Republic of Uganda

Ministry of Health

Uganda National eHealth Strategy

2017 - 2021

Foreword

The Ugandan healthcare system, through its ongoing health sector reforms, aims to improve health outcomes. As part of these reforms, the Ministry of Health (MOH) developed the Health Sector Development Plan (HSDP) 2015/16 - 2019/20 to address the key challenges facing Uganda's health system, set out priorities and key areas on which to focus health investment in the medium term, for both public and private partners, in order to optimally contribute to the attainment of both the health sector goals and the national goals as outlined in the National Development Plan II. Although implementation of HSSP III promised to produce many positive results, realizing the best outcomes in the face of increasing pressures on the healthcare system requires a fundamental transformation in the way health care is delivered and managed.

The Ministry recognizes the potential of information and communication technology (ICT) in transforming healthcare delivery by enabling information access and supporting healthcare operations, management, and decision making. However, the Ugandan health sector is characterized by a fragmented landscape of ICT pilot projects and numerous data and health information system (HIS) silos with significant barriers to the effective sharing of information between healthcare participants.

Although the government, partners, and private institutions are continuing to invest in various ICT initiatives, without some form of a national plan and coordination, there is a real risk of continued duplication, ineffective expenditure, and the creation of new solutions that cannot be integrated or scaled across the continuum of care.

To form a national plan and communication, the MOH developed a National eHealth Policy (2013), a National eHealth Strategy (2013), and subsequently a draft National eHealth Policy (2016) to guide the use of ICT in supporting health sector transformation. As part of these processes, the Ministry, through an eHealth Technical Working Group (eHealth TWG) supported by United Nations Children's Fund (UNICEF) and World Health Organization (WHO), conducted a series of national consultations that included health sector professionals, partners, faith-based organizations, Government, non-governmental organizations (NGOs), and other stakeholders.

In 2016, the Ministry, through technical and financial support from UNICEF and WHO under the stewardship of the eHealth TWG reviewed the draft eHealth Policy and strategy, seeking areas for improvement. The review process also followed a participatory approach driven by HSDP strategic objectives. The National eHealth Policy and Strategy provide an appropriate basis to guide the development of eHealth in Uganda. It adopts enterprise architecture (EA) - driven development approach to developing eHealth capabilities:

- Leverage what currently exists in the Ugandan eHealth landscape.
- Understand what the new components are and where they fit in existing structures.
- Define information structures to fit current needs and to support anticipated ones.
- Demonstrate how technology and resource constraints dictate both what is feasible and the path forward.

The implementation of this eHealth policy and strategy will accelerate the ongoing reforms and sustain the gains witnessed in the sector since 2015, when the sector started the implementation of HSDP. In addition, the policy and strategy will address some of the key challenges experienced

during HSDP, that include a shortage of qualified healthcare professionals at all levels of the health system; epidemics such as HIV/AIDS, tuberculosis (TB), and malaria; and limited access to health facilities and health professionals due to poor infrastructure, inefficiencies of the healthcare system, poverty, and ignorance.

The National eHealth Policy and Strategy will deliver the eventual benefit of a safer, high-quality, equitable, efficient, and sustainable health system that is equipped to respond to emerging health sector cost and demand pressures. The Ugandan healthcare system enhancements will also drive stronger workforce productivity that is vital to Uganda's long-term economic development.

The National eHealth Policy and Strategy is applauded as a useful guide to the next steps for Uganda in its eHealth journey. The Policy and Strategy are pragmatic, balances different priorities, and will help to lead Uganda toward the delivery of a safer, better connected, and more sustainable healthcare system.

Dr. Jane Ruth Aceng

Minister of Health

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Acknowledgements

List of Acronyms and Abbreviations

AIN	Alien Identification Number
BC	Business Continuity
CIS	Clinical Information System
CPD	Continuing Professional Development
CSO	Civil Society Organization
DGHS	Director General of Health Services
DR	Disaster Recovery
EAC	East African Community
EGI	e-Government Infrastructure
HEA-IF	Health Enterprise Architecture and Interoperability Framework
EHR	Electronic Health Record
EMR	Electronic Medical Record
eTWG	eHealth Technical Working Group
GOe	Global Observatory for eHealth
HCI	Health Centre 1
HCII	Health Centre 2
HCIII	Health Centre 3
HCIV	Health Centre 4
HDPs	Health Development Partners
HIS	Health Information System
HMIS	Health Management Information System
HPA	Health Professional Associations
HPAC	Health Policy Advisory Committee

HRHIS	Human Resources for Health Information System
HRIS	Human Resource Information system
HSC	Health Service Commission
HSDP	Health Sector Development Plan
HSSIP	Health Sector Strategic and Investment Plan
ICT	Information and Communication Technology
IFMS	Integrated Financial Management Systems
IHRMS	Integrated Human Resource Management System
IT	Information Technology
LIMS	Land Information Management System
LSMIS	Logistics and Supplies Management Information System
LIS	Library Information system
LOGICS	Local Government Information Communication System
LRC	Law Reform Commission
MDAs	Ministries Departments and Agencies
MDGs	Millennium Development Goals
MoEI	Ministry of Ethics and Integrity
MoES	Ministry of Education & Sports
MoFPED	Ministry of Finance, Planning and Economic Development
MoH	Ministry of Health
MoICT	Ministry of Information Communications and Technology
MoJCA	Ministry of Justice and Constitutional Affairs
MoLG	Ministry of Local Government
MoPS,	Ministry of Public Service
MoSTI	Ministry of Science, Technology and Innovation
NASH	National Authentication Service for Health
NBI	National Backbone Infrastructure

NDC	National Data Centre
NDP	National Development Plan
NeHP	National eHealth Policy
NeHSC	National eHealth Steering Committee
NeHS	National eHealth Strategy
NHP	National Health Policy
NIN	National Identification Number
NISF	National Information Security Framework
NITA-U	National Information Technology Authority - Uganda
NITP	National Information Technology Policy
NRH	National Referral Hospitals
PDA	Personal Digital Assistant
PHR	Personal Health Record
PHI	Personal Health Information
PI	Personal Information
PFP	Private-for-Profit
PNFP	Private-Not-for-Profit
PPP	Public Private Partnership
RC	Resource Centre
RCDF	Rural Communications Development Fund
RRH	Regional Referral Hospitals
SMART	Specific, Measurable, Achievable, Realistic and Time-bound
SIG	Special Interest Group
SOP	Standard Operating Procedure
TMC	Top Management Committee
TV	Television
TWG	Technical Working Group

UHEA	Uganda Health Enterprise Architecture and Interoperability Framework
UCC	Uganda Communications Commission
UCMB	Uganda Catholic Medical Bureau
UHI	Unique Healthcare Identifiers
UN	United Nations
UNMHCP	Uganda National Minimum Health Care Package
VHTs	Village Health Teams
WHA	World health Assembly
WHO	World Health Organization

Definition of Key Terms

Business Continuity (BC): is defined as the capability of the organization to continue delivery of products or services at acceptable predefined levels following a disruptive incident. (*Source: ISO 22301:2012*)

Business process reengineering (BPR): The fundamental rethinking and redesign of business processes to achieve dramatic improvements in critical contemporary measures of performance such as cost, quality, service, and speed.

Client: A recipient of health service regardless of the state of health.

Clinical Information System: A Clinical Information System (CIS) is a computer based system that is designed for collecting, storing, manipulating and making available clinical information important to the healthcare delivery process.

Disaster recovery (DR): involves a set of policies and procedures to enable the recovery or continuation of vital technology infrastructure and systems following a natural or human-induced disaster.

Distance learning for health professionals (eLearning): eLearning services comprise education and training in electronic form for health pprofessionals. eLearning improves the quality of education and increase access to learning resources. Examples of use include continuing professional development for doctors and nurses, and training on preventive services at the household level for community health workers. eLearning tools vary widely, and may allow interaction between the learner and instructor, access to digital libraries and online courses, networks to share experiences, or the use of mobile devices to access information to support delivery of care.

eHealth: A cost-effective and secure use of information and communication technology (ICT) in support of health and health-related fields, including healthcare services; health surveillance; health literature; and health education, knowledge, and research.

eHealth User: A person who uses or administers eHealth Services.

Electronic Health Record (EHR): An EHR is a digital record built to go beyond standard clinical data collected in a provider's office and inclusive of a broader view of a patient's care. EHRs contain information from all the clinicians involved in a patient's care and all authorized clinicians involved in a patient's care can access the information to provide care to that patient. EHRs also share information with other health care providers, such as laboratories and specialists. EHRs follow patients – to the specialist, the hospital, the nursing home, or even across the country.

Electronic medical records (EMR): An EMR is a digital version of the paper charts in clinician offices, clinics, and hospitals. EMRs contain notes and information collected by and for the clinicians in that office, clinic, or hospital and are mostly used by providers for diagnosis and treatment. EMRs are more valuable than paper records because they enable providers to track data over time, identify patient/clients for preventive visits and screenings, monitor patient/clients, and improve health care quality.

Emerging Technologies: New technologies that are currently developing or will be developed over the next five to ten years, and which will substantially alter the business and social environment.

Enterprise Architecture (EA): EA is the process of translating business vision and strategy into effective enterprise change by creating, communicating, and improving the key principles and models that describe the enterprise's future state and enable its evolution.

Health Worker: All people engaged in actions whose primary intent is to enhance health.

Human Resources for Health Information System (HRHIS): A system for collecting, processing, managing and disseminating data and information on human resource for health (HRH)

Mature Technologies: A Mature technology is a technology that has been in use for long enough that most of its initial faults and inherent problems have been removed or reduced by further development. In some contexts, it may also refer to technology that has not seen widespread use, but whose scientific background is well understood.

mHealth: mHealth or mobile health is defined as medical and public health practice supported by mobile devices, such as mobile phones, patient/client monitoring devices, personal digital assistants (PDAs), and other wireless devices.

Examples include the use of mobile devices for:

- Data collection for surveillance and public health (e.g. outbreak investigation)
- Real-time monitoring of an individual's health
- Treatment support, health advice and medication compliance
- Health information to practitioners, researchers and patient/clients
- Health education and awareness programs
- Diagnostic and treatment support, communication for health-care workers.

Patient: One who is suffering from any disease or behavioural disorder and is under treatment for it.

Patient/Client Registry: A Patient/Client Registry is an organized. system that uses observational study methods to collect uniform data (clinical and other) to evaluate specified outcomes for a population defined by a particular disease, condition, or exposure, and that serves a predetermined scientific, clinical, or policy purpose(s).

Personal health records (PHR): A PHR is a record that contains the same types of information as EHRs—diagnoses, medications, immunizations, family medical histories, and provider contact information—but are designed to be set up, accessed, and managed by patient/clients. Patient/clients can use PHRs to maintain and manage their health information in a private, secure, and confidential environment. PHRs can include information from a variety of sources including clinicians, home monitoring devices, and patient/clients themselves.

Telemedicine: This is the delivery of health care services, where distance is a critical factor, by all health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, research and evaluation, and for the continuing education of health care providers, all in the interests of advancing the health of individuals and their communities. Examples of telemedicine services are provided below.

- Store-and-forward services involve acquiring medical data for transmission later by the health-care provider for offline assessment and treatment recommendation.
- Remote monitoring services enable health-care providers to monitor an individual's condition remotely, using information technologies.
- Interactive services enable real-time interaction between health-care provider through means such as telephone, web conference, video conference and other forms of online and remote communication.

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EXECUTIVE SUMMARY

The National eHealth Policy and Strategy are directional documents that describes long-term vision for eHealth, with a strong focus on tangible benefits and deliverables. It also describes the leadership and governance structure, cantered on the National eHealth Technical Working Group that will help ensure the timely implementation of eHealth initiatives.

In order to have a policy and strategy that is holistic and inclusive, the development of the policy and strategy used a participatory process. Therefore the Strategy includes the views of multiple groups and sectors and is the result of many hours of debate and deliberation.

Vision
Effective use of information and communication technology for better health outcomes of the Ugandan population.

Mission
To transform the health of the people of Uganda by promoting effective utilization of information and communication technology.

Objective
To create an enabling environment for the development, deployment and utilization of sustainable, ethically sound and harmonized eHealth initiatives at all levels.

Strategic Areas of Implementation

- Leadership and Governance of eHealth
- eHealth Enterprise Architecture, Interoperability and Standards
- eHealth Services, Information Sharing and Data Management
- Infrastructure
- eHealth Information Assurance
- Ethics
- Human Resources and Capacity Building
- Mainstreaming Special Interest Groups
- Research, Innovation and Development
- eHealth Investment
- Stakeholder Engagement, Collaborations, Advocacy and Smart Partnerships
- Business Process Re-Engineering
- Legal and Regulatory Framework for eHealth

Principles

a) Client focused eHealth agenda
b) Equity
c) User-friendly technology applications
d) Multi Sectoral Approach
e) Human Rights based approach
f) Quality Information generation
g) Generate Quality Information base for strategic planning and policy development

Governance and Management

Successful implementation of the National eHealth Policy and Strategy requires a well-defined governance structure to provide improved visibility, coordination, and control of eHealth activities that are occurring across the country's health sector. The main goal of governance is to assure all stakeholders that operations will go as expected—that the results achieved will be in line with the decisions made.

Implementation

The following pillars represent the four key areas where we must excel in order to achieve our national eHealth vision:

- **eHealth Foundations**: The basic infrastructural building blocks required to enable the effective electronic sharing of information across the Tanzanian health sector
- **eHealth Solutions** : The specific computing systems and tools to address the high-priority needs of consumers, care providers, and healthcare managers that improve efficiency and effectiveness
- **Change and Adoption:** The actual actions that need to be carried out to encourage and enable participants in the healthcare system to adopt eHealth solutions and change their work practices to be able to use these solutions effectively.
- **eHealth Governance:** The appropriate national eHealth governance structures and mechanisms needed provide leadership, coordination, and oversight to ensure successful implementation of the national eHealth program

1 Introduction

1.1 eHealth Background

eHealth can benefit citizens, patient/clients, health and care professionals but also health organisations and public authorities. eHealth - when applied effectively - delivers more personalised 'citizen-centric' healthcare, which is more targeted, effective and efficient and helps reduce errors, as well as the length of hospitalisation. It facilitates socio-economic inclusion and equality, quality of life and patient/client empowerment through greater transparency, access to services and information and the use of social media for health.

The eHealth industry is a crucial element in building the foundation for a robust health system infrastructure and infostructure. eHealth will play a critical role in the development and application of systems and processes that support quality patient/client care through evidence-based clinical decisions and in the provision of the right information to the right person at the right time.

The Uganda National eHealth Strategic Plan guides the implementation of the National eHealth Policy. It aims to contribute to the attainment of the goals and objectives of the Second National Health Policy 2010 – 2020, the National Health Sector Strategic and Investment Plan-HSSIP (2016/16 – 2019/20) by strengthening the national capacity to optimize the management and use of eHealth resources for better health outcomes. It is relevant to all strategic directions, identified in the HSSIP. The National eHealth Strategy (NeHS) is aligned to the eGovernment policy framework, the National eHealth Policy (NeHP) and is consistent with the objectives of the National Development Plan II.

The National eHealth Strategy is a directional document that describes Uganda's long-term vision for eHealth, with a strong focus on tangible benefits and deliverables for the next five years. It also describes the leadership and governance structure, cantered on the National eHealth Steering Committee (NeHSC) that will help ensure the timely implementation of eHealth initiatives.

1.2 Methodology of developing the eHealth Strategy

The strategy has been developed through a participatory process, carried out with extensive input from stakeholders through workshops, discussion groups, interviews, and review of the World Health Organization (WHO) eHealth strategy development toolkit and other international frameworks. In developing the Strategy four broad information sources were looked at in detail;

(i) International eHealth Policy and Strategy Methodologies
(ii) Review of the current situation and overarching Plans, Policies and Strategies in terms of policy direction
(iii) Benchmarks with international experience Industry and academic experiences
(iv) Stakeholder consultations

These four pillars are put in the context of global policy recommendations from bodies such as The World Health Organisation (WHO) and in particular its National eHealth Strategy Toolkit and the Regulatory Reference Model . Through a process of international peer review and literature analysis, a specific aspect examined in detail has been the global trend towards the formation of Open Innovation-based eHealth 'Ecosystems' and the opportunity for Uganda to collaborate with international organisations. Through international best-practice review and key findings, an optimum organisational model for delivery of Uganda's eHealth strategy has been proposed including specific actions and timelines for implementation.

2 Strategic Context for eHealth

2.1 The International Perspective

The fifty-eight World Health Assembly in May 2005 adopted a resolution setting up a 'Global eHealth Strategy' within the World Health Organisation. The same year the WHO set up the 'Global Observatory for eHealth (GOe)' with the remit of studying, monitoring and promoting the role of eHealth in health services and systems globally. The GOe has published many documents looking at areas such as telemedicine, internet safety and security, mobility, legal issues and patient/client records. The WHO has stated:

"eHealth is changing health-care delivery today and is at the core of responsive health systems. The daily business of health relies on information and communication and, increasingly, on the technologies that enable it, at every level and in every country. This is equally so in delivering care, deploying personnel, managing programmes or conducting research. The case for adopting these technologies has been evident for over a decade. However, it has taken a crisis in the health sector in many countries to move eHealth from the periphery to the centre of strategic health planning. In an increasingly digital world, spurred by technological advances, economic investment, and social and cultural changes, there is growing recognition that inevitably the health sector must integrate ICT into its way of doing business. This applies whether the goal is to reach all citizens with high-quality, equitable and safe care, or to meet obligations for public health research, reporting and humanitarian action".

In support of this the WHO have published an eHealth Strategy Development Toolkit to help countries along the path to eHealth maturity. The document outlines a recommended approach to development and includes considerations such as stakeholder engagement, policy and governance models.

To ensure that a country realizes the potential from eHealth, it is important to establish an effective governance, management and implementation structure. To support the identification of such structure and help define its essential characteristics, a review of international eHealth experiences has been undertaken to examine best-practice criteria for

success. This review included Kenya, Tanzania, Australia, England, Scotland, Northern Ireland, Denmark, Cuba, Philippines and Canada. These were selected as they represent various approaches to eHealth implementation and have shown varying degrees of success and therefore key factors of both success and failure can be examined.

In addition, the review looked at African countries; South Africa, Nigeria, Ghana, Kenya, Rwanda and Tanzania to ensure that regional experiences are also brought into perspective.

The major output of this review was the definition of best-practice guidelines and criteria to identify the optimum governance and operational structure required for implementation. These criteria are used to identify an optimum model for Uganda of this strategy.

The following are a summary of the International Perspective:

(a) Governance. Strong governance and leadership is required and clear operational models/roadmaps need to be agreed by all early on in the execution phases. The delivery entity should have overall governance for implementation and manage funding allocations. The funding should be allocated on a milestone/deliverable stage-gate basis, held centrally and awarded to local delivery organisations as an innovation incentive.

(b) Deploy in Phases: Using a phased approach to implementation based on national priorities and building up to scale makes more sense than larger 'big bang' deployments.

(c) Enterprise Architecture, Interoperability and Standards: Deployments should be based and conform to an eHealth Enterprise Architecture, Interoperability Framework and standards such.

(d) eHealth Services: eHealth Services should be based on an approved eHealth Enterprise Architecture to enable standardization, interoperability and services that are aligned to the health care business objectives in a holistic manner.

(e) Infrastructure: Development of a secure network infrastructure is important and this should be shared across public and private healthcare systems. Public investment in these 'building blocks' is warranted and is a key 'enabler' to the applications that will be deployed on top.

(f) Business Process Re-Engineering: eHealth deployments should be viewed as Business process re-engineering and change management enabling through the use of information systems rather than ICT projects per se. Much up front effort needs to be directed at organisational impact analysis and change management aspects.

(g) National Oversight, Local Innovation: A national oversight approach for key aspects such as standards and interoperability combined with local innovation and incentives should be adopted.

(h) Stakeholder Engagement: Front line and clinical engagement is critical and these stakeholders should be 'champions' of eHealth solutions. Engagement with further stakeholders including patient/client groups, advocacy organisations and standards bodies

should be factored in early in the process.

(i) Health Identifier: A unique identifier is a cornerstone of most eHealth systems. What needs to be decided is the format this takes. Ideally re-use of existing initiatives and public infrastructure is advisable. Proper legislation needs to account for privacy and security issues.

(j) Leverage existing investments: Leverage existing investments wherever possible. For example in Ireland the Integrated Services Framework (ISF).

(k) Branding and Awareness: The delivery entity should be strongly branded and there should be strong and early engagement with the public. Campaigns of public awareness, education and benefits should be launched.

(l) Skills: The deficit of adequate health informatics skills needs to be addressed. Skills development and training are therefore necessary parts of an implementation program.

2.2 The Uganda Healthcare System

In planning for the more systematic and expanded application of eHealth to the health sector in Uganda, it is important to understand the organization of the healthcare system within the mainland.

Uganda is the country is divided into 111 districts and one city (the capital city of Kampala). The districts are spread across four administrative regions of Northern, Eastern, Central and Western. The districts are subdivided into 181 counties and 22 municipalities and 174 town councils which are further subdivided into 1,382 sub counties, 7,138 parishes and 66,036 villages (Census Report 2014). Parallel with the administration are traditional Kingdoms that enjoy some degree of mainly cultural autonomy. The districts are semi-autonomous in health planning and implementation, which is an important point to take into account when planning the deployment of eHealth throughout the country.

The Uganda Healthcare System is governed and supported through a number of institutions:

(i) The Ministry of Health (MoH)
(ii) Health Service Commission (HSC)
(iii) Public Service Commission (PSC)
(iv) Ministry of Local Government (MoLG)
(v) National Drug Authority (NDA)
(vi) National Medical Stores (NMS)
(vii) Uganda Aids Commission
(viii) Uganda National Health Research Organisation (UNHRO)
(ix) Central Public Health Laboratory (CPHL)
(x) Uganda Blood Transfusion Services (UBTS)
(xi) Uganda Virus Research Institute (UVRI)

(xii) Natural Chemotherapeutics Research Laboratory
(xiii) Uganda Medical and Dental Practitioners Council (UMDPC)
(xiv) Pharmacy Board
(xv) Uganda Nurses and Midwives Council (UNMC)
(xvi) Allied Health Professionals Council (AHPC)
(xvii) Pharmaceutical society of Uganda
(xviii) Health Committee of Parliament
(xix) ICT Committee of Parliament
(xx) ICT Association of Uganda
(xxi) Uganda Manufacturers Association
(xxii) World Health Organization (WHO)
(xxiii) UNICEF
(xxiv) USAID
(xxv) CDC - Uganda

The institutions above have been put into consideration when developing the eHS

The Government of Uganda (GOU) has dedicated significant effort, through public and private providers, to deliver primary healthcare services to its citizens. All the 112 districts in Uganda either have a hospital or HC IV or both. This however includes some old and dilapidated infrastructure mainly at General Hospitals (GHs) and some lower level health facilities.

Currently there are approximately 831 clinics, 2,941 Health Centre II, 1,289 Health Centre III, 197 Health Centre IV, 144 GH, 14 RRH, and 2 National Referral Hospital. About 72% of the population lives within five kilometres of a primary health facility; however, the majority of the population lives in rural areas at a distance from hospitals and the care of specialists.

Efforts by the GoU and Partners have facilitated recruitment of much-needed staff increasing the proportion of approved posts from 56% in 2010 to 69% in 2013/2014. This however leaves Uganda with a human resources (HR) deficit. This crisis, together with other challenges facing the Ugandan health sector, calls for the immediate formulation and implementation of an eHealth strategy as a way of supporting progress in the sector.

