and financial systems.

3.2 Current Issues

Although South Africa is relatively better equipped in terms of ICT infrastructure than most emerging economies in the world, connectivity is expensive and there are still areas without network coverage. This presents an opportunity for implementing affordable network options offered by mobile network operators.

Important issues of patient confidentiality and data security have historically been managed on individual systems and have generally restricted access to information. Due to the complex and private nature of patient data, this is not adequate. The mobility of personal information on mobile ICT devices makes the requirement for standards an urgent and essential part of realisation of the mHealth strategy.

The Health Normative Standards Framework for Interoperability (V1.0), which has been approved by the National Health Council in 2013, provides a set of eHealth standards that will facilitate interoperability between systems. Interoperability will ensure a seamless flow of information between disparate devices over different networks and from different recipients. Attaining true interoperability will require significant coordination and cooperation among stakeholders.

3.3 Research and Piloting

Internationally, there has been considerable investment in mHealth research. Locally, research has been limited, primarily due to lack of funding and the absence of a mHealth strategy with which to align research. There are several areas of mHealth requiring research and the accumulation of evidence on which to base future implementations. These areas include the use of mobile clinics, diagnosis support and patient referrals, the role of mobile devices in a national electronic health record system, the use of mobile devices in the implementation of the NHI, health promotion and education, especially mLearning to strengthen the health system through training of community care workers in rural areas.

To date, organisations engaged in developing and implementing mHealth solutions have not involved government in the early stages of technology or systems innovation. This has had the result of stalling potentially good projects or even entrenching bureaucracy. A holistic approach to mHealth is needed that looks for the adoption by all stakeholders, especially leaders in government. This would ensure that mHealth projects fit into the larger context of health system activities and address the strategic objectives of the health system.

Change management has to be addressed adequately. Any mHealth implementation needs a cross-functional team that can help address the important social, organisational and cultural elements of such an implementation. Full scale mHealth partnerships require careful selection and evaluation of partners. This will assist the country in moving forward and away from a situation where mHealth interventions remain "pilots". Models of partnerships include public-private partnerships (PPPs), inter-continent or inter-country partnerships and others such as 'build-operate-and-hand-over'.

The return on investment for mHealth, especially on the part of Ministries of Health, need to be well documented. It is important that governments develop a strong business case for the implementation of mHealth solutions and do not roll out technology for its own sake.

Most mHealth interventions are based on small projects, often non-governmental and not integrated into mainstream government health services. The evidence of success is based on pilot studies and focused on feasibility not cost effectiveness. To scale up these benefits requires a better understanding of local conditions, training of health workers, and appropriate choice of ICT tools.

ICT project implementation generally takes longer and therefore costs more than was originally budgeted for. In South Africa, smaller mHealth projects are mainly donor funded and are not financially sustainable. These projects rarely include cost-effectiveness evaluations or information about going to scale.

3.4 Legal and Policy Framework

In most countries where these pilots are being rolled out, there is still a lack of guiding legal framework. In South Africa the current legal framework protects confidential patient's health records. The National Health Act (61 of 2003) stipulates that the protection of patient's confidential medical information should be assured. This legislation includes the electronic transmission of personal medical information over networks. Other relevant legislation are: Electronic Communications Act of 2002, Independent Communications Authority of South Africa Act of 2006, the Electronic Communications Act of 2006 and The Protection of Personal Information Act of 2013. The right to privacy is also considered to be a fundamental right and is listed in the Bill of Rights of the Constitution in Section 14.

Health facilities collect personal information for the purposes of patient care. However it is unclear at what point a person loses the right to control information so collected (if at all) and what

[4]Leon, N. & Schneider, H. (2012) MHealth4CBS in South Africa: A review of the role of mobile phone technology for the monitoring and evaluation of community based health services. Cape Town, Medical Research Council and University of Western Cape

[5]Bukachi, F. & Pakenham-Walsh, N. Information Technology for Health in Developing Countries. Chest 2007;132;1624-1630. http://chestjournal.chestpubs.org/content/132/5/1624.full.html

legal mechanisms are available to address privacy and security concerns. In the case of mHealth there is a need for a clear security policy on care and loss of mobile devices, including cell phones.

Reimbursement is the compensation of healthcare providers for the health care services they have provided to patients. There is a move to establish a viable model to support reimbursement in mHealth. The M-Pesa project in Kenya is the most advanced mobile payment system in the developing world. M-Pesa allows users with a national identity card or passport to deposit, withdraw, and transfer money with a mobile device. In South Africa there is no way for patients or medical aid schemes to reimburse doctors via a mobile application.