2.3 Justification of eHealth in Uganda

Some of the key pressures facing the healthcare sector include the following:

- Shortage of qualified healthcare professionals at all levels of the health system
- Epidemics such as HIV/AIDS, tuberculosis (TB), and malaria
- Limited access to health facilities and to health professionals due to poor infrastructure
- Inefficiencies of the healthcare system
- Poverty
- Ignorance

To be able to mitigate the challenges, there is need to continuously improve the performance and capacity of the supply side to meet some of the growth in demand on health care services. The implementation of eHealth is looked at as one of the solutions to mitigate the challenges faced in the Health Care System.

3 Situation Analysis

3.1 Uganda eHealth Situation Analysis

The success of eHealth to facilitate improvement of health care services is premised on being able to overcome specific ICT in Health challenges, This can be achieved by using existing opportunities and ensuring that the threats are minimised by taking advantage of the strengths. An assessment to identify these was carried out through document review, key stakeholder consultations and physical observations. The assessment included an investigation of the current ICT services and infrastructure in the country, how data in the health system are collected and managed, referral ambiguities that result in loss of patient/clients' follow-up, best practices for monitoring and evaluation (M&E), and the information pathway for a network of service providers who could be better supported through ICT.

A detailed analysis is given below.

3.1.1 Leadership and Governance of eHealth

Currently eHealth leadership and governance function at national level is executed by the eHealth Technical Working Group (eHTWG) of the Ministry of Health. eHTWG is chaired by DGHS with the Resource Centre as the Secretariat, and is responsible for the development of the National eHealth Policy and Strategic Plan. eHealth leadership and governance at the district and community levels is not clear. This has led to bottlenecks in information flow between the various levels of the health system leading to poor performance.

3.1.2 eHealth Enterprise Architecture, Interoperability and Standards

Currently there are several standards that have been developed or adopted or adapted to facilitate use of Information Technology. These standards have not however been reviewed specifically for eHealth. The development of a National Enterprise Architecture and e-Government Interoperability framework is commencing by NITA-U. There is need to capitalize on the existing initiatives to develop this area.

3.1.3 eHealth Services, Information Sharing and Data Management

There are some eHealth services being implemented across the health sector are in the form of Health Management information Systems (HMIS), DHIS2, Human Resources for Health Information System (HRHIS) and Open Medical Records System (OpenMRS). The MoH has a knowledge Management Portal; an online resource that integrates health and health related information resources from the Ministry of Health and beyond, to provide a

single point of access to valuable information that facilitates evidence based decision making. The affiliated Institutions in collaboration with MoH have some notable eHealth Services; Warehouse Management System (WMS) and the computerized Logistic Management Information System (LMIS). Others are mTrac, U-Report; Inpatient and specialty services, Community Village Health Team (VHT) activities and routine reporting of data from the Health Facilities to the National Health Data Bank/ RC. There are also isolated mobile applications developed by local innovators but have not gone fully to the market. There have been several Telemedicine projects initiated in the country over the years.

The eHealth services form part of the national health information and knowledge resources existing today. These eHealth services/projects are in most cases stand-alone and funded by donors. The majority of these projects use mobile phones which belong to individuals. Others use different ICTs from different donors. The applications and products are not interoperable and compatible. Information is not shared and the services are not integrated

Many of the existing eHealth Services are development partner funded projects and have tended to be proof-of-concept pilots, where ICT is introduced (or imported) to demonstrate innovative technology in a limited context and they lack local ownership, support and funding. They often stall when the development partner funding is ended. The projects also fail due to the sustainability in terms of the supporting infrastructure such as affordable and reliable power, connectivity, etc.

3.1.4 Infrastructure

Currently data connectivity and networking in Uganda covers almost 100% of the whole country including; urban, district, rural and remote areas. This has been achieved through fibre for the major towns and wireless (mobile phone) connectivity for the district, rural and remote areas provided through the government National Data Transmission Backbone (NBI), and the private sector fibre and wireless networks. The Government has also built a National Data Centre (NDC) used to host MDA systems. Mobile phone penetration is over 57.6 %, and internet penetration of 39.8%.

ICT hardware is mainly comprised of electronic medical devices, computer hardware and mobile telephones. However the cost of internet is still high compounded by unreliable or unavailable power supply especially in lower health units and rural communities. In addition ICT hardware such as computers are few, poorly maintained and underutilised particularly in rural and remote health facilities. Currently there is reliance on imported hardware and software in the face of fast changing technology. This has led to the proliferation of hardware, software and communication equipment used in the numerous fragmented donor-funded projects, which do not share information and provide limited information to healthcare professionals for managing patient/clients effectively.

Currently, there is a challenge of complementary infrastructure such as green and affordable backup power to support eHealth that needs to be considered, there are several adoptions of Solar Energy, Inverter Systems that could be used to support eHealth.

There are mature technologies that are embraced in Uganda such as Cloud Computing, Big Data & Open Data, Data Analytics, Smart Systems, Digital Services and Internet of Things. These technologies have been adopted but not in an organized way. There is need to formalize their adoption and utilization to gain targeted benefits from them. There are also some continuously emerging technologies that are upcoming and used in an isolated manner and need to be explored for utilization.

3.1.5 eHealth Information Assurance

A National Information Security Framework (NISF) was developed and adopted by the GOU and it has attendant policies, standards and guidelines. Its implementation has not been commenced in the Health Sector. There is need to review and implement the NISF in the Health Sector and also develop attendant mechanisms to enhance information assurance.

There is also a Data Protection and Privacy Bill before Parliament for approval into law. This shall support the implementation of privacy for eHealth. There is also need to review it and ensure that it takes care of all the requisite privacy issues related to health care.

3.1.6 Ethics

The Uganda Medical and Dental Practitioners Council (UMDPC), Pharmacy Board, Uganda Nurses and Midwives Council (UNMC) and Allied Health Professionals Council (AHPC) are in place to amongst others ensure ethics are adhered to in healthcare[1]. In addition, the Ministry in charge of Ethics and Integrity is also mandated to set standards for rebuilding and promotion of ethics and integrity in society[2] and the Health Service Commission (HSC)[3] is charged with the responsibility of overseeing the dissemination, implementation and enforcement of the unified Code of Conduct and Ethics for all Health Workers. The existence of the aforementioned roles provides generic provisions for ethics and integrity that might apply in an ICT environment. There is need to review the sufficiency of the unified code of ethics for health workers to ensure that the ICT environment applicability is fully taken care of.

There is also the NISF and the Data Protection and Privacy Bill developed to cater for Trust, Privacy, Ownership, Dignity, Equity, and Proportionality of ICT related data. These are not health specific. There is need to review the sufficiency of the existing initiatives for completeness and develop supplementary policies for completeness in a health environment.

[1] http://health.go.ug/affiliated-institutions/professional-councils
[2] http://www.dei.go.ug/
[3] http://www.hsc.go.ug/content/background

3.1.7 Human Resources and Capacity Building

eHealth capacity building refers to the creation of an environment that fosters technology-enabled improvements to health care systems and delivery, including organizational, policy and technical interventions.

Human resources for eHealth comprise of health workers, IT professionals and electronic content developers. Health consumers who are individuals or communities also require knowledge and skills to use IT equipment and systems. One of the biggest issues facing health care organizations is the ability to attract and retain eHealth and IT professionals.

Most Health workers and consumers especially those in rural areas are not computer literate. In addition, most nurses and doctors feel overwhelmed by their routine work and feel that ICT is an extra burden that will draw them away from their core duties. However, in some health institutions/facilities where health workers are computer literate, computers are not used for routine official work.

IT professionals to manage and maintain the IT equipment and support the health workers in the use of IT equipment and systems, are not available especially in the lower health facilities (HCIV – HCII) and communities

There is limited relevant local content on health issues in local language and culture.

The Human Resource situation is compounded by the non-existence of an eHealth Workforce Structure and an eHealth Skills Framework to guide curriculum development for eHealth.

3.1.8 Mainstreaming Special Interest Groups

The need for mainstreaming Special Interest groups ICT utilization is included in the National ICT Policy and in the National ICT Sector Strategy and Investment Plan, this existence though is not specific to eHealth. There is need to develop a specific Strategy for mainstreaming Special Interest Groups for eHealth based on the national guidance and International best practice.

3.1.9 Research, Innovation and Development

There is growing recognition among the Government, Development Partners, Private Sector, Academia and the Civil Society for the importance of Research and Innovation and its potential for the transformation of the country as well as the associated economic benefits. This has been manifested in the National Development Plan, Health Sector Strategic Plan, the National Health Policy and the National ICT Policy among others.

In addition, there are many eHealth Innovations that have come up though a multiplicity of Innovation Hubs. Several ICT Innovation incubations and Hackathons have being conducted in the country (e.g. ACIA, Marie Stopes Health App Challenge, and Vodafone 2016 Health

App Challenge). Although several strides have been taken, eHealth related Innovation is faced with the following challenges;

- No structured and centralized funding for eHealth Research, Innovation and Development
- Fragmented efforts in eHealth Research, Innovation and Development
- Insufficient collaboration by the Innovators with the Health experts and other disciplines complementary to the Health Sector
- Most eHealth Innovations do not translate into marketable products
- Insufficient research support tools (high cost of innovation space, computing resources, access to online material, internet bandwidth, etc.)

The challenges above are compounded with the lack of standards to support innovation and insufficient entrepreneurship skills amongst innovators.

3.1.10 eHealth Investment

The Government and the Private Sector have invested in Infrastructure that can be used to support eHealth, like the National Backbone Infrastructure (NBI), the National Data Centre (NDC), and other computing infrastructure. These investments still remain fragmented and Investment in eHealth is mainly in the form of donor funded fragmented eHealth projects. The Government has also invested in medical equipment that is complementary to eHealth. The Private Sector on its side has also invested substantially in isolated systems complementary to eHealth without proper guidance. The WHO expressed willingness to offer a range of eHealth Services and Tools for adaptation by Uganda[4].

The investments are not based on any standard and thus not properly guided. This has resulted in numerous fragmented vertical eHealth projects/initiatives which do not share information and are not accountable to the Ministry of Health. There is need to develop and eHealth Architecture and Interoperability Framework to guide all investments in eHealth.

3.1.11 Stakeholder Engagement, Collaborations, Advocacy and SMART Partnerships

A National Policy on Public-Private-Partnership in Health[5] was developed to provide guidance to mainstreaming, establishing, implementing, coordinating, monitoring and evaluating partnerships between the Government of Uganda and the private health sector within existing laws, policies and plans

There are existing partnerships [6]but they are isolated[7] and not SMART. There are opportunities for partnership eHealth that need to be exploited[8]. There is a need to review

[4] http://www.who.int/goe/data/country_report/uga.pdf
[5] https://www.usaid.gov/sites/default/files/documents/1860/Uganda-National-Policy-on-PPPH-2012.pdf
[6] http://www.swecare.se/Portals/swecare/Documents/Uganda-Health-Sector-and-Partnership-Opportunities-final.pdf
[7] http://www.ictworks.org/2012/02/22/ugandan-mhealth-moratorium-good-thing/

the National Policy on Public-Private-Partnership in Health to ensure coverage in terms of eHealth with measurable outcomes and also develop and implement a specific and deliberate Partnership and Relationship Management Strategy for eHealth.

3.1.12 Business Process Re-Engineering

There are currently isolated efforts in the Private Sector to review their Business Processes in order to embrace eHealth. There is need to come up with a deliberate strategy for Business Process Re-engineering specific to eHealth led by the MOH and this should be complied to and by the all stakeholders.

3.1.13 Legal and Regulatory Framework for eHealth

Currently the legal and regulatory frameworks comprise of several laws and regulations which support but are not specific to eHealth, including:

(a) The NITA-U Act, 2009
(b) The Registration Of Persons ACT, 2015
(c) The Computer Misuse Act, 2010
(d) The Electronic Transactions Act, 2011
(e) The Electronic Signatures Act, 2011
(f) National Databank Regulations, 2015
(g) The Registrations of Persons Act, 2015
(h) The Uganda Communications Commission Act, 2013
(i) The Uganda National Council for Science and Technology Act
(j) Uganda National Council for Science and Technology (UNCST) National guidelines for research involving humans as research participants (2007)
(k) The Copyrights Act, Cap 215, Laws of Uganda
(l) Rural Communications Development Policy, 2001
(m) National Records and Retention Act, 2001

There is need to review in detail the current legal and regulatory framework to establish whether these take care of all eHealth regulatory areas. There is also need to put in place a legal and regulatory function for eHealth to oversee the review, coordination of the enforcement and compliance to the legal and regulatory framework.

3.2 eHealth SCOT Analysis

[8] http://www.swecare.se/Portals/swecare/Documents/Uganda-Health-Sector-and-Partnership-Opportunities-final.pdf

[Translate into Strategic Priorities on which the Strategic Plan is premised]	**Strengths** • Existence of political will by the government of to advocate healthcare reform and the use of ICT to improve the efficiency and efficacy of the healthcare system Existence of some Governance Structures for eHealth • Existence of medical and ICT training institutions • Existence of institutions and agencies that are responsible for provision of various services (National Medical Stores, National Drug Authority with their own data and information systems • Existence of a national ICT policy promoting the use of ICT throughout all sectors of the country • Existence of a national e-Government Masterplan that recognizes eHealth as a priority area • Existence of disease surveillance systems at health facility level reporting to national programs • Availability of the NBI and the NDC to support data storage and communications throughout the country • Existence of a National Identification System • Existence of ICT Legislation to support utilization of ICT • Diversity of Interests in ICT • Linkages with the Ministry of Ethics & Integrity and the four Health Professional Councils • Existence of a Ministry for Science, Technology and Innovation	**Challenges** • Insufficient Coordination and participation of partners in public-private-partnerships in promoting ICT in the health sector • Diversity of Special interests (SIGs) • Inadequate ICT infrastructure throughout the health sector • Lack of availability of proper information sharing systems within and outside the health sector • Absence of national eHealth strategy to guide implementation of eHealth initiatives • Lack of reliable health information/data collection and sharing among health providers • Insufficient biomedical and medical informatics experts and trained ICT professionals • Inadequate integration of eHealth skills into existing health professional training curricula • Lack of guidelines on research and use of data/information • Lack of compliance with eHealth standards and systems interoperability • Insufficient Governance structures to guide the development of eHealth across the health sector • Unstructured funding for eHealth Research, Innovation • Rigid existing Business Processes that do not take care use of ICT (for speed, accuracy, efficiency and proper record keeping • Insufficient Legal and Regulatory Framework awareness, enforcement and compliance assessment • Too many innovations – health staff don't have the capacity to keep up

Opportunities • Existence of Development Partner supported programs/ projects • Existence of appropriate technologies • Availability of new technologies such as mHealth • Existence of public-private partnerships legal framework to support eHealth development projects • Availability of Internet bandwidth at reduced rates to support data exchange as well as communication among health providers • Existence of young ICT Innovators • Existence of Structures of General Health Ethics and the National Health Code of Ethics • Ongoing initiatives for ICT for the Disabled by UNESCO, MoICT and NITA-U • Existence of Government Initiatives for green and affordable power (e.g. Solar)	*[How do we use these strengths to take advantage of these opportunities?]* • Development of a mechanism for Governance, Partnerships and collaboration for the different stakeholder categories • Develop a mechanism of capitalizing on existing initiatives related to eHealth with a view of strengthening and aligning to eHealth	*[How do we overcome the weaknesses that prevent us from taking advantage of the opportunities?]* • Development of a mechanism for Governance, Partnerships and collaboration for the different stakeholder categories • Develop a mechanism of strengthening eHealth supporting infrastructure and services within the existing country initiatives • Develop a mechanism of standardization in relation tom eHealth to ensure interoperability, economies of scale and affordability
Threats • Health Information security • Insufficient of reliable power supply from the national grid • Financial constraints • Inadequate application of information security standards on shared networks • Insufficient legal frameworks/legislation to support eHealth development • Low willingness to accept local eHealth innovations • eHealth Initiative personalization and resistance to collaboration. • Slow pace of policy implementation • Insufficient Government capacity to investigate and prosecute • Bad attitude and low motivation of health workers to adopt and properly use government digital health tools (already list support to external parties • Corruption • Cyber Attacks	*[How do we use these strengths to reduce the likelihood and impact of these threats?]* • Develop a mechanism of strengthening complementary infrastructure within the already existing initiatives in the country • Develop a deliberate stakeholder engagement, awareness and sensitization towards eHealth	*[How do we address the weaknesses that will make these threats a reality?]* • Develop a mechanism for preventing, detecting and combating cyber security related to eHealth • Develop a mechanism of strengthening the legal and regulatory framework for eHealth

4 Aspirations of the eHealth Strategy

4.1 Scope

The Strategy shall apply to Public, Private, and Development Partner, Non-Governmental, Academic, and Civil Society Institutions. It will also cover full range of healthcare services from operational, preventive, curative, rehabilitation, research and learning. The coverage of the scope shall include the entire country.

4.2 Vision

Effective use of information and communication technology for better health outcomes of the Ugandan population.

4.3 Mission

To transform the health of the people of Uganda by promoting effective utilization of information and communication technology.

4.4 Goal

To harness and create an enabling environment for the development and utilization of sustainable, ethically sound and harmonized Information and Communications Technology at all levels to promote health and improve health services delivery in Uganda.

4.5 Objectives

In meeting the goal the Strategy shall seek to provide options to support decision making by health care providers, health service managers and consumers of health services thereby making the health sector more responsive to the needs of individuals, families and communities. The main objective therefore is to guide the strategic use of information and communication technology to bridge the human resource and infrastructure inequities that exist in the health sector in Uganda.

Specifically;

(a) To harness Information and Communications Technology to facilitate the transformation of the Uganda health system and improve health outcomes;
(b) To make patient care safer and more effective by making available the right information in the right place at the right time;
(c) To ensure equitable access to quality health services for all, with emphasis on improving access to underserved communities and vulnerable populations;
(d) To contribute to 'health literacy' of all citizens for the necessary skills, knowledge and confidence to manage their own health;
(e) To standardize ICT for Health Infrastructure and services to ensure that they are aligned to health service requirements and are interoperable;
(f) To safeguard confidentiality, privacy, security and integrity of patient/client information;
(g) To enable more efficient use of healthcare resources through replacing paper intensive processes and providing better management of information;
(h) To enhance healthcare decision support through the utilization of ICTs;

(i) To promote eHealth research, innovation and development including research on the social determinants of health and the impact on the health of the Ugandan population

4.6 Strategy Guiding Principles

The following principles shall guide and underpin the planning and implementation of the eHealth Strategy to ensure effectiveness and sustainability of eHealth in Uganda:

(a) **Guarantee of patient/client information rights, integrity, and confidentiality in line with emerging public health access needs**: The implementation and use of eHealth solutions must place the highest importance on the protection of patient/client health information to ensure privacy and integrity. However, the protection of patient/client information has to be balanced with the need for the health sector to manage public health for all citizens, such as notification of emerging diseases or related outbreaks.

(b) **National Infrastructure** - Deliver core elements of enabling national eHealth infrastructure once, rather than duplicating development costs and efforts and increasing the likelihood of rework. Expedite delivery of benefits of eHealth by leveraging appropriate existing eHealth initiatives within the health system which are consistent with the capabilities and priorities of the country. These must be integrated and compliant with national eHealth standards.

(c) **Cost effective, efficient, and benefit-driven solutions in a limited resources environment that lead to future growth potential**: eHealth must be concerned not just about ICT choices, but also about the relationship of ICT choices to the benefits they bring in the health sector. It is not the technology alone that will bring these benefits; rather it is the health sector business processes that are changed by leveraging ICT which provide the business value, with the right level of organizational buy-in. Therefore, the ICT investment and implementation shall be driven by the value they provide to the Uganda healthcare system and patient care. Open Source Solutions shall be promoted for the development and implementation of eHealth Solutions.

(d) **Technology development, standardization, and convergence:** The themes underpinning developing the technology and standards that support eHealth shall be the following:

- Focus on usability;
- Convergence on fewer and more reusable, cost-effective ICT systems that are extensible, scalable, and manageable;
- Common standards and terminology across information systems;
- Involvement of local partners in development and support of information systems.

(e) **Stakeholder engagement and Collaboration** - Actively engage key health care stakeholders in the design and delivery of eHealth solutions. Ensure a collaborative and consultative approach to joint programme delivery by public, private and partner organisations at national and local level around a common sense of purpose and working for common good, and drawing on best expertise

(f) **Strong leadership and governance mechanism**: Successful implementation of the National eHealth Strategy depends on a strong leadership and governance mechanism for planning, directing, and monitoring at all levels.

(g) **Incremental approach** - Build long term national eHealth capability in an incremental and pragmatic manner, focusing initial investment in those areas that that deliver the greatest benefits for consumers, care providers and health care managers

(h) **Recognise different starting points** - Balance active support for care providers with less developed capability, while not constraining the ability for more advanced participants to progress

(i) **Leverage** - More effectively leverage and scale eHealth activity across the country

(j) **Balance alignment and independence** - Drive alignment of national eHealth activities whilst not unnecessarily limiting the ability of health care participants and vendors to implement locally relevant solutions

(k) **Build local Innovation Capacity** – Build long term capacity to develop local eHealth solutions

(l) **Ensuring availability of local skilled HR to ensure sustainability of the eHealth solutions:** Development of eHealth solutions is complex and time consuming and requires experienced professionals. Therefore, the development may involve international professionals with practical experience to ensure successful implementation of the National eHealth Strategy. However, to ensure sustainability, the first priority should be given to building local capacity before building more complex eHealth solutions

(m) **Ensuring business continuity mechanism for implemented eHealth systems:** This principle ensures that total cost of ownership is considered in deploying eHealth solutions and a clear mechanism is in place to ensure that expected service levels are met with minimum interruption and no possibility for loss of health information.

5 Strategic Direction/Focus

eHealth in Uganda is required to improve the delivery of health through reducing the cost of doing business, improvement of efficient and effectiveness, improvement in communication and collaboration, research & innovation, improvement of monitoring performance of health services as well as reducing the risk in delivery of health services.

The MoH developed a Health Sector Development Plan (HSDP) 2015/16 - 2019/20 as the second in a series of six 5-year Plans aimed at achieving Uganda Vision 2040 of a healthy and productive population that contributes to socioeconomic growth and national development. The goal of the Plan is to accelerate movement towards Universal Health Coverage (UHC) with essential health and related services needed for promotion of a

healthy and productive life. UHC makes it possible to ensure that all people receive essential and good quality health services they need without suffering financial hardship.

Health can be seen as is investment in information and communications technologies (ICT) in health and healthcare that enables changes and improvements in clinical and working practices in order to secure benefits that exceed the costs over time. The complexity of this requires that eHealth opportunities and choices be identified, priorities set and feasible plans developed so that constraints such as time and affordability are matched. This includes adopting an appropriate architecture coupled with comprehensive and rigorous information standards in order to ensure interoperability and sustainability over the long term.

The eHealth Strategy focus is aimed to deliver specific health outcomes in the HSDP in an integrated manner. This will enhance coverage, quality, access and safety of health service delivery in Uganda through eHealth. They will also progressively lead to increased efficiency of the health system, and improved health of the Ugandan population which will become more responsive to its health needs.

This strategy seeks to address the HSDP short and medium term priorities as follows;

No.	Strategic Objective	Intervention	eHealth Strategic Objectives
Health Sector Development Plan (HSDP) II: "To accelerate movement towards Universal Health Coverage (UHC) with essential health and related services needed for promotion of a healthy and productive life"			
1	To contribute to the production of a healthy human capital for wealth creation through provision of equitable, safe and sustainable health services.	(a) Health promotion across the life course (RMNCAH and elderly). (b) Provision of Non Communicable Disease Prevention and Control services (c) Provision of Communicable Disease Prevention and Control Services (d) To ensure that communities, households and individuals are empowered to play their role and take responsibility for their own health and well-being and to participate actively in the management of their local health services.	• Provide consumers with electronic access to the information needed to better manage and control their personal health outcomes • Provide consumers with confidence that their personal health information is managed in a secure, confidential and tightly controlled manner • Enable electronic access to appropriate health care services for consumers within remote, rural and disadvantaged

2	To address the key determinants of health.	Strengthen inter-sectoral collaboration and partnerships for effective implementation of the following program areas; • Safe water • Environmental health and sanitation • Food and nutrition services • Environmental pollution control • Housing and urbanization • School health • Road safety • Veterinary services • Energy • Gender and human rights	communities • Facilitate continuous improvement of the health system through more effective reporting and sharing of health outcome information • Enable multi-disciplinary teams to electronically communicate and exchange information and provide better coordinated health care across the continuum of care • Ensure the right consumer health information is electronically made available to the right person at the right place and time to enable informed care and treatment decisions • Enable the health sector to more effectively operate as an inter-connected system overcoming the current fragmentation and duplication of service delivery • Improve the quality, safety and efficiency of clinical practices by giving care providers better access to consumer health information, clinical evidence and clinical decision support tools • Support more informed policy, investment and research decisions through access to timely, accurate and comprehensive
3	To increase financial risk protection of households against impoverishment due to health expenditures.	(a) Establishment of systems for revenue generation (b) Establishment of systems for risk pooling (c) Establishment of systems for strategic purchasing of services (d) Improve financial and procurement management systems	
4	To enhance the health sector competitiveness in the region and globally.	(a) Health Systems strengthening by addressing i) Health governance and partnerships ii) Service delivery system iii) Health information and technology iv) Health financing v) Health products and technologies vi) Health workforce vii) Health infrastructure viii) Health Research and Innovation	

			reporting on the health system activities and outcomes.

Arising out of the situation analysis and the strategic focus, the following figure represents the eHealth Strategy Map to support the National Health Vision.

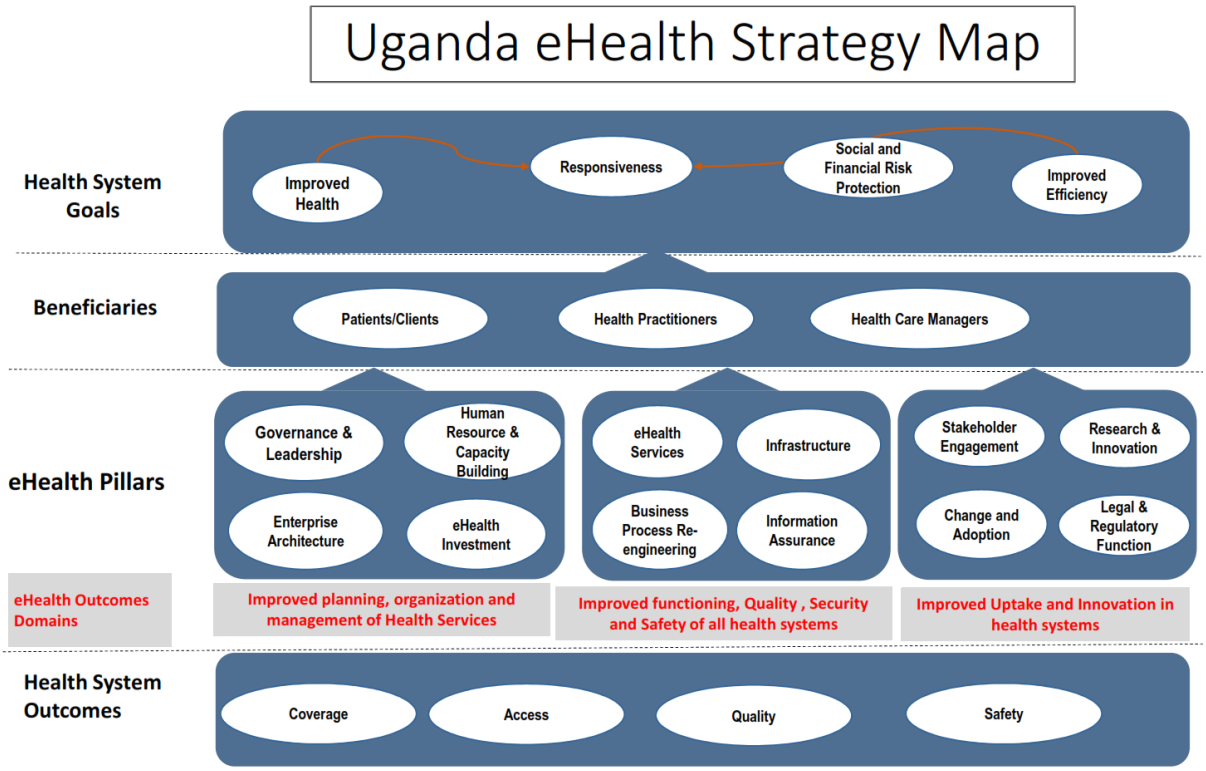


Figure 1 - eHealth Strategy Map

6 eHealth Strategic Pillars

The following pillars represent the key areas where we must excel in order to achieve our national eHealth Vision. For each pillar, we have identified strategic objectives toward which we strive. Each strategic objective is then followed by strategic initiatives.

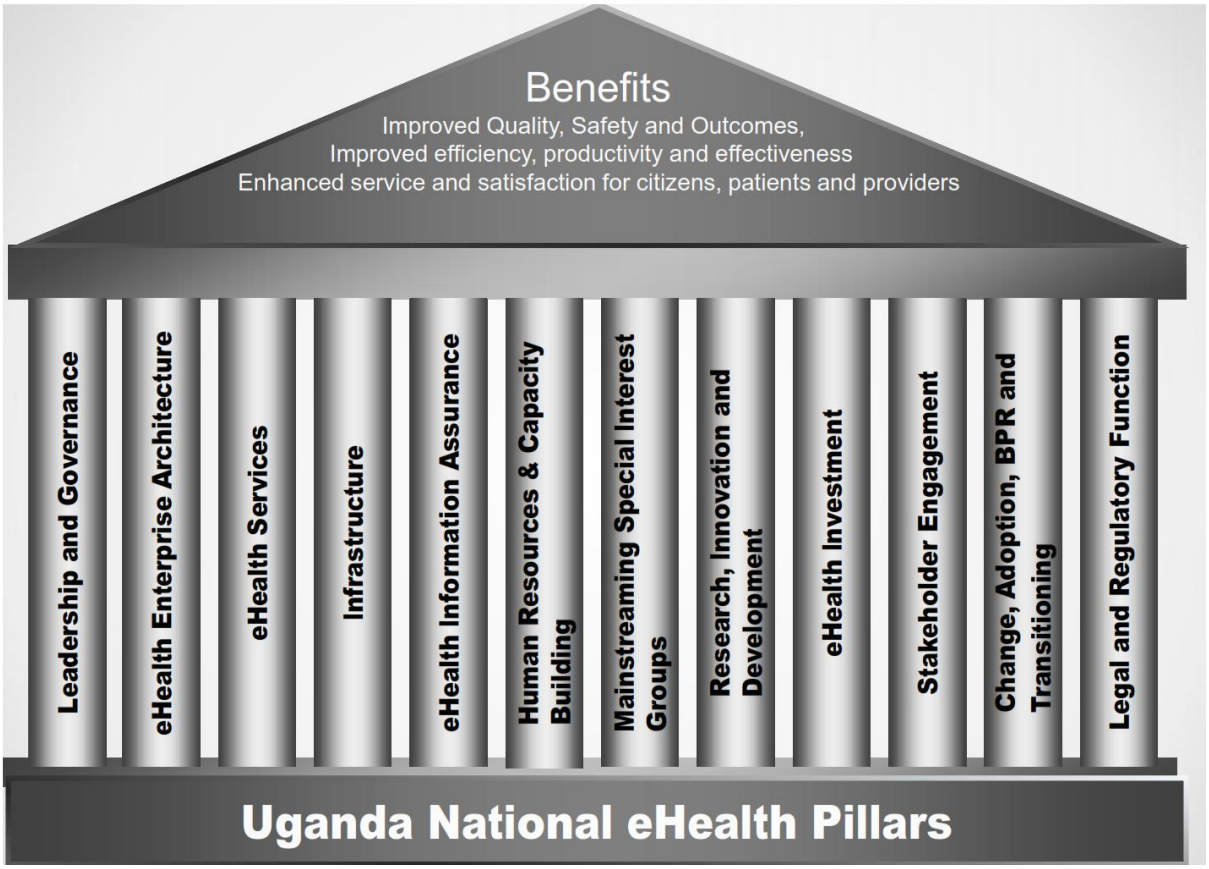


Figure 2 - Uganda National eHealth Pillars

6.1 Leadership and Governance of eHealth

The leadership and governance pillar focuses on establishing an appropriate national eHealth leadership and governance to provide leadership, coordination and oversight to ensure successful delivery of eHealth. This is aimed at ensuring clarity of accountability, transparency, appropriate stakeholder representation, sustainability and effective leadership and coordination.

Strategic Objective 1: Establish and institutionalize an eHealth governance structure to ensure effective management and oversight of eHealth Strategy implementation.

The successful implementation of the eHealth Strategy requires a well-defined governance structure is to provide improved visibility, coordination, and control of eHealth activities that are occurring across the country's health sector. The governance structure shall incorporate the assembly of a governance, management and technical teams to combine the knowledge, skills, and stakeholder needs in a way that absorbs and takes advantage of stakeholder contributions on a continuous basis.

Strategic Initiatives:

(a) *Analysis of the current institutional setting* – To establish gaps, needs and propose composition of the different structures to over all stakeholders

(b) Establish and institutionalize a National eHealth Steering Committee – To set overall national eHealth direction and priorities; reviewing and approving eHealth Policy and Strategy; funding decisions and the monitoring of progress against national eHealth deliverables and outcomes. Appendix **eHealth Technical Working Group**

(c)

(d)

(e) eHealth Core Team

1) Department of Health Information

2) Department of Quality Assurance

Quality Assurance department is mandated to ensure that health services provided are within acceptable standards for the entire sector, both public and private health services.

Objectives:

- Ensure standards and guidelines are developed, disseminated and used effectively.
- Build and strengthen regular supervision system at all levels of care in order to promote provision of quality health services.
- Facilitate establishment of internal QA capacity at all levels including operations research on quality health services.
- Coordinate sector performance monitoring and evaluation.

3) Department of Planning

The planning department is mandated to; provide guidance to the sector, mobilize resources, develop policy frameworks, coordinate with other stakeholders (local and international), review HSSIP & NHP and finally plan for and support capacity building and training of human resources for health.

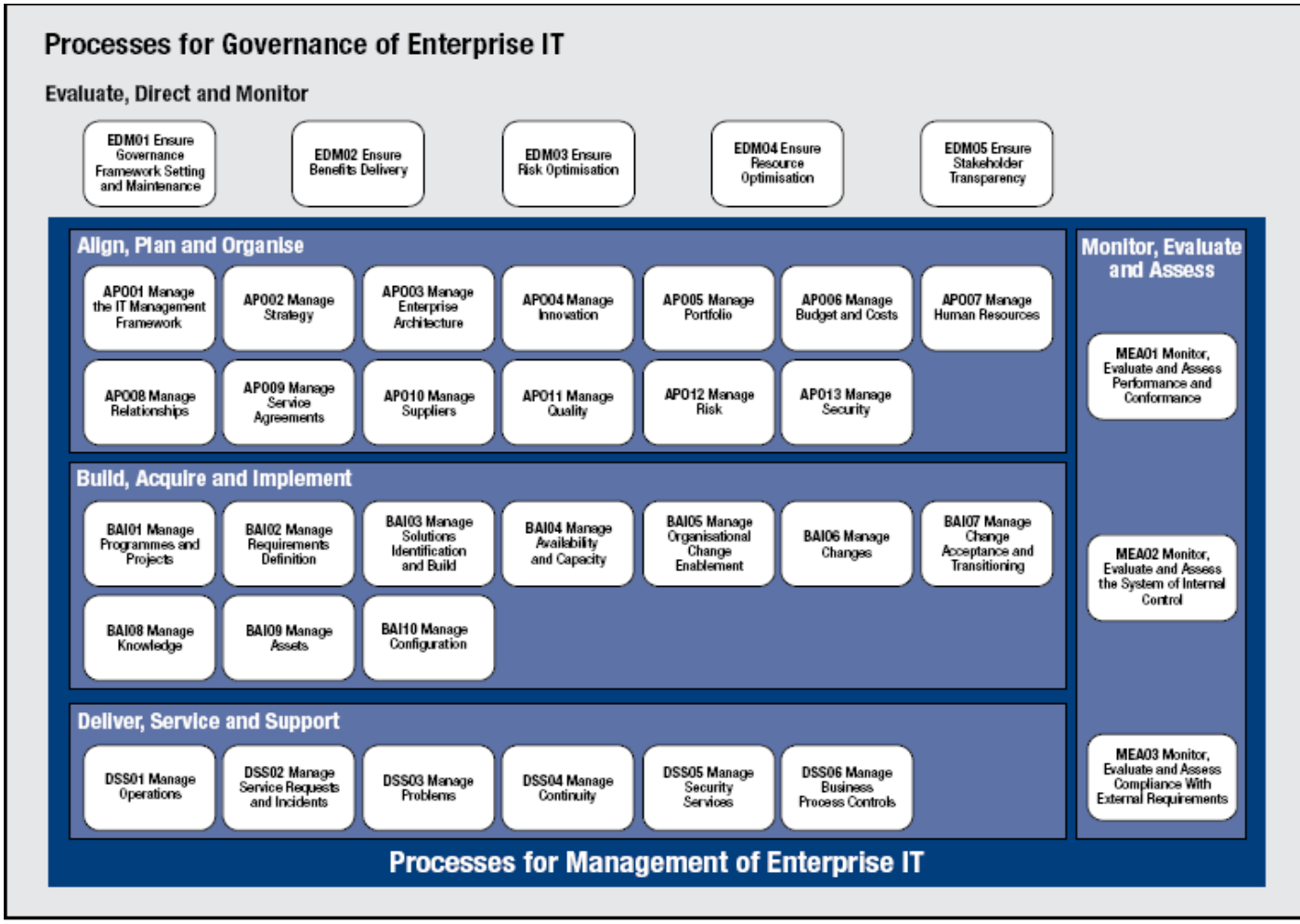
Objectives:

- Ensuring that sector Budget Framework Paper (BFP) , Ministerial Policy Statement, annual work plans and performance reports are produced
- Extending support to sector institutions, LGs and NGOs in strategic and operational planning
- Ensuring that the annual health sector performance report is produced
- Resource Mobilization and budget monitoring
- Policy analysis and production of sector policy documents
- Health Management Information System (HMIS) coordination

- Human resource capacity building

eHealth Ideal Governance and Management Responsibility Matrix

The Governance and Responsibility ideal matrix is derived from the COBIT Governance Framework.



Proposed Governance and Management

(f) **National eHealth Steering Committee**

(g) *Develop Terms of Reference for the different Institutions* – To develop a criteria for membership to the different Committees, their mandate, code of practice, expected results, meeting frequency and reporting mechanisms.

(h) *Establish and institutionalize a National eHealth Technical Committee/Working Group* (TWG) - To coordinate and oversee the eHealth strategy, investment and the execution of the national components of the eHealth work program. The TWG shall occasionally setup Adhoc committees depending on different subject requirements.

(i) *Establish and institutionalize a National eHealth entity* – to coordinate and oversee the E-Health strategy, investment and the execution of the national components of the eHealth work program. The entity shall use existing structures. The entity shall

be responsible for developing and providing technical guidance to the other lower structures.

(j) *Establish and institutionalize an eHealth Regulatory Function* – To review and oversee the implementation of the Legal and Regulatory Framework

(k) *Establish and institutionalize an eHealth Project Management Function* - To provide operational and coordinated management of all eHealth Projects to avoid duplication and also benefit from integrated implementation

(l) *Support the establishment of a National eHealth Society* – To bring together all the public and private sector actors in eHealth and ensure collaboration and information sharing.

(m) *Periodic monitoring and evaluation of the Governance Structures' activities*.

An Organizational Chart is shown in Appendix

<u>Strategic Objective 2:</u> Establish relationship and governance interactions with key stakeholders

The successful implementation of the eHealth Strategy requires a well-defined relationships with existing Government and other Bodies with a purpose of establishing formal collaborations in eHealth.

Strategic Initiatives:

(a) Establish the different Government and Other Bodies that are potential stakeholders in eHealth;

(b) Establish and define the existing Stakeholders' mandates related to eHealth;

(c) Develop and operationalize Memoranda of Understanding (MoU) to facilitate the cooperation with the key stakeholders.

<u>Strategic Objective 3</u>: Establish mechanisms for implementation and compliance to national eHealth regulatory frameworks taking into account relationships and interactions with existing regulatory bodies and functions.

Strategic Initiatives:

(a) Establish and institutionalize a National eHealth regulation function to implement and enforce national eHealth regulatory frameworks in collaboration with other regulatory bodies and the Ministry of Justice and Constitutional Affairs (MoJCA)

(b) Develop and operationalize a monitoring, Evaluation and Reporting mechanism for compliance to the eHealth Legal and Regulatory Framework

<u>Strategic Objective 4</u>: Establish Mechanisms for linking the eHealth Strategy to Local, Regional and International, Health and ICT Policies and Strategies including the SDGs

Strategic Initiatives:

(a) Develop and operationalize a monitoring, Evaluation and Reporting mechanism for eHealth towards the NHDP, National ICT Strategy and Investment Plan NDP II, EAC Regional Health Sector Strategic Plan (2015-2020), African Health Strategy (2016-2030), SDGs.

6.2 eHealth Enterprise Architecture, Interoperability and Standards

The eHealth Enterprise Architecture, Interoperability and Standards pillar focuses on putting in place a process and blueprint for transforming the health sector business vision and strategy using ICT into effective enterprise change by creating, communicating and improving the key principles and models that describe the entity's future state. The enterprise architecture includes the people, processes and ICT and their relationships to one another and the external environment.

The enterprise architecture comprises of the following;

1	**Strategy and Policy**	The Strategy and Policy reference model is designed to provide linkage between the architecture and strategic goals, policies and investments.
2	**Performance**	The Performance reference model describes performance frameworks and related metrics that apply across other dimensions.
3	**Business**	Business reference model is a generic representation of the business processes, products and services that deliver the outputs of the Healthcare.
4	**Data and Information**	The Data and Information Reference Model primary purpose is to discover, describe, manage, share and reuse information within and across MDAs. It describes best practices and artifacts that can be generated from the data architectures. It also provides a data and information governance framework, maturity assessment and attendant Standards.
5	**Application and ICT Services**	The Application and ICT Services Reference Model describes the business applications, including 'Software as a Service', that support the business processes of the enterprise. It includes core eHealth business applications, COTS corporate applications and end user computing applications. This shall have the attendant Standards
6	**Infrastructure**	The Infrastructure Reference Model describes the technology infrastructures that support the application and business processes of eHealth and the attendant Standards. It may include insourced, outsourced or cloud capabilities. This includes attendant Standards.
7	**Information Assurance**	The Information Assurance Reference Model is a scalable, repeatable, and risk-based for addressing information security and data privacy requirements in the context of Healthcare architecture at the enterprise, segment, and solution levels. This includes attendant Standards.

<u>Strategic Objective 1:</u> Plan, design and develop an eHealth Enterprise Architecture and Interoperability Framework.

The eHealth Enterprise Architecture and Interoperability Framework shall comprise of reference models, principles, procedures and standards with a common language against which all eHealth (ICT) Investments shall have to conform and be certified.

Strategic Initiatives:

(a) Establish an eHealth Architecture and Interoperability Governance Structure
(b) Conduct an eHealth Readiness Assessment Survey with a view of establishing existing and required infrastructure, services, personnel, investments, funding mechanisms, etc.
(c) Develop an eHealth Architecture and Interoperability development plan which institutes a collaborative, shared planning process to guide the development of an eHealth Enterprise Architecture and Interoperability Framework.
(d) Develop the eHealth Architecture and Interoperability Framework in alignment with the National e-Government Enterprise Architecture and e-Government Interoperability Framework.
(e) Develop and implement National Health Information Exchange (HIE)

<u>Strategic Objective 2:</u> Develop and Implement Compliance Assessment Mechanism to the eHealth Enterprise Architecture and Interoperability Framework.

All eHealth development, modernization, enhancement, and acquisitions shall conform to the eHealth Enterprise Architecture and Interoperability Framework.

Strategic Initiatives:

(a) Develop an eHealth Enterprise Architecture and Interoperability compliance framework
(b) Certify all eHealth investments against the eHealth Architecture and Interoperability Framework
(c) Set monitoring indicators, monitor compliance, report and act on violations

<u>Strategic Objective 3:</u> Develop and Implement a Review Mechanism for the eHealth Enterprise Architecture and Interoperability Framework.

The eHealth Enterprise Architecture and Interoperability Framework shall be reviewed periodically to ensure that unforeseen issues and emerging requirements are accommodated.

(a) Develop an eHealth Enterprise Architecture and Interoperability Review Mechanism
(b) Review the framework after evaluating performance and in line with emerging requirements;
(c) Revise the framework basing on the assessment and review.

6.3 eHealth Services, Information Sharing and Data Management

The eHealth Services pillar focuses on putting in place the eHealth services and tools that address the priority business needs of patient/clients, healthcare providers, healthcare managers by improving efficiency, effectiveness, communication, community education, (e.g. immunization and other outreach programmes), information and practice sharing data management and utilization and cutting costs of doing business.

<u>Strategic Objective 1</u>: Establish a unique, standardized, comprehensive and comprehensible Electronic Medical Record (EMR), Electronic Health Records (EHR) and Personal Health Record (PHR).

The purpose of the EMR, EHR and PHR are to provide a comprehensive documentation of an individual's health information as he or she makes contact with the health care system. It provides information on services and treatment decisions to enable care coordination between care provider teams. The EMR, EHR and PHR are also used as a key information source for longitudinal and aggregated health information, in conjunction with other health sector data sets, to support more informed health care reporting and research. The EMR, EHR and PHR shall amongst others ensure improved patient/client care, increased patient/client participation, improved care coordination, improved diagnostics and patient/client outcomes, and improved practice efficiencies and cost savings.

The design and deployment of EMR, EHR and PHR Systems require significant process change and huge investments in infrastructure and training. The strategy will adopt an incremental and distributed approach to the development of EMR, EHR and PHR that will focus initial efforts on enabling the flow of quality and relevant health information across the health care network. It will also support more effective decision making, management of EMR, EHR and PHR and the timely delivery of systems capability in those parts of the health sector that are ready to move. This approach is based on the principle of ensuring that health information is made available to the consumer and care provider at the point of care through simple facility networks such that district level information becomes more summarized and aggregated to provide a consolidated summary of facility performance.

Strategic Initiatives:

(a) Adopt and enforce the National Identification Number (NIN) and the Legally Resident Alien Identification Number (AIN) as the Unique Identifier of every Patient/Client;

(b) Identify and analyse all initiatives by different stakeholders towards the design of EMR, EHR and PHR with a view of utilization of achievements to-date;

(c) Design, adopt and enforce a National Standard EMR, EHR and PHR that conforms to international Electronic Health Record (EHR) Standards based on the NIN as the unique identifier;

(d) Develop, adopt and enforce a standardized mechanism for unique identification in circumstances where patient/clients do not have NINs or AINs such as children and non-registered aliens;

(e) Develop, adopt and enforce a standardized mechanism to take care of unique identification in cases of NIN and AIN irregularities;

(f) Monitor and evaluate the adherence and conformance to the unique identifier and the standard EMR, EHR and PHR.