There is also a process to have a framework to guide policy makers and health managers in planning and making decisions about implementing mHealth interventions. Without a standardized framework monitoring and evaluation of mHealth initiatives is challenging. As part of developing the mHealth components of health enterprise architecture, an assessment of current mHealth projects must be completed in order to determine which solutions need further investment.

4. PROBLEM STATEMENT AND CHALLENGES

The use of mobile technologies has increased exponentially world-wide and South Africa is no exception. The "All Media and Products Survey 2012", produced by the South African Audience Research Foundation found that 85% of the 35m adult population had access to use of a mobile phone and that 95% of households have a mobile phone. This makes mobile the most pervasive mass media in South Africa since 2009. Nearly 100% of all mobile users use SMS, Voice services and USSD (a menu system which works on all phones). This broad coverage highlights the importance of cell phones as a communication medium and the potential of mobile technology to play a transforming role in the improvement of the health system.

The implementation of mHealth solutions in developing countries has been hampered by several obstacles: poor infrastructure; lack of resources, and insufficient political commitment and support. In Sub-Saharan Africa in particular many mHealth pilot projects have failed to be taken to scale due to changing health personnel practice, technological challenges with integration of information and organisational systems, and the lack of sustainable funding and institutionalised system support.

mHealth devices vary widely in capabilities, price, and strength of evidence that they may improve patient outcomes, workflow efficiencies, and access to health information. In general a successful mHealth implementation must support the daily workflows in healthcare settings through the accurate collection, transmission, storage, computation and display of information.

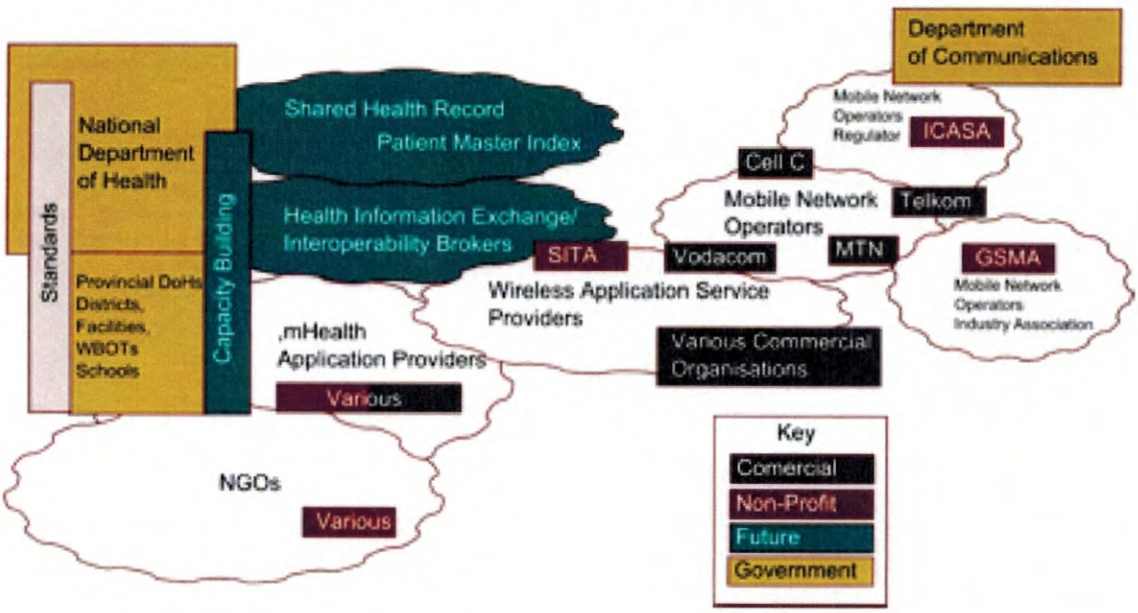
There are three basic requirements for the above: the availability of a reliable mobile or wireless architecture; the integration of mobile devices with a high degree of usability; and a robust application and services infrastructure. In addition, successful implementations must address issues of information security, affordability, sustainability of funding, interoperability, accessible power sources as well as the data storage limitations of mobile devices.

In South Africa to date, the challenges encountered in mHealth projects have been:

- Lack of alignment and integration of the interventions into health plans, strategies and systems,
- Absence of government leadership and coordination,
- Poor documentation and learning from best practices,
- Lack of use of open source options,
- Absence of practical approaches to privacy and security,
- Lack of interoperability, and
- Absence of a single framework within which to evaluate the role of mHealth and eHealth tools in strengthening the health system.