<u>Strategic Objective 2</u>: Establish comprehensive health facility, provider, and patient/client registries with complete and up-to-date information that meets stakeholders' needs.

The Ministry recognizes that developing and maintaining comprehensive master lists of health facilities, providers, and patients/clients is a necessary step toward monitoring health infrastructure and services, and that these lists form a core component of the national Health Management Information System (HMIS). International best practice in eHealth focuses on developing facility, provider, and patient/client registry systems that can be used to manage comprehensive master lists of health facilities, providers, and patient/clients respectively. Therefore, in this Strategic Objective, the Ministry intends to establish comprehensive master lists of facilities, providers, and patient/clients, and implement a standard facility registry system that is interoperable with existing and upcoming systems (e.g. Health Management Information System (HMIS), District Health Information System 2 [DHIS2], logistics management information system [LMIS], human resources for health information system [HRHIS], etc.).

Strategic Initiatives:

(a) Adopt and Enforce the National Identification Number (NIN) as the unique Identifier of every Health Provider;
(b) Develop a harmonized data element specification for the health facility, provider, and patient/client registries;
(c) Provide support to the revised registration process for public and private facilities and providers;
(d) Develop management and maintenance guidelines for the facility, provider and patient/client registries;
(e) Implement the facility, provider, and patient/client registry system;
(f) Monitor and evaluate the adherence and conformance to the unique identifier and the facility, provider and patient/client registry system.

<u>Strategic Objective 3</u>: Enable electronic healthcare planning and financial management to ensure effective collection, allocation, and use of health financial resources at all levels in accordance with health plan priorities.

Healthcare planning and financial management aim to improve the quality, equity, and availability of health services by enhancing the rationality and the efficiency in healthcare planning and financial resources management.

Strategic Initiatives:

(a) Design, develop and Implement a healthcare planning and financial management information system (HPFMIS) in line with the eHealth Enterprise Architecture and Interoperability Framework
(b) Integrate the HPFMIS with exiting e-Government Systems (e.g. the Integrated Financial Management Information System (IFMS), the Prime Ministers Management Information System (PMIS), the Output Budgeting Tool (OBT), the National Identification Register (NIR), Voucher System and Electronic Payment Systems Integration, etc.

<u>Strategic Objective 4</u>: Strengthen healthcare professionals' human resource management to ensure effective information management, assignment, development and accountable use of health human resources at all levels in accordance with health plan priorities.

The MOH launched and adopted the country's Human Resources for Health Information System (HRHIS) for collecting, processing, managing, and disseminating data and information on HRH. The HRHIS has been rolled out at the central MOH, 112 district health offices, 15 hospitals, the Uganda Virus Research Institute, and Nakasero Blood Bank. However, information exchange across multiple HR management systems, including professional registration bodies, Prime Minister's Office, District Administration and Local Government, President's Office, Integrated Payroll and Personnel Management System, Uganda Nursing and Midwifery Council, all hospitals and other private health service providers, is lacking. Therefore, in this Strategic Objective, the Ministry intends to integrate existing HR systems with HRHIS to enable exchange of information.

Strategic Initiatives:

(a) Identify and integrate existing Public, Private and Not for Profit HR systems (HRHIS, IPPS, etc.) into the provider registry.
(b) Enhance the HRHIS to include on-demand resource allocation, productivity, and prospective planning.
(c) Refine processes for managing and maintaining the provider registry.

<u>Strategic Objective 5</u> Strengthen the National electronic Logistics and Supplies Management Information System (LSMIS) to ensure adequate quality and quantities of health commodities are always available at the point of service to meet patient demand

The medicine and supplies strategy aims to build the capability to provide managers and facility administrations with accurate and current medicine demand and use data. The use of quality, timely logistics data is essential for effective supply chain management and efficient procurement of needed supplies. However, much of the current logistics data is inaccessible, incomplete, or missing, as is the availability of true demand information, making supply chain decision making challenging for the MOH and its partners. Therefore, in this Strategic Objective, the Ministry intends to develop a technology platform that will incorporate the existing systems (enterprise resource planning systems [ERPs], Web-enabled Ordering for HIV Drugs System, warehouse management systems [WMSs], DHIS, HMIS, e-Procurement System for Government, etc.) to assist in data collection, dissemination, and processing.

Strategic Initiatives:

(a) Implement a nationwide electronic LSMIS to amongst others take care of quantification, forecasting, tracking, etc., leveraging existing systems.
(b) Integrate the system with existing ERPs, WMSs, e-Procurement System for Government, DHIS and HMIS systems**.**

<u>Strategic Objective 6</u>: Enable electronic delivery and interventions of health services in line with the universal access to the Uganda National Minimum Health Care Package (UNMHCP) which includes promotive, preventative, curative, rehabilitative and palliative care.

The HSDP III is committed to the achievement of the Sustainable Development Goals. The plan includes strategies to improve access and quality of Reproductive, Maternal, New-born and Child (RMNCH) services delivery. In addition, HIV/AIDS, TB, and malaria are among the most important infectious diseases in Uganda; therefore, the control, or eradication in the case of malaria, is among the Ministry's strategies. Therefore, in this Strategic Objective, the Ministry intends to use ICT to improve access to patient data and improve health services in health facilities. In addition, the objective includes using ICT to provide health education between patient/clients and health workers as well as among health workers themselves.

The prevalence of major non-communicable diseases (e.g., high blood pressure and diabetes) is rapidly increasing and presents a challenge to our health system and its limited resources. These chronic diseases require records for clinical follow-up and monitoring, and their prevention is possible through ICT-enabled community interventions including health education.

Strategic Initiatives:

(a) Develop, Implement and promote a Clinical Information System (CIS) to enable patient/client identification, tracking, monitoring, and referral of at-risk patients, provision of accurate information to patients, and improvement of communication with health facilities in emergency cases. This shall include clinical management, clinical decision support, pharmacy management, ICU management, laboratory management, radiology management, picture archiving and communication management, nursing care management, etc.;
(b) Implement and promote an Electronic Medical Records (EMR) system with clinical decision support tools for reproductive and child health services, HIV/AIDS, TB, malaria, and non-communicable diseases (e.g., diabetes);
(c) Implement and promote Health Information Exchange and a shared Electronic Health Record (EHR) to allow sharing of information among health providers;
(d) Integrate the Clinical Information system with existing ERPs, WMSs, e-Procurement System for Government, DHIS and HMIS systems.

<u>Strategic Objective 7</u>: Strengthen the electronic health management information system (HMIS) to support evidence-based health care and decision making

M&E strategies aim to strengthen HMIS to improve evidence-based health care and decision making for both clinical actions and administration. The MOH has adopted DHIS2 as its core HMIS software, which includes M&E reporting, data management, and some HMIS data warehouse functions. The MOH has successfully completed its pilot use of DHIS2 and is currently scaling up its use for national coverage. However, much of the data, such as data from vertical programs, community-based health data, and data from some hospitals, are still lacking. Therefore, for this objective, the Ministry intends to strengthen the HMIS system by integrating existing system, vertical program, referral data, and community-based health data into DHIS2, improving timeliness and accuracy, and developing a true data warehouse that can be used to support this strategic area as well as others.

Strategic Initiatives:

(a) Integrate related information systems and vertical program HMIS information into DHIS2;
(b) Develop and Implement a community-based HIS that is linked to the HMIS.
(c)
(d) Collect and integrate community-based health information and services;
(e) Collect and integrate health data from referral hospitals into DHIS2;

<u>Strategic Objective 8</u>: Establish telehealth services to enable electronic delivery of quality health care to individuals in remote areas lacking needed expertise.

Referral hospital services strategies aim to increase access for patients in need of advanced medical care and improve quality of clinical services in hospitals. Telehealth is the delivery of

health-related services and information through the use of ICT in contexts where the providers and patients are in separate locations. Telehealth is used to improve access to medical services that would often not be consistently available in remote communities that lack needed expertise.

The envisaged telehealth Services are;

Clinical video telehealth: uses interactive video technologies for the real-time delivery of physician visits to distant clinics to make diagnoses, manage care, perform check-ups, and provide care in polytrauma, mental health, rehabilitation, and surgical consultations;

Store-and-forward telehealth supports the acquisition, transmission and storage of pre-recorded information (sound, data, image), such as X-rays, video clips, and photos, between providers and specialists in radiology, dermatology, and retinopathy; and

Care coordination/home telehealth uses electronic monitoring devices to capture patient physiological data related to symptoms and vital signs in the home environment and transmit those data to health care providers for review and appropriate coordination of care

In this Strategic Objective, the Ministry intends to use ICT to implement telehealth and tele-education services to enable provision of healthcare services at a distance.

Strategic Initiatives:

(a) Develop telehealth services and program.
(b) Develop and implement required telehealth infrastructure.
(c) Develop and implement telehealth services.

<u>Strategic Objective 9</u>: Establish mHealth services to enable electronic delivery of quality health, reduce isolation, amplify the voices of the disadvantaged, and provide means to individuals to influence health systems.

At least 52.3 per cent of Ugandans have access to mobile phones, according to the Uganda Communications Commission 2014. And these days it seems like you can do everything on that smartphone. Everything from email to banking to dinner reservations can be done with the swipe of a finger. And now those smartphones are giving patient/clients the ability to monitor their own health anytime, anywhere. Mobile phones can transform the way we monitor, engage and report our health to our doctors.

Almost everyone has a mobile device, and everyone goes to the doctor and other healthcare providers. It just makes sense to pair mobility and health together. For health care providers the end game now is a patient/client checking their own health so they can be their own personal health advocate. This brings it down to a different type of engagement between patient/clients and clinicians whereby better and timelier information can empower patient/clients to make informed decisions but with the support of their healthcare

network. In this Strategic Objective, the Ministry intends to use mobile telephony to implement mHealth and mEducation services to improve outreach of healthcare services.

(a) Develop mHealth services program with the aim of developing commercially sustainable mobile services that meet public health needs by;
    - Developing business cases that define an end-to-end value chain
    - Convening key mHealth stakeholders using working groups, workshops and events.
    - Replicating mHealth services that ensure integration into national health systems
    - Providing technical assistance for the launch
(b) Engagement of mobile phone service providers in the country and seek specific services tailored to meet the overall health sector objectives. This engagement will result in agreements on kinds of services, security and ethical requirements, special rates and other details that will allow health services to be accessed through the mobile phones ethically and unimpeded;
(c) Develop and implement required mHealth infrastructure including the Front-end (used to develop Mobile Apps), the Middleware (to connect front-end system with the data access layer), and the Back-end (the data access layer or the server side of the equation);
(d) Develop, implement and enforce mHealth services;
(e) Setup an inter-agency team to determine specific services that can be better managed and improved through the use of mobile telephony for the benefit of patient/clients, health care providers and the general public. This shall be reviewed and implemented through the annual programme of work. The areas to be covered will include treatment support and follow up services, medication compliance and help line services;
(f) Develop, implement and enforce a disease surveillance and epidemic tracking system using mobile telephony involving the private sector. This shall be linked to a data base to provide real-time information of selected diseases.

<u>Strategic Objective 10</u>: Enable an electronic communication and information sharing mechanism (for the referral system) to improve quality of service.

Access to medical specialists is a challenge because the health sector experiences limited health resources. The problem is aggravated by inefficient processes; it is very common for patient/clients to be referred to a specialist without adequate information about their conditions, a prior examination, or clear questions for the specialty consultant. Such poorly organized referrals result in wasted or ineffective specialty visits that further worsen access to specialty care and impede quality of care. To address these challenges, the Ministry intends to use ICT to effectively communicate and share information between primary care and specialty care providers.

Strategic Initiatives:

(a) Develop health professional collaborative network using mobile device technology following agreed-upon usage guidelines for clinical assistance.
(b) Implement an electronic referral system with multiple data entry and reporting mechanisms (VoIP, mobile, Internet) for providers, management, and patients.

<u>Strategic Objective 11</u>: Strengthen disease prevention, surveillance, and control by using a hybrid ICT solutions to facilitate early detection and rapid reporting and response.

Disease prevention and control strategies aim to improve disease surveillance and enhance community participation in health promotion and disease prevention. The use of timely information is essential for effective detection of as well as rapid reporting and response to infectious diseases. However, much of the current information is inaccessible, incomplete, or missing due to the lack of well-coordinated and functional disease surveillance systems. Therefore, in this Strategic Objective, the Ministry intends to use ICT to implement efficient, flexible, and comprehensive systems to conduct infectious disease surveillance and response as well as health education and promotion.

Strategic Initiatives:

(a) Review and enhance the electronic integrated diseases surveillance and response system as a build-on to the Integrated Disease Surveillance and Response (IDSR) that is linked to the HMIS system
(b) Implement an electronic information system (including the use of social media, television, radio, etc.) to provide health education and promotion.

<u>Strategic Objective 12</u>: Establish Intelligent and integrated Health facility management systems that monitors and manages diverse building management systems in a Health Facility in real time.

The drive towards a eHealth is not just about providing new services and improving the work efficiency of employees – it's also monitoring and managing building systems on an integrated basis so that medical environments provide the optimal amount of comfort to its patient/clients, whilst minimizing wastage in terms of resources and maintaining medical facilities effort in maintaining a green environment.

Strategic Initiatives:

(a) Implement a Medical Facility System that optimises Energy usage for critical areas using data shared real-time to adjust the demand of cooling and lighting at critical area, e.g. operating theatre, isolation room, etc., thus reducing energy wastage.
(b) Implement an Automated and networked HVAC systems – This allows end-users to adjust the heating, ventilation and air conditioning (HVAC) requirements in their individual spaces, thus conserving energy and controlling costs. In addition, sensors can monitor equipment for an indication that preventative maintenance is needed.

(c) Implement an Automated On-Demand Facilities control – Common facilities (meeting room, auditorium, training room, etc.) HVAC and lighting can be turned on/off based on booking status from the facilities booking system, thus saving energy and manpower
(d) Implement a Lighting control System– Lighting systems today can be accessed and computer controlled by the building owner or by the tenant via web-based control systems. Lighting systems can now be linked to a centralized information system that shows point-in-time usage or usage patterns for either a single building or an entire complex of buildings.
(e) Implement Elevator control – By network-enabling elevator systems, their operations can be monitored and optimized. Access control cards allow employees programmable, selective access to certain floors. Interactive in-elevator terminals can stream content, ranging from news feeds to emergency instructions. In addition, elevators can be continually monitored for performance and breakdowns to drive proactive maintenance.
(f) Implement Energy Management Systems – Hospital campuses consume large amounts of energy, and building owners want to minimize energy wastage and utility bills. Energy management systems such as environmental control systems, electrical power monitoring system, lighting, and machinery and onsite generators can be network enabled. This allows hospital administrators to monitor the energy usage and devise methodology to optimize electricity and gas usage in the daily operation and reduces total energy costs.
(g) Implement Security and monitoring Systems - Ensuring the safety of patient/clients is also a significant issue for healthcare professionals. By implementing RFID-based patient/client location and tracking, and combining it with video surveillance systems across the hospital compound, hospital employees can triangulate the position of patient/clients at any given time, to ensure that they can be quickly located in case of emergencies, or alerted if they leave care areas. Additionally, they can obtain greater visibility into inventory, and track the real-time location of high-value assets and life-saving equipment, substantially increasing safety and operational efficiencies. Finally, such an integrated system will also be effective in identifying hazardous situations, such as fires, and to send messages rapidly to response teams, allowing for fast decision making and action.
(h) Implement Parking control Systems – Entry to parking areas can be controlled via access cards or other electronic identification methods. In addition to access control, parking systems can integrate with security, lighting, elevator and HVAC systems. These systems can be programmed to turn on and off for the individual tenant when they enter the parking structure. Parking costs can be monitored and accounted for electronically, reducing administrative overheads.
(i) Implement Access control Systems – Access control can also be managed on a granular level depending on the location, or status of the employee. For example

non-Operational Theatre (OT) staff may not have access to operating rooms during a surgical procedure. Hospitals may also want to control visitor access to wards during specific periods, especially those wards with quarantined patients.

<u>Strategic Objective 13</u>: Establish an eHealth Data, Information and Knowledge Management, Analysis and Utilization System.

The Strategic Objective aims at providing for the collection, quality review, aggregation and reporting of health-related data for clinical and system-wide use.

The implementation of this objective requires a number of sophisticated systems and tools that are designed to anonymize, de-duplicate, aggregate, and analyse the vast amount of digital health data created in Uganda. Data analytics has been used extensively and successfully in many other industries but is still in its infancy in the health sector. Some of the challenges lie with the very nature of this data, which is can be described by:

(a) Volume of data collected at any moment (quantity);
(b) Velocity in which this data is created (speed);
(c) Variety of the various types of data available (specialization); and
(d) Veracity of the information from a clinical perspective (quality).

These services will provide a data management, data analytics and health intelligence platform with access, as permitted by privacy regulations, to clinical data that is available in the clinical repositories and in the local EMRs systems across the country.

Strategic Initiatives:

(a) Develop an eHealth Data, Information and Knowledge Management Guideline defining data, information and knowledge lifecycle responsibilities and requirements (e.g. Processes, Data Ownership / Stewardship, Audit, Creation and Collection, Analysis, Retention and Disposal, Data Quality, etc.);
(b) Develop a Right to Use Policy - Defining the purposes for which health data can be used by providers in the direct delivery of care to the patient (e.g. “Need to Know” rules);
(c) Develop Data, Information and knowledge Sharing Agreements - Defining the purposes for which health data may be shared between organizations and terms of responsibilities that must be observed by all custodians of that data;
(d) Develop data analysis requirements, methods and reporting mechanisms;
(e) Creation of consistent national health data standards, definitions and dictionaries in accordance with the eHealth Enterprise Architecture
(f) Map data sources and storage of data to allow for optimisation of data flow patterns that enable timely and accurate data collection
(g) Develop a reporting process and key indicators that are consistent National analytics and reporting capabilities that are aligned across Central and Local Government

perspectives to provide standard insights into performance of the Health Sector towards the HSDP, NDP II and SDGs and operational effectiveness of Medical Facilities;

(h) Develop a National Health Digital Content Strategy;
(i) Review and Strengthen the MoH Website in line with the Guidelines for Development and Management of Government MDA Websites;
(j) Strengthen the MoH Knowledge Management Portal [9] to include amongst others Business Intelligence, Content Management, Data Management and a Data Warehouse/Data Mart.

6.4 Infrastructure

The Infrastructure Pillar focuses on putting in place the foundation that supports health information exchange, i.e. the sharing of health information across geographical and health sector boundaries, and implementation of innovative ways to deliver health services and information. Infrastructure includes computing infrastructure, databases, directory services, infrastructure development & management, connectivity and storage. This also includes complementary infrastructure like power, buildings, etc.

<u>Strategic Objective 1:</u> Strengthen Core ICT infrastructure and affordability to improve communication and information sharing across the health systems and at all levels

ICT infrastructure forms the foundations for electronic communication and information sharing across geographical and health-sector boundaries. This includes the computing infrastructure, databases, directory services, network connectivity and storage that underpin a national eHealth environment. Although there are several initiatives for establishing ICT infrastructure by the Government, the health sector is still characterized by limited and inadequate ICT infrastructure, which presents significant obstacles to the deployment of eHealth services. Therefore, in this strategic objective the Ministry intends to establish a cost-effective and affordable ICT infrastructure to support communication and sharing of information across the continuum of the healthcare system.

Strategic Initiatives:

(a) Facilitate health sector institutions, including health facilities and training institutions to establish ICT strategic plans that are aligned with their respective business objectives, functions, priorities and the National eHealth Strategy;
(b) Coordinate and support health sector institutions, including health facilities, and training institutions to establish sustainable ICT infrastructure and services in conformance with the National eHealth Enterprise Architecture and Interoperability Framework;
(c) Develop and enforce a minimum Infrastructure Requirements Guidelines in all health sector institutions, including health facilities;

[9] http://library.health.go.ug/

(d) Develop and enforce an eHealth Infrastructure Maintenance, Upgrade and Disposal Standard Operating Procedure (SOP) in all health sector institutions, including health facilities;
(e) Link Health Facility Accreditation to the Minimum Infrastructure and Standard Operating Procedure Requirements;
(f) Connect Health Sector Institutions and Facilities (***Appendix F***) to the National Backbone Infrastructure (through appropriate last mile solutions) as a priority in order to share a common connectivity advantage;
(g) Utilize the National Data Centre (NDC) to host Health Sector Data/Information and Services
(h) Utilize the National Backbone Infrastructure (NBI) for eHealth information/data communication;
(i) Aggregate eHealth demand and business needs across eHealth Stakeholders with a view of facilitating bulk procurement of infrastructure.

Strategic Objective 2: Adopt green and affordable Power for eHealth

To facilitate affordable and constant power provision to support the uninterrupted utilization of ICTs in delivery of healthcare services, all health practitioners (including public and private) need to develop, utilize and maintain green and affordable backup power system in conformance with the Renewable Energy Policy of Uganda.

Strategic Initiatives:

(a) Identify and review the current green and affordable power for eHealth initiatives implemented;
(b) Design a green and affordable power for eHealth Guideline in consultation with the Ministry of Energy;
(c) Support the development, installation and maintenance of a green and affordable power primary and backup system in conformance with the Green and Affordable power for eHealth Guideline;
(d) Monitoring the operationalization of the Institutional green and affordable power backup systems.

Strategic Objective 3: Ensure eHealth ready Medical Facility Building Infrastructure

The drive towards a Connected Medical Facilities is not just about providing new services and improving the work efficiency of employees – it's also monitoring and managing building systems on an integrated basis so that medical environments provide the optimal amount of comfort to its patient/clients, whilst minimizing wastage in terms of resources and maintaining the facilities effort in maintaining a green environment.

Strategic Initiatives:

(a) Design a Medical Facilities Building Guidelines to support eHealth in line with the Building Control Act;
(b) Setup a Medical Facilities Building Control Committee to oversee the adherence to the Guidelines
(c) Monitoring the operationalization of the eHealth Medical Facility and institutions readiness.

Strategic Objective 4: Utilize Appropriate Mature and Emerging Technologies to enhance core eHealth Services

This Strategic Objective aims at building a core set of technologies that have matured and those emerging that have a great potential to improve eHealth development impacts and empower communities.

Strategic Initiatives:

(a) Assess Appropriateness of Mature and Emerging Technologies for support of Health in the Ugandan Situation;
(b) Develop and implement a Big Data and Open data Guidelines for health to facilitate analytics, research and innovation
(c) Develop a Social Media Guidelines for Health
(d) Develop an Internet of Things utilization Guidelines for Health
(e) Develop a cloud computing Guidelines for eHealth leveraging existing initiatives by NITA-U and the Private Sector
(f) Develop Digital Services Guidelines for Health leveraging existing initiatives by MoICT & NG, NITA-U and the private Sector
(g) Develop a Smart Systems Guidelines for Health leveraging existing initiatives by MoICT & NG, NITA-U, KCCA and the Private Sector
(h) Continuously Identify and Review Emerging Technologies in Healthcare to establish their applicability in the Ugandan Healthcare Environment.

6.5 Ethics

The Ethics Pillar focuses on ensuring preservation of ethics and integrity in the provision and receipt of healthcare services in an ICT environment by all stakeholders.

The

Strategic Objective 1: eHealth Ethical Standards and guidelines shall be put in place in conformance to cultural and religious values as well as international best practice.

This Strategic Objective aims to ensure uniformity in the principles for assurance, consistency and confidence to all users of professional eHealth services.

Strategic Initiatives:

(a) Review of the existing Standards for Ethics (Medical Practice, ICT, Public Service, Regional, International and any other related) to establish requirements for eHealth
(b) Develop eHealth Ethics Standards and Guidelines as part of the eHealth Enterprise Architecture and Interoperability Framework
(c) Disseminate and sensitize all stakeholders about the eHealth Ethics Standards and Guidelines
(d) Enforce the eHealth Ethics Standards and Guidelines
(e) Monitor Compliance to the eHealth Ethics Standards and Guidelines

Strategic Objective 2: eHealth Code of Ethics shall be put in place, complied to and enforced.

This Strategic Objective aims to ensure that stakeholder can confidently and with full understanding of known risks realise the potential of eHealth in managing their own health and the health of those in their care.

Strategic Initiatives:

(a) Review of the existing Codes of Ethics (International, Regional, National, Medical Practice, ICT, Public Service and any other related) to establish requirements for eHealth
(b) Develop an eHealth Code of Ethics
(c) Disseminate and sensitize all stakeholders about the eHealth Code of Ethics
(d) Enforce the eHealth Code of Ethics
(e) Monitor Compliance to the eHealth Code of Ethics

6.6 eHealth Information Assurance

Health information technology promises a number of potential benefits for individuals, health care providers, and the nation's health care system. It has the ability to advance clinical care, improve population health, and reduce costs. At the same time, this environment also poses new challenges and opportunities for protecting individually identifiable health information. Several general laws, policies and regulations are in place to help protect electronic information privacy and security.

There is a National Information Security Framework that includes attendant policies, guidelines and standards for electronic information security. In the same vein, there is a Data Protection and Privacy.

Although, laws, policies and regulations related to security and privacy of information exist, data safety and privacy in eHealth has been violated in a number of instances. This is because security regarding the confidentiality, availability and integrity of data and information has not been defined and backed by an official procedure. The form in which data and information should be transmitted and the encryption methodology is also non-

existent. Procedures regarding responsibility and accountability in the use of passwords and access privileges are not fully implemented.

Patient/client identifiable information could be viewed by third party vendors and the transmission of data and information via the internet or WAN is not well regulated. Business continuity plans and disaster recovery procedures are non-existent. There is no standardized information on the ownership of patient/client identifiable data. Computing equipment are susceptible to external threats like viruses, worms and hacking of corporate networks.

There is the urgent need for strategies that protect privacy and security while permitting critical analytic uses of health data and multipurpose data standards that meet the needs of the diverse groups that record and use health information.

Strategic Objective 1: Enhance Information Security to ensure confidentiality, integrity, quality and availability of information when designing, procuring, implementing, maintaining and retiring eHealth Infrastructure and Solutions.

Strategic Initiatives:

(a) Review the National Information Security Framework (NISF) together with other relevant Government MDAs to evaluate whether it takes care of all the electronic health information security requirements in line with existing regulatory environment (e.g. local content, Access to Information Act and international best practice
(b) Develop, operationalize and maintain an Institutional eHealth Information Security Guidelines that comprises comprehensive and aligned Information security safeguards, and programs, practices, processes, tools and techniques in conformance with the NISF.
(c) Monitor and evaluate compliance to the electronic health information security guideline by all stakeholders.

Strategic Objective 2: Enhance Information Protection and Privacy to ensure electronic Health information is protected and privacy maintained

This Strategic Objective is aimed at ensuring that all health practitioners (including public and private) protect Personal Information (PI) Privacy and Personal Health Information (PHI).

Strategic Initiatives:

(a) Review the Data Protection and Privacy Law together with other relevant Government MDAs to evaluate whether it takes care of all the electronic health information privacy requirements in line with international best practice

(b) Develop, operationalize and maintain an Institutional eHealth Information Privacy and Protection Guidelines that comprises comprehensive and aligned safeguards for PI & PHI, and programs, practices, processes, tools and techniques in conformance with the Uganda Data Protection and Privacy Law and Regulations and the Global Health Information Privacy and Protection Statement (GHIPPS).
(c) Develop a protocol and procedure of data handling in the health sector, research and training institutions to ensure appropriate disclosure, systems for authorization and consent for all aspects of personal and service data.
(d) Monitor and evaluate compliance to electronic health information privacy by all Stakeholders
(e) Conduct Personal Information Privacy training and awareness;
(f) Publish Privacy policies and practices for all Stakeholders.

Strategic Objective 3: Ensure Business Continuity and Disaster Recovery when utilizing eHealth

Business Continuity and Disaster Recovery (BCDR or BC/DR) are closely related practices that describe the preparation for unforeseen risks to continued operations. This is more so true with the increasing reliance of ICT for Health.

Strategic Initiatives:

(a) Review the National Information Security Framework (NISF) together with other relevant Government MDAs to evaluate whether it takes care of all the electronic health information business continuity and disaster recovery requirements in line with international best practice
(b) Develop, operationalize and maintain a Business Continuity and Disaster Recovery Plan for eHealth.
(c) Monitor and evaluate compliance to the Business Continuity and Disaster Recovery Plan by all Stakeholders.

6.7 Human Resources and Capacity Building

There is a clearly identified need to support the national eHealth Strategy with sufficient numbers of skilled health IT resources as this is a critical factor for successful implementation of a national eHealth[10]. The building of Uganda's eHealth Human Resources and skills capacity and capability requires concerted strategies.

Strategic Objective 1: Evaluate the current readiness and enhance capacity of the Health Worker to embrace and support the implementation of eHealth

There is need to understand the current status of the health workers competences and skills required for eHealth. Furthermore there is need to develop/adopt/adapt eHealth Skill set

[10] http://www.who.int/goe/data/country_report/uga.pdf,

and competencies that shall be used for the evaluation and development of the right curriculum. Therefore, in this objective, the Ministry plans to evaluate the skills and competencies of its health professionals and subsequently design a standard framework to be followed in developing curriculums for eHealth.

Strategic Initiatives:

(a) Design and conduct a Workforce, Training and Skills needs assessment for eHealth;

(b) Develop an eHealth Workforce Structure that shall be complied to by all levels of healthcare;

(c) Develop, adopt or adapt an eHealth skills and competencies framework;

(d) Review Health practice training, standards and accreditation to include eHealth skills and knowledge as a mandatory requirement;

(e) Develop and enforce an eHealth Curriculum Framework to be followed by different training providers in developing and delivering Health training

(f) Review and enforce all current training of health professionals to conform to the eHealth Curriculum Framework;

(g) Develop comprehensive policies and plans for use of ICTs in health workforce development;

(h) Monitor and conduct compliance assessments against the eHealth Curriculum Framework;

(i) Monitor the uptake and acceptability of the eHealth Curriculum Framework in health training;

(j) Monitor and conduct compliance assessment against the eHealth Workforce Structure.

<u>Strategic Objective 2:</u> Enable Health workers to have access to continuous professional development through e-learning and digital resources

There is need to increase production and improve quality of training (pre-service, in-service, and continuous education). A well-educated workforce is vital to the discovery and application of healthcare practices to prevent disease, promote well-being, and increase the quality life-years of the public. Although there are several initiatives toward improving healthcare delivery through the use of ICT, these initiatives usually overlook a critical need of using ICT to improving quality by developing and maintaining a well-trained workforce of health professionals. Therefore, in this objective, the Ministry plans to adopt the use of ICT to develop and provide continuous education to its health professionals.

Strategic Initiatives:

(a) Develop and approve methodology for delivering blended learning, including basic ICT training for health workers (at all levels);
(b) Develop a program and electronic content for various health professionals.
(c) Implement health sector e-learning platform;
(d) Develop digital resources to enable offline learning for areas with limited Internet access along with online learning;
(e) Develop guidelines on establishment of appropriate nationally recognized qualifications in eHealth (e.g. Health Informatics);
(f) Establish a national eHealth knowledge repository;
(g) Develop a collaboration and harmonization mechanism for different sectors, research institutions and industry in building human resource capacity for ICTs, and the exchange of e-health expertise between countries;
(h) Establish/invest in national eHealth centres of excellence for eHealth development in collaboration with other relevant MDAs.

6.8 Mainstreaming Special Interest Groups

ICT initiatives fail to take care of Special Interest Group-specific barriers; such as SIG-relevant content and digital services, safety issues and culture norms that discourage ICT use.

Special Interest Groups (SIGs) include but are not limited to Women, the Disabled, the Aged Persons, the Illiterate, etc. Governments, Technology Providers and Development Partners need to keep these barriers when developing Policies and Strategies. They need to also design skills development, training and sensitizations.

The SIGs responsibilities are:

(a) To promote communication between practitioners with an interest in the special area
(b) To promote education and scientific meetings focussing on the area of special interest
(c) To facilitate and encourage research in the area of special interest
(d) To propose issues or recommendations for the consideration of the Government and the Practitioners.

The Practitioners responsibilities are to;

(a) To listen and adopt the recommendations of the SIGs

<u>Strategic Objective 1:</u> Support Access to, Acceptance and Utilization of eHealth by Special Interest Groups (SIGs).

This Strategic Objective aims at ensuring that SIGs have a voice to champion their concerns about accessibility and utilization of ICT for Health.

Strategic Initiatives:

(a) Coordinate the setup and institutionalization of a Special Interest Group Forum for eHealth to amongst others;
- To engage the health and ICT communities in dialogue to establish the current need for ICT in discomfort management and find creative ways of responding to this need
- To design guidelines of good practice for a more conducive, safe and responsible use of ICT in managing discomfort;
- To develop appropriate eHealth solutions for SIG's and increase awareness / strengthen dissemination of these eHealth solutions by amongst others, developing Apps for different projects of the SIGs;
- To develop and apply standard review and accreditation process to eHealth solutions for SIGs programs considered to be of a sufficiently high standard for practitioners and members of the public to utilize safely
- To provide ICT SIG related training to practitioners and service users in order to facilitate the use of ICT;
- To monitor, evaluate and research the impact of ICT in clinical practice for SIGs;
- To encourage appropriate investment of resources from different sectors to support ICTs for SIGs;

(b) Deliberately review the existing legal and regulatory framework with a view of establishing completeness for all the focus areas of the SIGs;
(c) Develop an Infrastructure, eHealth Services, accessibility architecture and Standards for SIGs as part of the eHealth Enterprise Architecture and Interoperability Framework;
(d) Develop Policies and Guidelines for eHealth for SIGs;
(e) Develop a National Healthcare Web Portal for the SIGs;
(f) Develop and enforce a Content Development as part of the National Health Digital Content Strategy;

6.9 Research, Innovation and Development

eHealth innovation is able to provide new or improved therapies, medical treatments and diagnosis techniques. Major breakthroughs, which can contribute significantly to improved health status, are expected in genetics, tissue and organ engineering, surgery and the treatment of disease. Important innovations include genetic engineering, cloning, pharmaceuticals, and the growth of replacement tissues and organs.

eHealth applications could reduce costs, deliver healthcare services remotely and increase the efficiency of this delivery by, for instance, avoiding unnecessary duplicate examinations.

Cost effective technological advances, though constrained by ethical debate, will enhance screening, surveillance, and environmental health. “Cost-effective” medical technologies often spread in cost-increasing ways. Some medical technologies reduce costs if their use is restricted to narrowly defined indications or populations, but increase costs as their use expands. Medical technologies exert their influence through both volume and price effects.

<u>Strategic Objective 1:</u> Enhance HealthCare Research and Innovation using Information and Communications Technology.

There is a continued need for improvement of healthcare quality and processes and this can be supported by evidence-based research. Health research matters to all because it underpins the quality of our health and care services and makes a vital contribution to health outcomes quality of life. ICTs have a great potential to support healthcare evidence-based research.

This Strategic Objective aims to create an enabling environment for evidence-based healthcare research for eventual healthcare process and quality improvement.

Strategic Initiatives:

(a) Create a National Health Care Web Portal for subscription with amongst others the following:
- An indexed Register of all Health Care Researchers and Innovators;
- A local Health Care Research and Innovation in Uganda indexed database;
- Links to International healthcare databases.

<u>Strategic Objective 2:</u> Establish an open multidisciplinary approach to Research, Innovation Development, Translation and Commercialisation of eHealth for clinicians, teachers, educators, and the general public.

This Strategic Objectives aims to create an integrated and interdependent environment (ecosystem) where companies, innovators, scientists, policymakers, governments, regulators, patient/clients, development partners and other organisations can interact productively to promote radical change and innovation in healthcare supported by new developments in information and communication technologies (ICT).The intention is to create sustainable, affordable, citizen centric healthcare systems, which leverage new technologies whilst at the same time stimulating the economy and creating new employment opportunities.

Strategic Initiatives:

(a) Identify and develop a database of all players in the eHealth Innovation Ecosystem with their stake and responsibilities;
(b) Develop an eHealth Innovation Governance and Partnership Strategy

<u>Strategic Objective 3:</u> Promote Research, Innovation Development, Translation and Commercialisation of eHealth for innovators, clinicians, teachers, educators, and the general public.

This Strategic Objective aims to leverage the existing expertise and innovations and also support the eHealth innovations to be strengthened with the aim of translating them in marketable products.

Strategic Initiatives:

(a) Identify and prioritize the eHealth research and innovations for empowering patient/client and enabling better health care e.g. Detection, Diagnosis, Prognosis eHealth; Standards Localization, PHR, teleHealth, mHealth and Decision Support Apps, etc.;
(b) Conduct periodic surveys of all eHealth Innovations in the country with a view of identifying how to support and collaborate to strengthen the solutions;
(c) Develop an eHealth Portal with amongst others the following information;
- All Innovation Stakeholders including but not limited to the Innovators
- All eHealth Related Innovations
- All eHealth Funding Opportunities and Sources
- Priority eHealth Research and Innovation Opportunities
- Linkages to eHealth related electronic resources

(d) Develop an open, standards based technology platform that enables innovators to create apps that seamlessly and securely run across the healthcare system. The apps shall be available for use by patient/clients, doctors, and healthcare practitioners to improve clinical care, research, and public health;
(e) Conduct eHealth Innovations Workshops to bring together innovators and other players
(f) Develop and implement an eHealth Innovation Strategy and Agenda to include amongst others;
- A Framework that incentivises the sharing of innovative ideas and collaboration
- Promotion of the use of Open Source Solutions in line with the National Free and Open Source Policy and Strategy
- Partnership mechanism with existing Innovation Hubs to develop eHealth Innovations and also leverage the plans by NITA-U
- A mechanism for supporting local eHealth innovations
- A mechanism of patenting/ intellectual property of eHealth Innovations
- Creation of a Community of eHealth Innovators
- Priority Research and Innovation Agenda for eHealth
- Access to International and Regional eHealth Innovation Labs

6.10 eHealth Investment

Sustainable and affordable eHealth initiatives are enhanced by; establishment of robust funding mechanisms, rational selection, acquisition and deployment of cost effective eHealth systems, provision of appropriate financial incentives to providers, and implementation of effective eHealth interventions that ensure access to effective health services for all individuals. eHealth players include the development partners, public, private and NGO sectors.

Before beginning any eHealth project, financing must be procured and its sustainability protected 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 delivered as quickly as feasible. There are relatively few economic assessments of potentially beneficial eHealth solutions in the developing world. These are to support "policy makers and health departments to make informed decisions when allocating scarce resources" .The Uganda eHealth Strategy will contribute to regional efforts in this regard.

The Government of Uganda shall provide initial resources for the national eHealth Programme within the health and ICT budget. Additional resources will be secured through; public-private-partnership, development partner support and private sector investment.

Implementation of the National Health insurance scheme will also help realise funds for eHealth through integrated health service delivery

<u>Strategic Objective 1:</u> Rationalize and Integrate eHealth into the national health plans and budgets.

Rationalization and Integration of eHealth initiatives into comprehensive national plans makes it possible for eHealth to access financing through the national budget and also provides an entry point into donor resources negotiated by governments. Integration also brings with it economies of scale as shared infrastructure and human resources and other inputs can be made available for eHealth initiatives. eHealth budgets should cover; capital expenditure, operation budgets, salaries for all staff and costs for training and maintenance of systems

Strategic Initiatives:

(a) Identify and document all the funding sources for eHealth (including Government, Development Partners, External Funders, Private Sector Investments);
(b) Develop guidelines for developing, planning and implementing eHealth programs in line with the eHealth Enterprise Architecture and Interoperability Framework;
(c) Mainstream eHealth in the national health budget and development frameworks in line with the eHealth Enterprise Architecture and Interoperability Framework;
(d) Provide appropriate funding and operational mechanisms for eHealth to support and in alignment with the eHealth Enterprise Architecture and Interoperability Framework;

(e) Enforce and monitor that all procurements are based on the eHealth Enterprise Architecture and Interoperability Framework;
(f) Develop, implement and enforce a Cost-Benefit and Impact Assessment Guidelines for eHealth;
(g) Plan and conduct cost-benefit analysis and an impact assessment for eHealth implementations;
(h) Enhance the processes to ensure proper investment and management of allocated funds at the National and Local Government for eHealth;
(i) Conduct Mid-Term Reviews of the eHealth Strategy and ensure that institutions plans are aligned to it.

<u>Strategic Objective 2:</u> Promote Public-Private-Partnerships (PPP) and pooling of resources by all partners.

The MOH is facing a surmountable challenge in implementing eHealth projects because of the following reasons; public sector budget constraint, non-integrated solution (for public infrastructure/service), public money tied up in capital investment, insufficient creativity and innovative approaches, total project cost ,time in delivering the project, risks in delivery of projects, high administration costs, maintainability, and poor project management. The MOH shall put in place mechanisms to enhance Public-Private-Partnership and international collaborative projects in research, education and training to reduce the challenges in eHealth project implementation.

Strategic Initiatives:

(a) Develop guidelines for effective collaboration and partnership in the planning, organisation and management of all eHealth PPP projects and programs in consultation with MoFPED
(b) Implement guidelines for strengthening public-private-partnerships and pooling of resources by all partners to support a common implementation framework for eHealth.
(c) Identify and prioritize plausible eHealth Projects
(d) Procure priority eHealth PPP Projects in line with the eHealth Enterprise Architecture and Interoperability Framework

<u>Strategic Objective 3:</u> Develop and implement eHealth investment plan

Information and Communication Technology (ICT) is continually transforming the delivery of healthcare and system administration services, here and around the world. As such, investing in ICT and innovation for Healthcare is a significant cornerstone of Uganda's Health's commitment to improving the healthcare. An eHealth Investment plan provides a cohesive and considered plan for ICT for Healthcare investment priorities to ensure;

(a) Co-design strategic direction in eHealth
(b) Examine challenges, risks and service delivery needs
(c) Determine the investment priorities which will deliver the greatest value.

The MOH shall design and establish an investment funding program in consultation with key stakeholders, to encourage the development and implementation of high-priority eHealth solutions

that support national standards and that can be effectively scaled and leveraged across all levels of the health systems and the population.

Strategic Initiatives:

(a) Develop and Implement an eHealth Investment Plan based on the eHealth Strategy;
(b) Lobby for the resources generated from ICT sector such as the Rural Communications Development Fund (RCDF) and projects such as the Regional Communications Infrastructure Program (RCIP), National Health insurance scheme , etc. and create an eHealth Investment Fund to develop eHealth applications for rural and remote areas to provide effective health services;
(c) Develop and implement eHealth Business Process Outsourcing Guidelines to enable outsourcing some processes in eHealth implementation;
(d) Develop and implement a Joint procurement plan for eHealth to benefit from economies of scale.

<u>Strategic Objective 4:</u> Reform the Development Partner Support and Project Implementation Methods

Multi-year development programs are often incompatible with the rapid innovation cycle needed to introduce new technology-enabled practices. The current methods of development implementations are through projects (start and an end). Too often, the sustainability of the solutions and innovations a projects brings are an afterthought. Furthermore, Organizations are likely to shy away from using ICT solutions for fear of failure and seldom share results. Individual projects are not structured to contribute to investments in platforms, applications and devices that have utility across projects. This Strategic Objective aims at rationalizing the way support is provided to eHealth Projects to focus more on integrated support to eHealth Projects and realization of eHealth as a strategic asset.

Strategic Initiatives:

(a) Identify and make an inventory of all Development Partners that provide (are planning to provide) support related to eHealth in the country, the projects, the type of support;
(b) Conduct an analysis of all the support with a view of rationalization;
(c) Develop and maintain an updateable and searchable Portal/Database of all the proposed, current and completed support by Development Partners;
(d) Develop and implement a Coordination Strategy for all Development Partners with a view of rationalization and enabling joint support and subsequently sustainability of investments;
(e) Ensure that all Development Partner support for eHealth is in alignment with national priorities, investment priorities, sector priorities and the local environment;
(f) Strengthen the Awareness and Sensitization for the eHealth Vision, Priorities and Serialization.

(g) Share the eHealth Enterprise Architecture and Interoperability Framework with all Development Partners to ensure that all support is aligned to it.

6.11 Stakeholder Engagement, Collaborations, Advocacy and SMART Partnerships

eHealth needs effective collaboration in order to succeed. This can only be achieved by engaging with all stakeholder groups affected by eHealth. This helps to inform, mobilise support, identify opportunities, highlight priorities, manage and mitigate risks.

Strategic Objective 1: Identify and engage all eHealth Stakeholders at National, Regional Internationallevels

This Strategic Objective aims at ensuring that all stakeholders in the eHealth value chain are identified and engaged to ensure that all stakeholders' needs are supported and taken care of.

Strategic Initiatives:

(a) Develop an updateable Stakeholder Register including but not limited to health consumers, health care practitioners, Government MDAs, Development Partners, Academia, IT Service Providers, etc.
(b) Develop an Incentive Strategy for attracting Stakeholders to volunteer information
(c) Develop and implement a Stakeholder and Partnership Engagement Plan
(d) Facilitate the establishment of eHealth certification of Health Practitioners and Providers;
(e) Support the MoLG and District Local Governments to incorporate the eHealth strategy in their engagement work.

Strategic Objective 2: Create awareness for eHealth

eHealth needs to be demystified using different approaches to enable health providers, consumers and the general population to use eHealth to help improve the health of the population. Concerted effort will be made to carry out awareness campaigns in the course of implementing an actual eHealth project/programme and during eHealth training, because this yields better results. Mass campaigns will be used to provide larger target groups a certain level of eHealth knowledge. Each target group will be matched with the eHealth solutions and systems that are relevant to their needs and are user-friendly.

Strategic Initiatives:

(a) Provide guidelines with clear definition of criteria and targets for eHealth awareness and progress expected.
(b) Develop and roll-out eHealth awareness campaigns and build a positive attitude.
(c) Develop appropriate communication mechanisms and forums for defined target groups.

(d) Promote awareness of eHealth, specific eHealth services applications, and their benefits.
(e) Develop guidelines for measuring the effectiveness of the awareness campaigns
(f) Develop a schedule for carrying out awareness campaigns for the target groups.
(g) Establish a framework for measuring effectiveness of engagement and awareness activities.
(h) Promote and sustain national development of eHealth.
(i) Promote collaboration and buy-in of all stakeholders and partnerships with various organizations.
(j) Ensure continuous improvement and minimal duplication of efforts on eHealth.

6.12 Change, Adoption, Business Process Re-Engineering and Transitioning

This pillar focuses on what needs to be done to encourage and enable participants in the healthcare system to adopt eHealth solutions and change their work practices to be able to use these solutions effectively. It furthermore focuses on how to manage the rapid changes in technology while implementing eHealth.

<u>Strategic Objective 1:</u> Establish a comprehensive change and adoption strategy to promote and enforce the development and use of eHealth solutions for both public and private institutions at all levels.

Although eHealth has proved to bring about genuine potential benefits in many countries, several practical experiences indicate that the obtained benefits can vary greatly depending on several factors, including the willingness of the actors to use eHealth solutions to interact with the health system. Therefore, to ensure the maximum benefit is obtained from the eHealth investment, the Ministry intends to establish a comprehensive change, adoption and transition strategy to promote and enforce the use of these solutions at all levels in the health system.