The mHealth stakeholder framework is also complex and involves many distinct organisational groups as shown in the diagram below:-

South Africa mHealth Stakeholder High Level Overview



The Mobile Network Operators (MNOs) control the mobile service offerings and are regulated by ICASA. Mobile Health application providers generally use Commercial Wireless Application Service who aggregate services from all the MNOs. For effective interoperability there will need to be a health information exchange, patient master index and a shared electronic health record which will managed within the Department of Health.

Most mobile services require the user to pay using airtime. In the health environment this is a challenge because the people most in need of services often have no airtime on their phones. Due to this, reverse billed (where the service provider pays) and zero rated (where the MNO absorbs the cost) services will be useful for mHealth interventions.

5. CONTRIBUTION OF MHEALTH TO STRATEGIC OBJECTIVES OF HEALTH

The Department's five year (2014/15 to 2018/19) strategic goals are to:

- Prevent disease and reduce its burden, and promote health;
- Make progress towards universal health coverage through the development of the National Health Insurance scheme, and improve readiness of health facilities for its implementation;
- Re-engineer primary healthcare by increasing ward based outreach teams, contracting general practitioners and district specialist teams, and expanding school health services;
- Improve health facility planning by implementing norms and standards;
- Improve financial management by improving capacity, contract management, revenue collection and supply chain management reforms;
- Develop an efficient health management information system for improved decision making;
- Improve the quality of care by setting and monitoring national norms and standards, improving user feedback systems, increasing safety in health care, and improving clinical governance;
- Improve health human resources through adequate training and accountability measures.

This strategic implementation plan for mHealth is aligned to the national eHealth Strategy for South Africa 2012-2016 which is driven by several initiatives, including:

- The proposed National Electronic Health Record system;
- The proposed National Health Insurance; and
- The roll-out of a national electronic medical record system for monitoring anti-retroviral treatment for HIV/AIDS.

In the short to medium term, this mHealth strategy seeks to address the NDoH's short and medium term priorities. These priorities are outlined in the Department of Health's Strategic Plan for 2014/15–2018/19 and the Annual Performance Plan 2014/15 – 2016/17.

6. AIM OF THIS IMPLEMENTATION PLAN

6.1 Purpose

The overall aim of this strategy is to provide a single, harmonised and comprehensive mHealth Implementation Plan that

a. supports the medium-term priorities of the public health sector,
b. paves the way for future public sector mHealth requirements,
c. lays the requisite foundations for the future integration and coordination of all mHealth initiatives in the country (both public sector and private sector) , and
d. addresses and meets the needs of the following groups:
   - Individuals so that they are empowered to maintain and promote their own health as well as that of their families and communities,
   - Providers of healthcare services, and
   - Healthcare managers and policy makers.

The following sections look at opportunities to enable and support service delivery.

6.2 Strengthening Health System effectiveness[7] [8]

Service Delivery Interventions	Opportunity for mHealth to enable and support intervention
Strengthening Health Information Systems.	
Strengthen the District Health Information System (DHIS).	• Improve ICT infrastructure and connectivity so that DHIS software can be implemented at clinics and move to a web-based, centralised platform. Include mobile technologies and infrastructure.
Develop framework for a monitoring and evaluation function with HMIS.	• Improve ICT infrastructure and connectivity so that related software can be used more effectively. Include mobile technologies and infrastructure.
Enforce common standards, norms and system across the country.	• Provision of on-line training and testing on service delivery norms and standards. Include mobile platform.
Re-engineering the PHC approach	
Implement the re-engineered Primary Health Care approach to aggressively reduce avoidable morbidity and mortality	• Use telemedicine delivered via mHealth to strengthen the referral system and identify at-risk patients early on and refer timeously and appropriately. • Community health workers to communicate via cell-phones, send and receive data via cell-phones. • School nurses to screen children in mobile clinics and use mHealth solution to refer timeously and appropriately.
Health promotion and disease prevention at a household and community level delivered via mobile platforms e.g. podcasts to mobile phones, radio, etc.	• Mobile communications infrastructure used for educational information channels for the public.
Improve patient care and satisfaction.	• Use of telemedicine delivered via mHealth for improved patient care in rural areas.
Reduce queuing times in clinics.	• Appointment scheduling system which sends reminders to patients via SMS.
Improved HR for health.[10]	
Strengthen HR and HRM system/s.	• Capacity building for existing staff using mLearning.
Improve the functioning of clinic services.	• Support implementation of a mobile platform for DHIS.
Improved logistics and monitoring of equipment	
Reporting stock outs and low stock levels	• Tool to notify supply chain when stock levels are low
Monitor Equipment	• Utilise sensors and "the internet of things" to check that equipment is working correctly and report to a central location