Strategic Initiatives:

(i) Develop and implement an eHealth Change and Adoption Strategy
(ii) Establish national awareness and education campaigns on eHealth programs.
(iii) Review existing health facility and provider accreditation acts to enforce the use of eHealth solutions and required standards.
(iv) Build eHealth skills capacity and capability by establishing national coordination of changes to higher education programs.
(v) Promote and empower local companies with the capacity and capability to develop and maintain large-scale eHealth solutions.

<u>Strategic Objective 2:</u> Establish a comprehensive Business Process Re-Engineering strategy to take to facilitate the uptake of eHealth.

The success of eHealth implementation is hinged around achieving radical performance improvements through a clean slate approach for processes, instead of speeding up outdated inefficient processes with technology. This entails breaking away from the outdated rules and fundamental assumptions that underlie existing healthcare operations.

BPR comes with the following two challenges;

- **Technical challenge:** which is due to the difficulty of developing a process design that is a radical improvement of the current design,
- **Socio-cultural challenge:** resulting from the severe organizational effects on the involved people, which may lead them to react against those changes.
- **Project Management:** This is the challenge of managing the BPR project

This Strategic Objective aims at establishing a way of improving the business processes to support benefit realisation from implementation of eHealth putting into consideration the challenges anticipated.

Strategic Initiatives:

(a) Develop and implement a Business Process Re-Engineering Guideline for eHealth that amongst others includes;
   - Setup the BPR Project and Team
   - Conduct a Business Diagnosis and Measurement
   - Documentation current Business Processes and convert into an automated work flow model
   - Select Processes for Change and Modelling
   - Re-design the Business Processes to align with eHealth Enterprise Architecture and Interoperability Framework
   - Personnel adjustment and training
   - Management of Change and Employee Empowerment
   - Consideration of Outsourcing some Business Processes

(b) Sensitize and handhold different Medical Facilities in adoption or adaptation of the Business Process Re-Engineering Guideline
(c) Enforce and Monitor compliance to the Business Process Re-Engineering Guideline for eHealth

<u>Strategic Objective 3:</u> Establish a comprehensive eHealth Transitioning strategy to take care of rapid changes in technology.

Information technology has been rapidly changing, and will continue to do so at an unprecedented and perhaps even accelerating rate.

(a) Adherence to the eHealth Enterprise Architecture that ensures standardization and interoperability such that any new technologies can integrate with existing ones
(b) Keeping abreast with current trends through the resource centre to enable review of plans and forecasting changes early enough
(c) Develop and implement a training and knowledge acquisition Guideline
(d) Develop an eHealth Procurement Guideline that takes care of Vendor Support in terms of changed Technology

6.13 Legal and Regulatory Framework

The regulatory environment in which eHealth solutions are deployed greatly influences affordability, availability and adoption. The regulatory environment in eHealth provide guidance for all stakeholders on effective implementation of eHealth. There are existing laws, regulations, and policies, declarations that are able to support implementation of eHealth but need a proper mechanism for enforcement and compliance assessment.

Furthermore, there is need to review the completeness, appropriateness and effectiveness of the existing regulatory environment. This strategic Objective aims at putting a legal and regulatory function for eHealth that shall have the responsibility of ensuring the efficiency and effectiveness of the legal and regulatory environment.

<u>Strategic Objective 1:</u> Establish and operationalize a Legal and Regulatory Function for eHealth.

Strategic Initiatives:

(i) Establish a legal and regulatory function in the MOH to oversee the legal and regulatory role, enforcement, audit, compliance assessment and review working closely with other Regulatory Bodies and the Ministry of Justice.
(ii) Review all the existing legal and regulatory framework related to eHealth and make recommendations on requisite improvements.
(iii) Establish a privacy and regulatory framework to ensure appropriate privacy safeguards and consent processes for access to and use of health information in line with the National Data Privacy and Protection Law.
(iv) Review existing acts for information related to providing patient/client rights. This includes the existing act defining code of conduct for providers (Professional Councils and Health Service Commission). This review includes record retention, confidentiality, privacy, and security based on the eHealth activities.
(v) Review acts that cover sharing of information for the public good, research, and care purposes (e.g., Health Insurance Portability and Accountability Act [HIPAA] in the United States). The review aims at establishing feasibility of adaptability.

7 Implementation

The strategic objectives and initiatives outlined in Section 6 above describe the high-level actions that must be taken in order to achieve eHealth Vision for eHealth in the short, medium and long term. In order to deliver on the eHealth Strategy, work in the following priority areas requires a pragmatic, systematic and coordinated approach. These areas identified have strong interdependencies and cannot be planned for in isolation.

Successful implementation for the eHealth Strategy calls for the need to comprehend the detailed structure and components of the healthcare system and how they work together. In order to achieve the above the implementation shall be commenced with developing an Architecture which shall ensure the ability unify and integrate healthcare processes across multiple functions; the ability to unify and integrate data across the healthcare system and to link up with external partners; increased agility by lowering the complexity barrier within the healthcare; reduced healthcare solution delivery time and development costs by maximising reuse; and ability to create and maintain a common vision of the future shared by both healthcare and IT communities by driving IT alignment.

In light of the above and borrowing from regional experience in Rwanda[11], Tanzania[12], Kenya[13] and Ghana[14], an Enterprise Architecture (EA) approach has been adopted to guide the implementation of the eHealth Strategy. Enterprise Architecture is a strategic planning process that translates an enterprise's business vision and strategy into effective enterprise change. EA is a well-defined practice for conducting enterprise analysis, design, planning, and implementation, using a holistic approach at all times, for development and execution of strategy. EA applies architecture principles and practices to guide organizations through the business, information, process, and technology changes necessary to execute their strategies.

Through Enterprise Architecture, the future-state of eHealth shall be defined, the future requirements, principles and models shall then be compared to the current-state of eHealth, and then gaps shall be identified and be used as insights to influence plans going forward.

EA is a complete specification of all of the key elements and relationships that constitute an organization, including which components need to be aligned to which parts. EA defines the structure for design and implementation of eHealth systems, linking the systems to be interoperable and using defined standards, so that health information and data from various sources can be linked and integrated to provide a better understanding of how the health sector is delivering overall health services. In so doing, the eHealth as a whole experiences reduced risks of fragmentation, fewer duplications of effort, and greater interoperability.

[11] http://emr.moh.gov.rw/wiki/display/RHEA/Rwanda+Health+Information+Exchange+(RHIE)+Home+Page
[12] https://homes.cs.washington.edu/~anderson/docs/2011/hm2011.pdf
[13] http://www.afyainfo.org/downloads/finish/3-afyainfo-documents/1196-the-kenya-health-enterprise-architecture-khea/0
[14] https://www.itu.int/md/D10-RGQ14.3.2-C-0012/en

The Ministry aims to develop a Uganda Health Enterprise Architecture and Interoperability Framework (UHEA) to guide the development of the national integrated eHealth. The UHEA shall document the Health Human Capital Architecture, Business Architecture, Information Architecture (Data and Application/Solution Architecture), Technology Architecture, Information Security Architecture, Privacy & Data Protection Architecture as well as the attendant Standards for all the architecture areas. To this effect the UHEA shall define the required eHealth Applications, Technology and Standards holistically.

The UHEA shall be developed following the strategic initiatives outlined in Section 6.2. UHEA shall allow the MoH and other stakeholders who want to invest in eHealth to accomplish the following:

(a) Leverage what currently exists in the Uganda eHealth landscape.
(b) Understand what the new components are and where they fit into existing structures.
(c) Define data structures to fit current needs and to support anticipated ones.
(d) Demonstrate how technology and resource constraints dictate both what is feasible and the path forward.

7.1 Roadmap and Action Plan

The implementation of the National eHealth Strategy is organized into three (3) interconnected Phases over a Five (5) Year Period, each phase representing a specific stage in the progressive implementation of eHealth. The phases indicate the main areas of emphasis at a particular period, based on available resources. This does not exclude initiation of parallel activities where appropriate opportunities arise.

This approach will yield the following benefits:

Not all eHealth initiatives that have been identified are equally important; taking them up in phases will ensure that the ones that are most important are taken up first, benefits and gains from them are visible and faster which, in turn, will impart added impetus to the subsequent stages of implementation that are more complex.
With manpower resources and budgetary allocations being limited the phased approach will ensure that not only is the manpower suitably focused to concentrate smaller chunks of work, but also that the limited budgetary allocations are better utilized.
Doing the implementation in stages will also mean that if some mistakes become apparent in the early stages of implementation, these can not only be corrected but also that subsequent initiatives in later stages of the implementation stand to gain from these early mistakes. Doing everything all at once will deny agencies this advantage.
A staged implementation ensures that parts of the implementation are taken, and successfully accomplished before moving on to the next stages. As such, stakeholders do not have to wait for a long time to see the "low hanging fruits" or the early successes. In an all-at-once approach success necessarily comes much later.

(a) Phase I: Establishing eHealth Foundations and Governance (Connect and Communicate) – ***Two (2) Years***

This Phase focuses on establishing the basic building blocks that need to be implemented first as they are pre-requisites for all future capabilities.

(b) Phase II: Deploy, Maintain and Support based on the UHEA (Developing and Building up) – ***Two (2) Years***

The second phase builds on the foundational capabilities from Phase 1 and begins to add some of the higher level of functionality of eHealth. The Phase focuses on commencing the deployment and maintenance of eHealth in line with the Uganda Health Enterprise Architecture and Interoperability Framework (UHEA) to support effective use and management of health resources (financial, medicine, HR, etc.).

(c) Phase III: Continue Implementation, Consolidation and Review (consolidating and mainstreaming) – ***One (1) Year***

The third phase builds on the capabilities developed in previous phases to enhance coordination of eHealth across the continuum. The Phase focuses on continuing the implementation based on of the Uganda Health Enterprise Architecture and Interoperability Framework (UHEA) by consolidating and mainstreaming into the entire Health Sector and reviewing. This phase includes;

As illustrated in ***Appendix A)*** each phase builds on the previous phase, with no one phase being entirely independent or discrete. For example, the functionality gained in Phase I, through foundational initiatives, will enhance the functionality of Phase II and II initiatives. A phased approach to implementing eHealth allows a focus on accomplishing specific deliverables and benefits at each phase, and creates incremental successes from which to build and realize the full vision for eHealth.

While the Ministry is working to develop its eHealth strategy, it currently implements several eHealth solutions, including HMIS software strengthening, DHIS2, HRHIS, several other mHealth solutions, etc. The development of the eHealth Strategy does not mean stopping the ongoing initiatives.

Some activities are longitudinal and will span the entire course of the timeframe while others may be more distinct. All are captured in the action plan, including the timeframe needed to meet or sustain each initiative. Revisiting the action plan shall be important to ensure the continued alignment of activities with achieving the eHealth Policy and Health Sector Development Plan and the Sustainable Development Goals. As time advances, there shall be opportunities to assess the status of the progress and revisit the action plan.

The eHealth Steering Committee as the owners of the strategy shall oversee the action plan with the support of the eHealth Technical Working Group. The eHealth Entity shall implement the action plan.

7.2 Projects and Prioritization

The National eHealth Strategic Plan will be implemented through the National eHealth Program which will comprise of integrated projects/programmes at national, sector, district, community and institutional level. All programmes/projects will adhere to agreed national standards so that information can follow seamlessly as required. The focus will be to ensure that different parts of the service understand their roles and what they are accountable for delivering and meeting the agreed targets on time.

A project charter is a primary document used to guide project teams in planning their work. A charter will be developed for each project, defining the project in terms of its objectives, scope, stakeholders and major deliverables, along with other required standard elements. In its governance role, the eHealth Steering Committee shall prioritize and determine whether projects (as indicated by their charters) are consistent with the overall strategic framework and National priorities. The charters also serve as a reference point for the eHealth Steering Committee in its ongoing monitoring role to ensure achievement of the promised project deliverables and continued alignment with the National eHealth vision.

7.3 Funding and Budget

7.3.1 Funding Model

The eHealth Strategy to realize its vision, mission, objectives and targets requires appropriate and adequate resources. The financing of the eHealth Strategy shall be within the broad financing structure and strategy for the Vision 2040, NDP II, HSDP II and the ICT SIP II. In addition to the formal financing models, other options are suggested. The detailed models amongst others include:

Area	Description	Options
Funding sources	The organizations and agencies that are potential sources of funding for the action plan.	• Government MDAs • Local Governments • Nongovernmental organizations (NGOs) • Development Partners • International or regional development banks • Existing funding and incentive schemes (Innovation Fund) • Health Insurance Scheme • Outsourcing (Pay-per-use) • Transnational Corporations • Civil Society Organizations (CSO) • Vendors and industry (health and non-health) • Private Sector

		• Ugandan Citizens
Funding mechanisms	The potential mechanisms through which funding can be obtained from funding sources.	• Budgetary provision including Non Tax Revenues (NTRs) • Public Private Partnerships (PPPs) • Foreign Direct Investment (FDI) • Debt Swap Financing • Grants • Donations • Co-Financing • Technical Support • Loans • ICT Investment Bonds
Magnitude	Estimate of the magnitude of funding that each potential funding source could provide.	• High-level funding range, rather than specific funding amounts
Timing and duration	Understanding of the timing when potential sources of funding may be available, and over what duration funding may be accessible.	• Short-term • Medium-term • Long-term
Conditions	Aligning any conditions that may be required to secure funding from potential funding sources.	• Population health outcomes (e.g. Universal Health Coverage) • National infrastructure development • Health system improvement • Clinical and medical research improvement

The main driver for the financing model for the eHealth Strategy shall be the National Treasury. By Government spearheading the financing of strategy, it will be a demonstration of the pivotal role of eHealth in the socio-economic transformation of the country. The Government of Uganda is expected to spear head investments in areas that are public in nature as well as those for improving the delivery of government services.

The Private Sector has been an engine of growth for the country's economy in general and the Health and ICT Sector in particular. Accordingly, PPPs shall continue to play a key role in implementation of the Strategy. The key areas of focus will be in those areas under the Strategy where public private collaboration can result in great benefits.

The Private Sector will also be a major source of Investment. This will be facilitated by an enabling environment created by appropriate policies, laws and taxation regimes. The Private sector will also bring in the much needed technical and technological expertise for the development of eHealth.

The support from the Development Partners will be critical for the successful implementation of the Strategy. Investment will particularly be in form of direct budget support as well as technical and financial support to specific programmes and projects. In addition, the implementation of Strategy shall leverage on the vast experience of Development Partners in implementation of regional and international programmes and projects.

7.3.2 Budget

The Budget for implementation of the eHealth Strategy is in alignment with the Roadmap and Action Plan. The total budget for the five year period is Thirty Billion, Six Hundred Twenty Eighty Million and Five Hundred and Eighty Thousand Uganda Shillings ***(30,628,580,000/=).*** Detailed Costing and Budget

		Values in Millions of Uganda Shillings					
No.	**Strategic Pillar**	**Year**	**Year1**	**Year 3**	**Year 4**	**Year 5**	**Total**
1	Leadership & Governance	121.36	56.40	56.40	56.40	73.20	**363.76**
2	Enterprise Architecture, Interoperability and Standards	2,719.44	2,394.40	14.40	34.40	114.40	**5,277.04**
3	eHealth Services, Information Sharing and Data Management	6,312.64	283.08	1,565.00	45.00	1,549.00	**9,754.72**
4	Infrastructure	1,121.08	1,181.28	1,116.60	1,103.60	1,103.60	**5,626.16**
5	Ethics	26.72	126.40	14.40	14.40	14.40	**196.32**
6	Information Assurance	70.08	189.60	21.60	21.60	21.60	**324.48**

7	Human Resources and Capacity Building	166.00	272.72	823.40	23.40	23.40	**1,308.92**
8	Mainstreaming Special Interest Groups	3.36	45	509	9	7.2	**573.56**
9	Research, Innovation and Development	120.00	852.62	802.48	752.48	752.48	**3,280.06**
10	eHealth Investment	72.56	315.80	249.00	257.40	257.40	**1,152.16**
11	Stakeholder Engagement, Collaborations, Advocacy and SMART Partnerships	49.00	379.04	43.04	43.04	43.04	**1,757.16**
12	Change, Adoption, Business Process Re-Engineering and Transitioning	15.00	158.16	41.16	41.16	41.16	**296.64**
13	Legal and Regulatory Framework	272.00	232.00	232.00	232.00	232.00	**1,200.00**
	Total	11,069.24	6,486.50	5,488.48	2,633.88	4,232.88	**31,110.98**

The detailed Budget is given in ***Appendix B)***.

7.4 Monitoring and Evaluation

Monitoring and Evaluation (M & E) is a core part of eHealth Strategy as it allows the management of implementations to assess whether objectives are being met, or how to redirect resources to better achieve the stated objectives if they are not being met.

There are two (2) components of monitoring and evaluation, i.e. monitoring the execution of the plan (inputs, activities, and outputs as defined in the plan) to keep track of the status of implementation, and monitoring results if the plan delivers the desired outputs and outcomes.

The Results-based management [15]approach adopted in the eHealth Toolkit has been embraced to develop the eHealth Monitoring and Evaluation Framework. The approach focuses on performance and on achievement of outputs, outcomes and impacts by:

(a) Defining indicators that provide insight into the adoption of eHealth and the tangible results for health and non-health stakeholders;
(b) Identifying indicator baseline and target measures to allow monitoring and evaluation of progress over the duration of the plan; and
(c) Describing the governance and processes required.

The deliverables from each strategic pillar and activities are the output indicators and the desired eHealth outcomes are the outcome indicators. The output indicators shall be used to measure the adoption of eHealth and outcome indicators for the results of adoption. Issues, concerns, problems and/or challenges shall be identified and evaluated during monitoring and evaluation for appropriate actions. Regular status reporting and communication shall be provided to ensure delivery of required outputs and attainment of expected outcomes.

7.4.1 The Proposed Monitoring and Evaluation Process

The process for National Monitoring and Evaluation of eHealth during the implementation of the Action Plan is show in Figure 3. below.Figure 3 - National Monitoring and Evaluation Process for eHealth in Uganda

[15] United Nations. Programme performance assessment in results-based management (http://www.un.org/Depts/oios/mecd/un_pparbm/index.htm, accessed 17 May 2012).

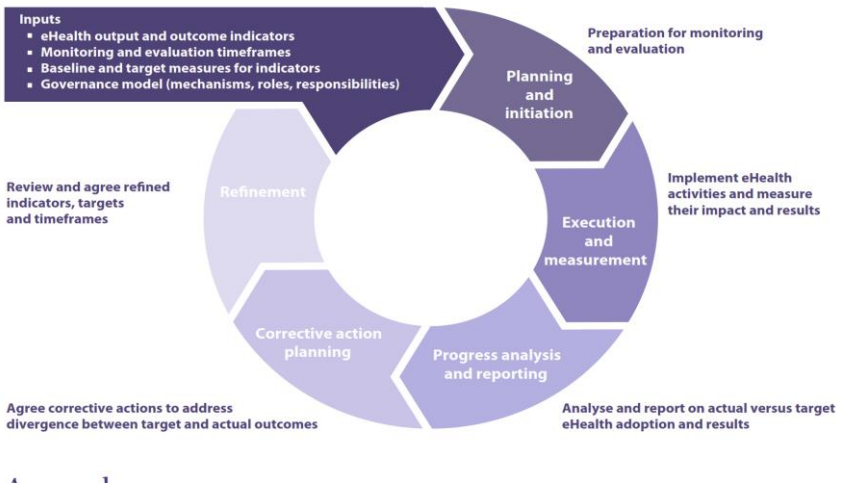


Figure 3 - National Monitoring and Evaluation Process for eHealth in Uganda

Process	National Level	Activity Level
Planning and initiation	• Define and communicate national evaluation schedule and milestones • Develop and communicate national monitoring and evaluation frameworks, tools and templates • Provide advice and support to activity-level teams in defining appropriate indicators and targets that support national-level indicators and targets	• Establish local monitoring and evaluation roles and responsibilities • Define detailed monitoring and evaluation timelines and milestones that align with national timings • Develop and deploy detailed monitoring and evaluation procedures, tools and templates that align with national requirements • Define detailed indicators that support measurement of national indicators • Define target measures that support national targets • Define indicator measurement approaches
Execution and measurement	• Provide advice and expertise to activity-level teams on developing indicator measures to assess current performance	• Collect measurement data while activity is being undertaken • Develop and track current indicator measures • Identify and resolve issues in developing current indicator measures
Progress analysis and reporting	• Collate activity-level reports on actual versus target performance for indicators Corrective action planning	• Develop reports that describe actual versus target performance for activity-level indicators

	• Liaise with activity-level teams to explore performance and understand causes of divergences • Develop reports that describe actual versus target performance for national-level indicators • Identify causes of divergences in actual and target performance at the national level	• Identify causes of divergences in actual and target performance at the activity level
Corrective action planning	• Liaise with activity-level teams to understand corrective actions that can be taken to address activity-level and programme-level divergences • Identify and assess programme-level corrective actions to address divergences in actual and target performance at the national level • Assess impact, costs and risks of implementing programme-level corrective actions • Review and gain endorsement programme level corrective actions with the Steering Committee • Manage changes in the scope of national programme (if required) to implement corrective actions	• Identify local actions that can be taken to address divergences in actual and target performance for activity-level indicators • Identify programme-level actions that can be taken to address divergences in actual and target performance for activity-level indicators • Assess impact, costs and risks of implementing local and programme-level actions for the activity in question • Manage changes in scope (if required) to implement corrective actions
Refinement	• Identify national target measures for indicators that may be unrealistic or unachievable within the required timeframe • Liaise with activity-level teams to understand changes to activity-level targets Understand implications on national level target measures for indicators • Develop revised national target measures for indicators • Review and gain endorsement of revised national target	• Identify activity target measures for indicators that may be unrealistic or unachievable within the required timeframe • Refine target measures for indicators to be realistically achievable • Agree changed target measures for indicators for future monitoring periods

	measures with the Steering committee	

The derived Monitoring and Evaluation Framework for the eHealth Action Plan is shown in ***Appendix B).***

The MOH shall incorporate the identified actions and monitoring and evaluation requirements into different Departments Operational Plans.

The governance model and processes for national monitoring and evaluation shall be included in the establishment of the national eHealth governance structure to direct, implement, enforce, monitor, and evaluate the national adoption of eHealth in the country.

7.5 Governance and Management

Successful implementation of the National eHealth Strategy requires a well-defined governance structure to provide improved visibility, coordination, and control of eHealth activities that are occurring across the country's health sector. The main goal of governance is to assure all stakeholders that operations will go as expected—that the results achieved will be in line with the decisions made. The governance structure needs to incorporate the assembly of a management team and technical team to combine the knowledge, skills, and stakeholder needs in a way that absorbs and takes advantage of stakeholder contributions on a continuous basis.

Below are the Governance activities that majorly focus on establishing governance structures and mechanisms for accountability, transparency and leadership.

The Governance and Management structures have been developed basing on the COBIT 5 Framework [16]with the following principles;

(a) Meeting Stakeholder needs
(b) Covering the Enterprise End-to-end
(c) Applying a Single Integrated Framework
(d) Enabling a Holistic Approach
(e) Separating Governance from Management.

The Governance and Management is premised on two distinct categories base on a detailed responsibility matrix shown in Appendix ***eHealth Ideal Governance and Management Responsibility Matrix***;

(a) **Governance**, which comprises;
- Evaluating, Directing and Monitoring (EDM)

(b) **Management**, which comprises;

[16] https://www.isaca.org/cobit/Documents/COBIT-5-Introduction.pdf

- Align, Plan and Organize (APO)
- Build, Acquire and Implement (BAI)
- Delivery, Service and Support (DSS)
- Monitor, Evaluate and Assess (MEA)

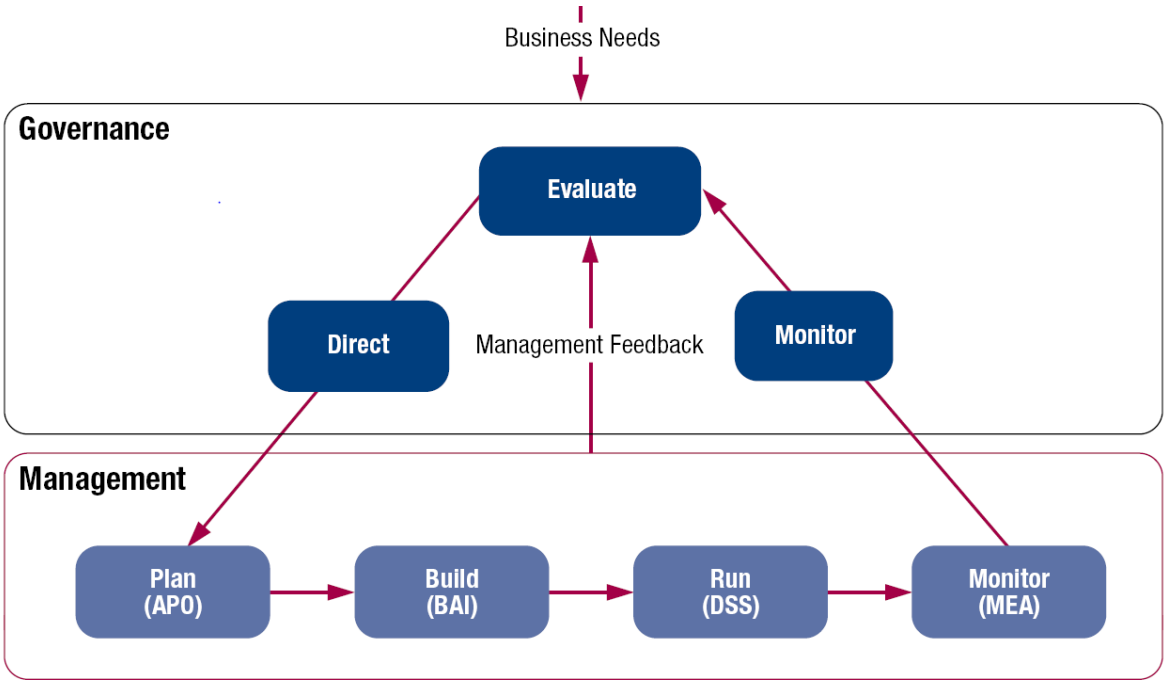


Figure 4 - eHealth Governance and Management Role

The Governance and Management Framework as derived for eHealth in given in the table below.

Governance/ Management Area	Proposed Governance Establishment/ Function	Alignment with current Structures
Evaluating, Directing and Monitoring (EDM)	**National eHealth Steering Committee** • Setting overall national eHealth direction and priorities, for reviewing and approving national eHealth strategy and funding decisions, and for monitoring of national eHealth strategy progress and evaluating outcomes	**Health Policy Advisory Committee (HPAC)** *Note: HPAC lacks representation from the ICT Sector (Ministry, Industry and Civil Society)*

Align, Plan and Organize (APO)	**eHealth Technical Working Group** • Developing and overseeing implementation of the eHealth Strategy based on direction from the Steering Committee	**eHealth Technical Working Group** *The eHTWG could constitute other sub-Committees, e.g. the Enterprise Architecture.*
		Division of Health Information *Note: The Division needs strengthening to perform this role in addition to its other functions*
		Ministry of Health Planning Department. *To mainstream eHealth in the Planning for the Ministry of Health Planning Framework.*
Build, Acquire and Implement (BAI)	**eHealth Entity** • Coordinating the implementation of the national eHealth strategy, investment, project management and execution. This role shall include liaison with the other stakeholders directly involved in the building and acquisition and implementation. • Coexist with existing governance functions operating at a national, regional and local level. As such, there is a need to identify and formalize the relationships with these governance functions, and clearly define how they will interact with relation to eHealth strategy,	**Division of Health Information** *Note: The Division needs strengthening to perform this role in addition to its other functions. The Division could be upgraded to a Department.*

	investment and coordination.	
Delivery, Service and Support (DSS)	**eHealth Entity** • Accountability for ensuring the developed eHealth services are delivered, services, supported and maintained	**Division of Health Information** *Include the delivery, service and support function in their role.*
	eHealth Regulatory Function • Accountability for implementing and enforcing national eHealth regulatory frameworks. • The development of this function would need to address relationships and interactions with existing regulatory bodies and functions.	**Ministry of Health - Quality Assurance Department** Include enforcement of eHealth regulatory function in the Quality Assurance Function. NOTE: Consideration should be made to recruit Legal Personnel.
		Health Service Commission (HSC) *Include eHealth regulatory function in their role*
		Public Service Commission ***Include eHealth regulatory function in their role***
		Office of the Solicitor General
		Health Professionals Council *Include eHealth regulatory function in their role*
Monitor, Evaluate and Assess (MEA)	**eHealth M & E Function** • Accountability for reviewing and reporting on eHealth Indicators in alignment with	**Division of Health Information** *Include eHealth M & E function in their role.* ***The Project Management Unit***

	International, regional and national Health Indicators	**Health Service Commission (HSC)** *Include eHealth M & E function in their role*
		Health Professionals Council *Include eHealth M & E function in their role*
		Ministry of Health - Quality Assurance Department *Include M & E function in the Quality Assurance Function.*

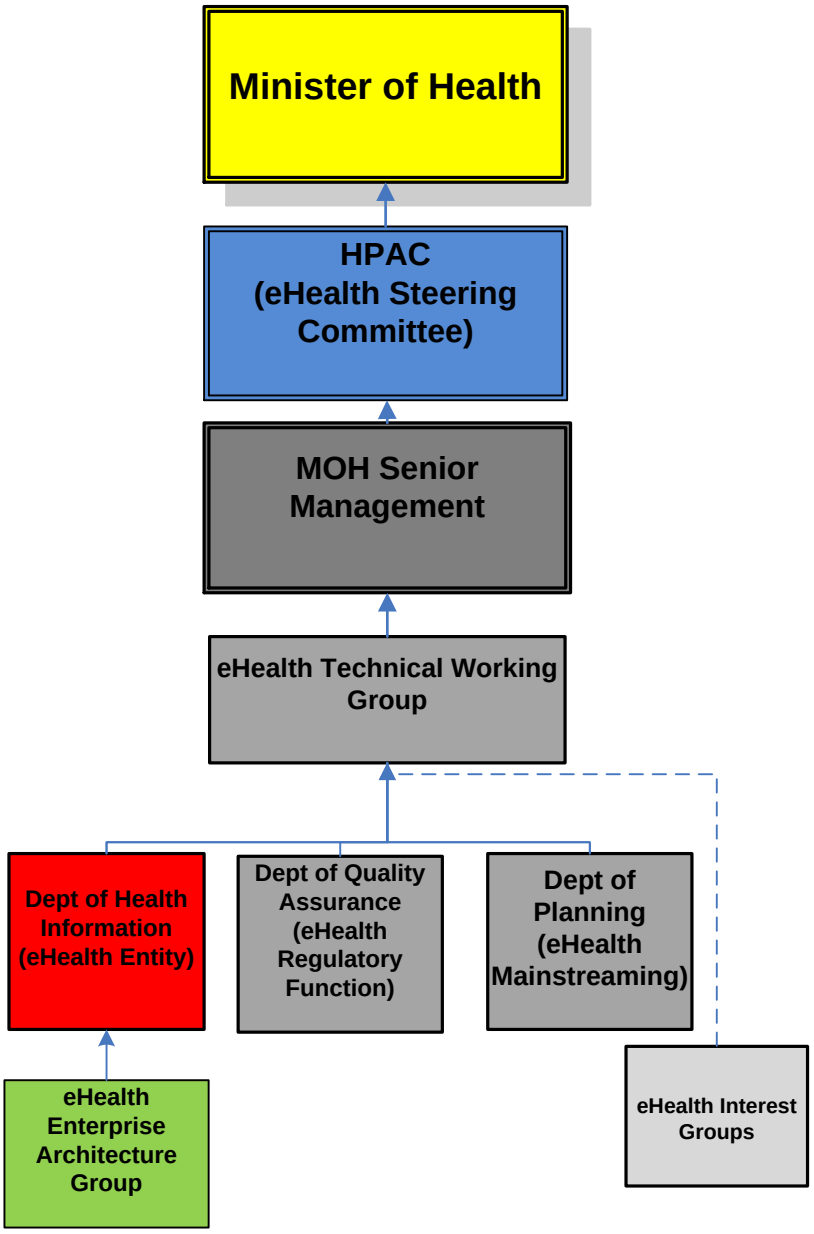


Figure 5 - eHealth Governance Organogram

The detail of the Terms of Reference for the different Governance and Management Structure are detailed in ***Appendix Proposed Governance and Management***.

7.6 Critical Success Factors

In order for this eHealth Policy and Strategy to become operational and have the expected impact, the following are the key success factors;

(a) Strong Leadership and dedicated coordination;
(b) Key stakeholders and consumers recognize the benefits and are engaged;
(c) Project Planning and Readiness Assessment to inform Implementation;
(d) A sustainable Workforce Model in place;
(e) A sustainable Funding Model in place;

(f) Public sector implementation project sponsorship, resources and funding;
(g) Private sector adoption programmes such as Practice Incentive programme (PIP) and Accreditation to drive uptake;
(h) Complementary ICT Infrastructure and Architecture in place;
(i) Access and Accessibility Policies and Procedures in place;
(j) Trust in the eHealth services and identifiers with stakeholders;
(k) Legislation and Regulatory Framework to support eHealth;
(l) Ongoing review and evaluation.

7.7 Sustainability

Numerous eHealth projects struggle and may fail to survive beyond the pilot. Despite the large number of eHealth projects today and positive outcomes of evaluation studies, the actual uptake of eHealth services is lower than expected.[17]

There are four (4) major challenges in the uptake of eHealth[18];

(a) Low Diffusion: eHealth is not available to, desired by everyone (potential users do not have the resources, or the need to utilize eHealth;
(b) Low acceptance: eHealth is not satisfying (early adopters do not have their needs satisfied)
(c) Low adherence, also referred to as non-usage attrition; eHealth is not used persistently
(d) Current frameworks from eHealth development suffer from
    - Lack of fitting infrastructure
    - Inability to find funding
    - Complications with scalability
    - Uncertainties regarding effectiveness and sustainability

7.7.1 Sustainability Planning

In the context of eHealth Projects, Sustainability can be described as a system that has passed the pilot phase and is now fully operating[19]. A sustainable eHealth Service will no longer be financed by external funds. However, being financially sustainable is not the only important aspect for eHealth, there is need for Institutional sustainability, political sustainability and technological sustainability.

7.7.2 Sustainability Planning Guideline

A sustainability model shall be developed basing on the following segments:

(a) Stakeholder Analysis: Active participation of key stage holders to develop and implement eHealth
(b) Research and Analysis: Identification of past, existing and planned eHealth initiatives
(c) Principles and Stakeholder Value Prepositions: Developing a set of consensus based principles outlining how the stakeholders want to establish eHealth. In addition, it is important to understand the value of participation in eHealth for each stakeholder. The probability of successful sustainability will be greatly improved if eHealth can directly relate its value back to each stakeholder and show a positive return on investment over time for each participant.

[17] http://www.ncbi.nlm.nih.gov/pubmed/19482542
[18] http://doc.utwente.nl/75576/; http://www.jmir.org/2011/4/e124/
[19] https://www.myesr.org/html/img/pool/business_models_eHealth_report.pdf

While improved quality of care is important to all stakeholders, financial measures are a strong and measurable determinant of sustainability. Success factors for this phase include the following:

- An adopted set of guiding principles for building and sustaining eHealth
- A description of the value propositions for each stakeholder
- Connection of the use cases to stakeholder value propositions is important before funding becomes an issue

(d) Capital and Operating Strategies: eHealth funding can come from many sources. Capital funding to build and launch eHealth will be different from the operational funding that is likely to come from participants in some form. It is important to identify the sources for each type of funding, determine the probability of obtaining that funding, and develop a strategy to secure the funding required for both building and operating eHealth. Success factors for this phase include the following:

- Determination of the funding required to build as well as operate eHealth until it is sustainable on its own merits
- Identification of the various sources of funding and the requirements to secure funding from each proposed source
- Stakeholder support for the funding strategies

(e) Risk Mitigation: All projects entail risk. Some risks are significant and some are minor. Identifying each potential financial risk and determining a mitigation strategy is important for achieving sustainability. There is need to a Uganda eHealth solid risk mitigation strategy covering the five domains of eHealth: Governance, Finance, Business and Technical Operations, Legal and Policy, and Technical Infrastructure. Success factors for this phase include the following:

- Clear definition of each potential risk related to sustainability
- Prioritization of each risk to determine where mitigation strategies are critical to sustainability
- Analysis of the costs and benefits of each mitigation strategy to determine where resources should be focused to ensure sustainability

(f) Financial Modelling and Scenario Development: Consensus-based decision making is possible when the intersections of multiple stakeholder value propositions can be identified. The process proposed for Uganda eHealth is keyed to locating these intersections and using them to obtain agreement on critical decisions related to the formation of a sustainable financial plan between divergent stakeholders. Only by finding those critical points that engage and effectively lock in support from stakeholders can progress be made towards the ultimate goal of sustaining eHealth. Developing a flexible financial model provides decision makers with the capacity to test various assumptions regarding sustainability and reach consensus. Concurrent with the development of the financial model, it is important to identify potential scenarios for how eHealth will develop and grow. Together, decision makers can model the consequences of various scenarios on the issue of sustainability. Success factors for this phase include the following:

- Flexible financial model is designed, tested, and adopted
- Realistic scenarios are created based on various assumptions

- Scenarios are tested against the financial model to determine the appropriate strategy for sustainability

(g) Stakeholder testing and Modifications: Once the consensus financial model is defined it needs to be tested with the stakeholders for input and additional feedback. As the stakeholders have been involved in the process since the beginning, their input will already have been built into the different scenarios. However, stakeholders generally do not fully commit to a project until the sustainability model is finalized. Therefore, once developed, the sustainability model needs to be tested and modified as needed. Success factors for this phase include the following:

- The desired sustainability model is presented to the key stakeholders and feedback obtained
- Modifications are made to the model as needed
- Stakeholders approve the sustainability model

(h) Adoption and Implementation: Once the sustainability model is approved and adopted, eHealth can move forward with implementation. It is important to have key stakeholders publically endorse the model, agree to participate, and make a firm financial commitment to eHealth through the participation agreement. At this point, eHealth may fully move into implementation, knowing there is a sustainable financial model. Success factors for this phase include the following:

- Formal stakeholder approval
- Communication of the approval to all stakeholders, including the Iowa Legislature and Governor
- Participation agreements signed and executed by eHealth participants

Appendices

Appendix A) Phased Implementation

Strategic Pillars and Strategic Initiative	Phase I								Phase II								Phase III			
	2016/17				2017/8				2018/19				2019/20				2020/21			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Leadership and Governance																				
Approval and Review of the eHealth Policy and Strategy	MOH & Cabinet																Review of the eHealth Strategy			
Define, establish, and institutionalize the eHealth governance structures	TORs & Appoint	Continuous Monthly Meetings of the Governance Structures																		
Establish relationship and governance interactions with key stakeholders	Identification, Mandates & MOU's Established	Execution of the established MOUs (NIRA, NITA-U, UBOS, UCC, OPM, NPA, etc.)																		
Mechanisms for implementation and compliance to national eHealth regulatory frameworks	Establish Regulatory Function and M & E Framework	Continuous Monthly Monitoring, Compliance Assessment and Reporting on the Regulatory Environment																		
Develop and operationalize a monitoring, Evaluation and Reporting mechanism for eHealth towards the SDGs, NDP II, NHDP and National ICT	Develop an M & E & Reporting Mechanism	Continuous Periodic Monitoring, Evaluation and Reporting towards SDGS, NDP II, NHDP, ICT SIP																		

Strategic Pillars and Strategic Initiative	Phase I								Phase II								Phase III			
	2016/17				2017/8				2018/19				2019/20				2020/21			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Strategy and Investment Plan.																				
eHealth Enterprise Architecture, Interoperability and Standards																				
Plan, design and develop an eHealth Enterprise Architecture and Interoperability Framework.	EA Devp't Plan, Governance, Vision & eHealth Readiness Assessment				Develop eHealth EA & Health Information Exchange (HIE), Awareness and Training															
Develop and Implement Compliance Assessment Mechanism to the eHealth Enterprise Architecture and Interoperability Framework.							eHealth EA Compliance Framework		Enforce and Certify all eHealth investments against the eHealth Architecture and Interoperability Set monitoring indicators, monitor compliance, report and act on violations											
Develop and Implement a Review Mechanism for the eHealth Enterprise Architecture and Interoperability Framework.							eHealth EA Review Mechanism										Review eHealth EA		Revise the eHealth EA	
eHealth Services, Information Sharing and Data Management																				

<table>
<tr><th rowspan="3">Strategic Pillars and Strategic Initiative</th><th colspan="8">Phase I</th><th colspan="8">Phase II</th><th colspan="4">Phase III</th></tr>
<tr><th colspan="4">2016/17</th><th colspan="4">2017/8</th><th colspan="4">2018/19</th><th colspan="4">2019/20</th><th colspan="4">2020/21</th></tr>
<tr><th>Q1</th><th>Q2</th><th>Q3</th><th>Q4</th><th>Q1</th><th>Q2</th><th>Q3</th><th>Q4</th><th>Q1</th><th>Q2</th><th>Q3</th><th>Q4</th><th>Q1</th><th>Q2</th><th>Q3</th><th>Q4</th><th>Q1</th><th>Q2</th><th>Q3</th><th>Q4</th></tr>
<tr><td>Establish a unique, standardized, comprehensive and comprehensible EMR, EHR and PHR.</td><td colspan="4">• Adopt the NIN as the Unique Patient/client ID
• Develop NIN & AIN Implementation Plan (Nov 2016)
• Identify and Analyse all EMR, HER & PHR initiatives (Dec 2016)
• Design & adopt a National Standard EMR, EHR and PHR (June 2017)
• Exceptional [Absence and Irregularities] Procedures (Dec 2016)</td><td colspan="16">• Enforce the EMR, HER & PHR using the NIN as a unique ID
• Monitor compliance and Report of Non-Compliance
• Monitor Irregularities and Report</td></tr>
<tr><td>Establish comprehensive health facility, provider, and patient/client registries with complete and up-to-date information that meets stakeholders' needs</td><td colspan="4"></td><td colspan="2">Data Element Spec for Registries (Nov 2017)</td><td colspan="6">Electronic Patient/client, Facility and Provider Registries & Maintenance Guidelines (Sep 2018)</td><td colspan="8">• Enforcement, Utilization and Update of Registries
• Support to the revised registration process for public and private facilities and providers
• Compliance Assessment and Reporting</td></tr>
<tr><td>Develop and Implement Priority eHealth Services and/or Applications</td><td colspan="4">Identify and Prioritize and endorse eHealth Services and/or Applications:
• Electronic healthcare planning and financial management
• Healthcare professional's human resource</td><td colspan="3">Develop TOR for identified eHealth Services and/or Applications</td><td>Identify resources and procure</td><td colspan="12">Build/deploy/scale identified priority eHealth services and/or applications</td></tr>
</table>

Strategic Pillars and Strategic Initiative	Phase I								Phase II								Phase III			
	2016/17				2017/8				2018/19				2019/20				2020/21			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	management • National electronic Logistics and Supplies Management Information System (LSMIS) • Electronic delivery and interventions of health services to in line with the universal access to the Uganda National Minimum Health Care Package (UNMHCP) • Strengthen the HMIS to support evidence-based health care and decision making • telehealth • mHealth • Electronic communication and information sharing mechanism for the referral system • Electronic integrated diseases surveillance and response system • Intelligent and integrated Health facility																			

Strategic Pillars and Strategic Initiative	Phase I								Phase II								Phase III			
	2016/17				2017/8				2018/19				2019/20				2020/21			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	management systems																			
Establish an eHealth Data, Information and Knowledge Management and Utilization System.	Develop an eHealth Data, Information and Knowledge Management Guideline				Develop Data, Information and knowledge Sharing Agreements				• Implement and Enforce Data Sharing • Monitor, Evaluate and Report of Data Management and Sharing											
	Develop a National Health Digital Content Strategy				• Implement the National Health Digital Content Strategy • Monitor, Evaluate and Report on the status of the implementation of Content Management Strategy															
	Review and Strengthen the MoH Website				Monitor, Evaluate and Report on the status of the MoH Website Content Management															
	Review the MoH Knowledge Portal				ToR and Procure the redesign of the KM Portal				Rebuild and deploy the KM Portal				Monitor, Evaluate and Report on the status of the KM Portal Content Management							
Infrastructure																				
Strengthen Core ICT infrastructure and affordability to improve communication and	• Develop a Health Sector ICT				Develop a Minimum				• Enforce the requirement for ICT Strategies, Minimum Infrastructure Requirements and SOP for eHealth Infrastructure											

<table>
<tr><th rowspan="3">Strategic Pillars and Strategic Initiative</th><th colspan="8">Phase I</th><th colspan="8">Phase II</th><th colspan="4">Phase III</th></tr>
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<tr><td>information sharing across the health systems and at all levels</td><td colspan="4">Strategy Guideline
• Facilitate Health Sector Institutions to develop ICT Strategies</td><td colspan="2">Infrastructure Guideline and SOP for eHealth Infrastructure Maintenance, Upgrade and Disposal</td><td colspan="14">• Link Health Facility Accreditation to existence of ICT Strategies, Minimum Infrastructure Requirements and SOP
• Monitor, Evaluate and Report on the status of the compliance to ICT Strategy development and implementation, Infrastructure and SOP</td></tr>
<tr><td>Connect Priority Health Institutions and Facilities (Appendix F)) to the National Backbone and National Data Centre</td><td colspan="3">Identify/Review priority Institutions/Facilities to connect</td><td colspan="19">• Conduct Site Surveys and Connect Health Institutions and Facilities to the NBI and the NDC
• Utilise the NBI and NDC for communication and Hosting Services
• Monitor, Evaluate and Report on the status of the compliance</td></tr>
<tr><td>Aggregate eHealth demand and business needs across eHealth Stakeholders with a view of facilitating bulk procurement of infrastructure.</td><td colspan="10"></td><td colspan="3">Identify eHealth Infrastructure Bulk Procurement Requirements</td><td colspan="2">Negotiate and Contract</td><td colspan="7">• Enforce the Bulk Procurement Contract(s)
• Monitor, Evaluate and Report on the status of the compliance to the Bulk Contract(s)</td></tr>
<tr><td>Adopt green and affordable Power for eHealth</td><td colspan="3">Identify current Initiatives for green and</td><td colspan="3">Develop and adopt a Guideline for green and</td><td colspan="13">• Enforce green and affordable power
• Monitor, Evaluate and Report on the status of the compliance to green and affordable power</td></tr>
</table>