[6]The National Health Act of 2003 empowers the Minister of Health to regulate both the public and private health care sectors.
[7]Includes Priority 3 of the 10 Point Plan 2009 - 2014: Improving the Quality of Health Services.
[8]Includes Priority 4.2 of the 10 Point Plan 2009 - 2014: Improving the Functionality and Management of the Health System.
[9]Includes Priority 4.1 of the 10 Point Plan 2009 - 2014: Refocus the Health System on Primary Health Care
[10]Includes Priority 5 of the 10 Point Plan 2009 - 2014: Improved Human Resources Planning, Development and Management.

6.3. Prevent disease and reduce its burden, and promote health

Service Delivery Interventions	Opportunity for mHealth to enable and support intervention
Prevent non-communicable diseases through education on benefits of health lifestyles.	• Mobile communications infrastructure used for educational information channels for the public.
Reduce communicable diseases such as malaria.	• mHealth support for data collection and reporting for intervention programmes, including the Epidemic Preparedness Response (EPR) programme for malaria.
Mobilise community through community health workers. Extend care into the community using community health workers.	• Community health workers communicate via cell-phones, send and receive data via cell-phones.
Establish innovative methods of early detection of non-communicable and chronic diseases.	• Mobile communications infrastructure used for educational information channels for the public. • ICT support for mobile PHC facilities.
Conduct routine assessment and screening.	• Mobile communications infrastructure used for reminders to citizens/patients. • mHealth systems used for data collection and reporting for assessment and screening programmes.
Provide high quality antenatal and post natal services, in time.	• Use of mHealth-enabled telemedicine to strengthen the referral system and identify at-risk patients early on and refer timeously and appropriately. • Use of mHealth-enabled telemedicine to make decisions to move patients to higher levels of care.
Provide accessible high quality infant and child care services.	• Mobile clinics for immunisations, post-natal care linked to EHR. • mHealth-enabled referral system. Pick up at-risk infants and refer.
Provide HCT during pregnancy and PMTCT prophylaxis where necessary.	• mHealth system for Monitoring and Evaluation (M&E) of HCT programme.
Employ an effective referral system for pregnant women and infants with high risk conditions.	• mHealth-enabled referral system. Pick up at-risk patients and refer.
Enable expert support to remote sites.	• Use of mHealth-enabled telemedicine in clinics – with appropriate infrastructure installed, especially in remote and rural areas. • Mobile clinics with telemedicine capability.
Effective and available ambulance services.	• Effective EMS Information Systems, using the latest mobile technology to enhance communication
Support community health workers so that they can provide post-natal care at patients' homes.	• Community health workers communicate via cell-phones, send and receive data via cell-phones. • mHealth-enabled referral system. Pick up at-risk patients and refer.
Public health education for the community.	• Mobile communications infrastructure used for educational information channels for the public.
Action HCT, scale up HCT[14] .	• mHealth system for M&E of the HCT programme.
Reach people in their homes, work and public places, social mobilisation.	• Mobile communications infrastructure used for educational information channels for the public.
Integrate HIV&AIDS and TB treatment, care and support with PHC services.	• Community health workers communicate via cell-phones, send and receive data via cell-phones. • School nurses to screen children in mobile clinics and use mHealth solutions to refer timeously and appropriately.
Monitor treatment, follow up and adherence.	• Community health workers communicate via cell-phones, send and receive data via cell-phones.

6.4. Strengthen Research and Development[15]

Service Delivery Interventions	Opportunity for mHealth to enable and support intervention
Strengthen research and development	• Collaboration with research institutions and HEIs • Determine mHealth research areas especially in support of: o mHealth standards localisation o NHI implementation o Evaluation of mHealth benefits o Web and media technologies o Effective open source mHealth solutions

[11] Includes Priority 8 of the 10 Point Plan 2009 - 2014: Mass mobilisation for the better health for the population.

[12]HCT = HIV Counselling and Testing (replaced the old concept of VCT)
[13]PMTCT Preventing Mother to Child Transmission

[14]HCT HIV Counselling and Testing

[15]Priority 9 of the 10 Point Plan 2009 - 2014: Strengthen Research and Development.