Strategic Pillars and Strategic Initiative	Phase I								Phase II								Phase III			
	2016/17				2017/8				2018/19				2019/20				2020/21			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	affordable power		affordable power																	
Ensure eHealth ready Medical Facility Building Infrastructure					• Design a Health Facilities Building Guideline • Conduct consultations on the Health Facilities Building Guideline			Setup a Medical Facilities Building Committee	• Enforce the Medical Facilities Building Guideline • Monitor, Evaluate and Report on the status of the compliance to the Medical Facilities Building Guideline											
Utilize Appropriate Mature and Emerging Technologies to enhance core eHealth Services	Assess Appropriateness of Mature and Emerging Technologies for support of Health in the Ugandan Situation		Develop guidelines for appropriate Mature and Emerging Technologies		• Sensitize and disseminate guidelines for appropriate Mature and Emerging Technologies • Monitor, Evaluate and Report on the status of the compliance to the Medical Facilities Building Guideline • Continuously Identify and Review Emerging Technologies in Healthcare to establish their applicability in the Ugandan Healthcare Environment												
Ethics																				
eHealth Ethical Standards and guidelines shall	Review of the		Develop eHealth Ethics Standards					• Disseminate and sensitize all stakeholders about the eHealth Ethics Standards												

Strategic Pillars and Strategic Initiative	Phase I								Phase II								Phase III			
	2016/17				2017/8				2018/19				2019/20				2020/21			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
be put in place in conformance to cultural and religious values as well as international best practice.	existing Standards for Ethics		and Guidelines as part of the eHealth EA						• and Guidelines • Enforce the eHealth Ethics Standards and Guidelines • Monitor, Evaluate and Report on the status of the compliance to the eHealth Ethics Standards and Guidelines											
eHealth Code of Ethics shall be put in place, complied to and enforced.	Review of the existing Codes of Ethics		Develop eHealth Codes of Ethics		• Disseminate and sensitize all stakeholders about the eHealth Code of Ethics • Enforce the eHealth Code of Ethics • Monitor, Evaluate and Report on the status of the compliance to the eHealth Code of Ethics															
Information Assurance																				
Enhance Information Security to ensure confidentiality, integrity and availability of information when designing, procuring, implementing, maintaining and retiring eHealth Infrastructure and Solutions.	Review the NISF – establish if it totally takes care of Health Information Security		Develop, Institutional eHealth Information Security Guideline		• Disseminate, sensitize and train all stakeholders about the eHealth Information Security Guideline • Enforce the eHealth Information Security Guideline • Monitor, Evaluate and Report on the status of the compliance to the eHealth Information Security Guideline															
Enhance Information Protection and Privacy to ensure electronic Health information is protected and privacy maintained	Review the Data Protection and Privacy Law		Develop, Institutional eHealth Information Privacy and		• Disseminate, sensitize and train all stakeholders about the eHealth Information Privacy and Protection Guideline • Enforce the eHealth Information Privacy and Protection Guideline • Monitor, Evaluate and Report on the status of the compliance to the eHealth Information Privacy and															

Strategic Pillars and Strategic Initiative	Phase I								Phase II								Phase III			
	2016/17				2017/8				2018/19				2019/20				2020/21			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
			Protection Guideline		Protection Guideline															
Ensure Business Continuity and Disaster Recovery when utilizing eHealth	Review the NISF – establish if it totally takes care of eHealth Business Continuity		Develop a Business Continuity and Disaster Recovery Plan for eHealth		• Disseminate, sensitize and train all stakeholders about the eHealth Business Continuity and Disaster Recovery Plan • Enforce the eHealth Business Continuity and Disaster Recovery Plan • Monitor, Evaluate and Report on the status of the compliance to the eHealth Business Continuity and Disaster Recovery Plan														
Human Resources and Capacity Building																				
Evaluate the current readiness and enhance capacity of the Health Worker to embrace and support the implementation of eHealth	Develop a Sensitization and basic eHealth Training Program and content Conduct eHealth Awareness and Basic Training amongst Health		Design and conduct a detailed Workforce, Training, Skills and Competencies needs assessment for eHealth		• Develop an eHealth Workforce, Training, Skills and competencies framework • Develop professional practice standards and accreditation requirements for eHealth				• Disseminate and sensitize all stakeholders about the eHealth Workforce Structure, Competencies Framework, Professional Practice Standards and Curriculum Framework • Enforce the eHealth Workforce Structure, Competencies Framework, Professional Practice Standards and Curriculum Framework • Monitor, Evaluate and Report on the status of the compliance to the eHealth Workforce Structure, Competencies Framework, Professional Practice Standards and Curriculum Framework										

Strategic Pillars and Strategic Initiative	Phase I								Phase II								Phase III			
	2016/17				2017/8				2018/19				2019/20				2020/21			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Workforce						practice; • Develop an eHealth Curriculum Framework													
Enable Health workers to have access to continuous professional development through e-learning and digital resources			• Develop and approve methodology for delivering blended learning • Develop a program and electronic content for various health professionals.			• Implement health sector e-learning platform; • Establish a national eHealth knowledge repository; • Develop a collaboration and harmonization mechanism			• Disseminate and sensitize all stakeholders about the eHealth e-Learning Platform, qualifications for eHealth, Knowledge Repository and collaboration mechanism • Enforce the eHealth e-Learning Platform, Knowledge Repository and collaboration mechanism • Monitor, Evaluate and Report on the status of the compliance to the eHealth e-Learning Platform for eHealth, Knowledge Repository and collaboration mechanism										
Mainstreaming Special Interest Groups																				
Support Access to, Acceptance and Utilization of eHealth by Special Interest Groups.	Coordinate the setup and institutionalization of a Special Interest Group Forum for eHealth		Review the existing legal and regulatory framework – to align with SIGs		• Develop an Infrastructure, eHealth Services, accessibility architecture and Standards for SIGs as part of the eHealth EA; • Develop Policies and Guidelines for				• Disseminate and sensitize all stakeholders about the eHealth SIG Architecture, Web Portal and Content Management Procedures • Enforce the eHealth SIG Architecture, Web Portal and Content Management Procedures • Monitor, Evaluate and Report on the status of the compliance to the eHealth SIG Architecture, Web Portal and Content Management Procedures										

Strategic Pillars and Strategic Initiative	Phase I								Phase II								Phase III			
	2016/17				2017/8				2018/19				2019/20				2020/21			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
					eHealth for SIGs; • Develop a National Healthcare Web Portal for the SIGs; • Include specific procedures for SIGs as part of the National Health Digital Content Strategy															
Research, Innovation and Development																				
Enhance HealthCare Research and Innovation using Information and Communications Technology.	Develop Requirements for National Health Care Web Portal				Procure, Design, Develop and Deploy a National Health Care Web Portal				• Disseminate and sensitize all stakeholders about the National Health Care Web Portal • Enforce the eHealth National Health Care Web Portal • Monitor, Evaluate and Report on the status of the compliance to the National Health Care Web Portal											
Establish an open multidisciplinary approach to Research, Innovation Development, Translation and Commercialisation of eHealth for clinicians, teachers, educators, and the general public.	• Identify and develop a database of all players in the eHealth Innovation Ecosystem with their stake and responsibilities • Develop an eHealth								• Disseminate and sensitize all stakeholders about the eHealth Innovation Governance and Partnership Strategy • Implement the eHealth Innovation Governance and Partnership Strategy • Monitor, Evaluate and Report on the status of the implementation of the eHealth Innovation Governance and Partnership										

Strategic Pillars and Strategic Initiative	Phase I								Phase II								Phase III			
	2016/17				2017/8				2018/19				2019/20				2020/21			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	Innovation Governance and Partnership Strategy																			
Promote Research, Innovation Development, Translation and Commercialisation of eHealth for innovators, clinicians, teachers, educators, and the general public.	• Identify and prioritize the eHealth research and innovations • Develop an eHealth Innovation Strategy and Agenda				Develop an open, standards based technology platform and Portal that enables innovators to create apps				• Disseminate and sensitize all stakeholders about the Strategy & Agenda and Platform & Portal • Implement the eHealth Innovation Strategy and Agenda using the Platform and Portal • Monitor, Evaluate and Report on the status of the implementation of the eHealth Innovation Strategy and Agenda • Conduct Periodic Surveys of eHealth Innovations • Conduct Periodic Workshops for eHealth Innovations										
eHealth Investment																				
Rationalize and Integrate eHealth into the national health plans and budgets.	Identify and document all the funding sources for eHealth				• Develop guidelines for developing, planning and implementing eHealth programs • Set up structures and processes to ensure proper investment and management of allocated funds				• Mainstream eHealth in the national health budget and development frameworks (including MoLG and Districts) • Provide appropriate funding and operational mechanisms for eHealth support • Enforce and monitor that all procurements are based on the eHealth Enterprise Architecture and Interoperability Framework; • Conduct Mid-Term Reviews of the eHealth Strategy and ensure that institutions plans are aligned to it.										
Promote public-private-partnerships (PPP) and pooling of resources by all partners.	Develop PPP guidelines				• Identify and prioritize plausible				• Implement PPP eHealth Projects • Monitor, Evaluate and Report on the progress of the eHealth PPP Projects.											

Strategic Pillars and Strategic Initiative	Phase I								Phase II								Phase III			
	2016/17				2017/8				2018/19				2019/20				2020/21			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
				• eHealth Projects • Procure using PPP																
Develop and implement eHealth investment plan	• Lobby for Resources for eHealth Investment form RCIP, RCDF, Health Insurance Scheme, etc. to create an eHealth Investment Fund • Develop an eHealth investment plan			Develop an eHealth Business Process Outsourcing Guideline	• Implement eHealth Investment Plan • Enforce the eHealth Business Process Outsourcing Guideline • Monitor, Evaluate and Report on the progress of the eHealth Investment Plan. • Monitor, Evaluate and Report on the progress of compliance to the eHealth Business Process Outsourcing Guideline											
Reform the Development Partner Support and Project Implementation Methods	• Identify and make an inventory of all Development Partners that provide (are planning to provide) eHealth support • Develop and maintain an			• Conduct an analysis of all the support with a view of rationalization; • Develop a Coordination Strategy for all Development Partners	• Implement the eHealth Development Partner Coordination Strategy • Enforce the eHealth Development Partner Coordination Strategy • Monitor, Evaluate and Report on the progress of the eHealth Development Partner Coordination Strategy											

Strategic Pillars and Strategic Initiative	Phase I								Phase II								Phase III			
	2016/17				2017/8				2018/19				2019/20				2020/21			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
	updateable and searchable Portal/Database of all the proposed, current and completed support by Development Partners;																			
Stakeholder Engagement, Collaborations, Advocacy and SMART Partnerships																				
Identify and engage all eHealth Stakeholders and Partners at National, Regional and International level	Stakeholder Register & Engagement Plan & Conduct Two Stakeholder Engagements	• Continuous Stakeholder Engagement as per the Engagement& Partnership Plan including awareness • Monitor, Evaluate and Report on the progress of the compliance to the Stakeholder Engagement as per the Engagement& Partnership Plan																		
Create awareness for eHealth	Develop an Incentive Strategy	• Disseminate and sensitize all stakeholders about the Incentive Strategy • Implement the Incentive Strategy • Monitor, Evaluate and Report on the progress of the compliance to the Incentive Strategy																		
Change, Adoption, Business Process Re-Engineering and Transitioning																				
Establish a comprehensive change and	Review existing health facility				• Develop an				•				• Disseminate and sensitize all							

Strategic Pillars and Strategic Initiative	Phase I								Phase II								Phase III			
	2016/17				2017/8				2018/19				2019/20				2020/21			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
adoption strategy	and provider accreditation acts to enforce the use of eHealth solutions and required standards				eHealth Change Management and Adoption Strategy								stakeholders about the Change and Adoption Strategy • Implement the Change and Adoption Strategy • Promote and empower local companies with the capacity and capability to develop and maintain large-scale eHealth solutions • Monitor, Evaluate and Report on the progress of the compliance to the Change and Adoption Strategy and development of large-scale eHealth Solutions							
Establish a comprehensive Business Process Re-Engineering strategy					Develop a Business Process Re-Engineering (BPR) Guideline for eHealth				• Disseminate and sensitize all stakeholders about the BPR Guideline • Implement and Enforce the BPR Guideline • Monitor, Evaluate and Report on the progress of the compliance to the BPR Guideline											
Establish a comprehensive eHealth Transitioning strategy			• Develop an eHealth Procurement Guideline • Develop an eHealth Training and Knowledge		• Disseminate and sensitize all stakeholders about the eHealth Procurement Guideline • Implement and Enforce the eHealth Procurement Guideline • implement a training and knowledge acquisition Guideline • Monitor, Evaluate and Report on the progress of the compliance to the eHealth Procurement Guideline, Knowledge Transition Guideline and EA												

Strategic Pillars and Strategic Initiative	Phase I								Phase II								Phase III			
	2016/17				2017/8				2018/19				2019/20				2020/21			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
			Transition Guideline																	
Legal and Regulatory Framework																				
Establish and operationalize a Legal and Regulatory Function for eHealth.	Establish a legal and regulatory function in the MOH		Review all the existing legal and regulatory framework related to eHealth		• Revise /Enhance/Enact the requisite Laws and Regulations to support eHealth • Implement and Enforce the eHealth Legal and Regulatory Framework • Monitor, Evaluate and Report on the progress of the compliance to the eHealth Legal and Regulatory Framework															

Appendix B) Detailed Costing and Budget

eHealth Strategy Budget.xlsx

Appendix C) Monitoring and Evaluation Matrix

eHealth Strategy M & E Framework.xlsx

Appendix D) Governance and Management

Existing Governance Structures

4) Health Policy and Advisory Committee (HPAC)

Role

HPAC, as the SWAp coordination mechanism, advises government on priorities, policy implementation, and conducts regular joint reviews of health sector performance.

Representation

- Ministry of Health
- Health Development Partners
- National, Regional Referral and District Health Care Delivery levels
- Health Service Commission
- Uganda AIDS Commission
- Private-not–for–Profit Medical Bureaus,
- Other Line Ministries (Public Service, Finance, Education, Water and Environment, Gender, Local Government)
- Civil Society Organisations
- Faith based organizations
- Private Sector
- People living with the diseases

Meetings

HPAC holds monthly meetings chaired by the Permanent Secretary of the Ministry of Health

Reporting

Reports to the Top Management Committee of the Ministry of Health.

Technical Working Groups

HPAC is supported by seven Technical Working groups (TWGs)

- Human Resources for Health
- Health Infrastructure
- Medicines Management and procurement
- Basic Package
- Sector Budget
- Supervision
- Monitoring and Evaluation
- Public Private Partnership in Health.

5) eHealth Technical Working Group

6) eHealth Core Team

7) Department of Health Information

8) Department of Quality Assurance

Quality Assurance department is mandated to ensure that health services provided are within acceptable standards for the entire sector, both public and private health services.

Objectives:

- Ensure standards and guidelines are developed, disseminated and used effectively.
- Build and strengthen regular supervision system at all levels of care in order to promote provision of quality health services.
- Facilitate establishment of internal QA capacity at all levels including operations research on quality health services.
- Coordinate sector performance monitoring and evaluation.

9) Department of Planning

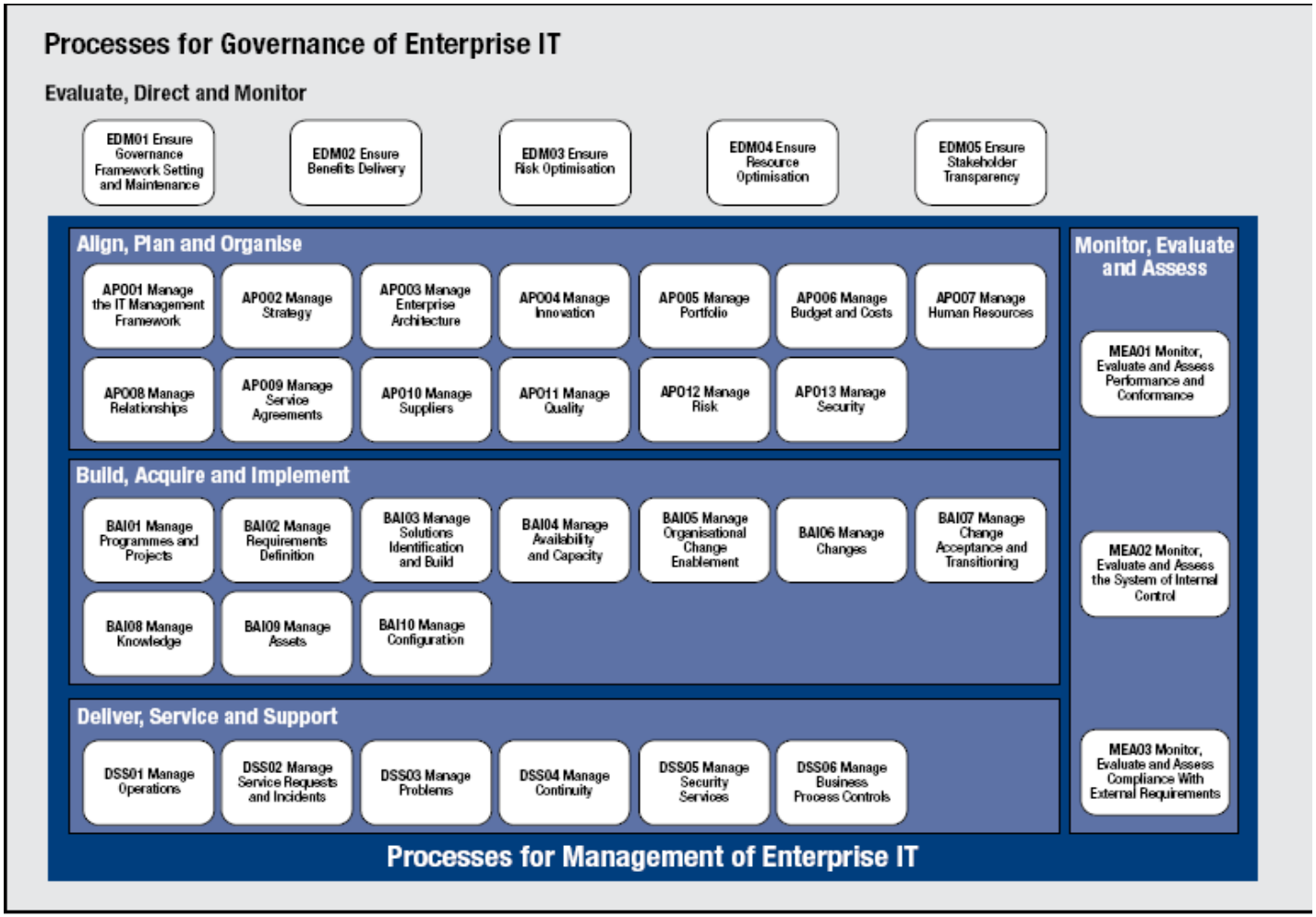
The planning department is mandated to; provide guidance to the sector, mobilize resources, develop policy frameworks, coordinate with other stakeholders (local and international), review HSSIP & NHP and finally plan for and support capacity building and training of human resources for health.

Objectives:

- Ensuring that sector Budget Framework Paper (BFP) , Ministerial Policy Statement, annual work plans and performance reports are produced
- Extending support to sector institutions, LGs and NGOs in strategic and operational planning
- Ensuring that the annual health sector performance report is produced
- Resource Mobilization and budget monitoring
- Policy analysis and production of sector policy documents
- Health Management Information System (HMIS) coordination
- Human resource capacity building

eHealth Ideal Governance and Management Responsibility Matrix

The Governance and Responsibility ideal matrix is derived from the COBIT Governance Framework.



Proposed Governance and Management

1) National eHealth Steering Committee

The National eHealth Steering Committee (NeHSC) is an important component in ensuring the overall success of the National eHealth Strategy in Uganda. The NeHSC will provide a system-level perspective to the Ministry and stakeholders on ICT and eHealth needs, priorities, and initiatives within the country.

The role of the NeHSC is to provide advice to the Ministry and stakeholders on the implementation of the National eHealth Strategy, within the broader context of the National Development Plan II and HSDP III.

Roles and Responsibilities

(a) Provide leadership and strategic guidance in moving forward with eHealth as aligned with ongoing priority projects, the National eHealth Strategy, and the HSDP III;
(b) Provide eHealth and eGov (electronic government) expertise and knowledge to the broader health system;
(c) Oversee the development, implementation and Monitoring & Evaluation and review of the National eHealth Policy, Strategy and Enterprise Architecture;
(d) Champion eHealth initiatives at national, regional, and district levels;
(e) Set, prioritize and oversee eHealth-related policies and projects, including regulating and approving eHealth projects from the subcommittees and partners, and assessing and identifying start-up and subsequent eHealth projects;
(f) Establish criteria for identification and selection of eHealth solutions;
(g) Review and approve a mechanism of health data collection, analysis and reporting;
(h) Identify opportunities for collaboration with key national and international eHealth partners;
(i) Pursue funding opportunities and leverage existing investments to support the National eHealth Strategy;
(j) Provide advice to the Ministry and stakeholders on the allocation or reallocation of resources as appropriate to achieve the National eHealth Strategy;
(k) Review gaps (knowledge, human resources, funding, monitoring and evaluation, solutions, legal and regulatory, research, etc.) and approve priorities for implementation;
(l) Oversee the work of the eHealth TWG.

Reporting and Accountability

The committee will report to the Minister through the chairperson (Director General) and secretary (head of eHealth Unit). The committee submits quarterly reports of progress made to the Minister. SWG.

The committee members are accountable to the broader health system. The committee will have an accountability mechanism in the form of an evaluation that the group will conduct annually to assess the following:

- Outcomes based on an agreed-upon work plan
- Adequacy of the established terms of reference.

Membership

The committee will be composed of no more than 9 voting members and will consist of one representative from MDAs, Hospitals, other government institutions, associations, partners and experts. The members shall be representative in their own right (not delegable) and shall be at the level of Director and Commissioner.

Additional members will be selected at the discretion of the NeHSC (not limited to MDAs). As noted previously, the committee is a system-level platform comprising the various sectors of the health services continuum. Members are not participating on behalf of their own individual organizations.

The involvement of agencies and sectors beyond those that constitute the committee membership will occur through processes that are employed to undertake the committee's work.

Members shall be appointed for a two-year term, with a proportional rotation being established to ensure continuity of the group, and each member will sign the terms of reference (outlining their roles and responsibilities clearly) for their commitment for this term.

No.	Designation	Institution	Role
1	Director General of Health Services	Ministry of Health	Chairperson
2	Head of the Division of Health Information	Ministry of Health	Secretary
3	Director/ Commissioner [ICT, Planning or Monitoring and Evaluation]	Health Service Commission	Member
4	Director/ Commissioner [ICT, Planning or	Office of the Prime Minister	Member

	Monitoring and Evaluation]		
5	Director/ Commissioner [ICT, Planning or Monitoring and Evaluation]	Ministry of ICT	Member
6	Director/ Commissioner [ICT, Planning or Monitoring and Evaluation]	Ministry of Local Government	Member
7	Director/ Commissioner [ICT, Planning or Monitoring and Evaluation]	Ministry of Gender	Member
8	Director/ Commissioner [ICT, Planning or Monitoring and Evaluation]	National IT Authority	Member
9	Director/ Commissioner [ICT, Planning or Monitoring and Evaluation]	Ministry of Ethics and Integrity	Member
10	Director/ Commissioner [ICT, Planning or Monitoring and Evaluation]Permanent Secretary	Uganda Bureau of Statistics (UBOS)	Member
11	Director – Health Monitoring Unit	Office of the President	Member
12	Director/ Commissioner [ICT, Planning or Monitoring and Evaluation]	Allied Health Professionals Council (AHPC)	Member
13	Director/ Commissioner [ICT, Planning or Monitoring and Evaluation]	Medical and Dental Practitioners Council	Member
14	Director/ Commissioner [ICT, Planning or Monitoring and Evaluation]	Uganda Nurses and Midwives Council	Member

15	Director/ Commissioner [ICT, Planning or Monitoring and Evaluation]	Pharmacy Council	Member
16	Director/ Commissioner [ICT, Planning, Research or Monitoring and Evaluation]	Uganda National Academy of Sciences (UNAS)	Member
17	Specialist [ICT, Planning, Research or Monitoring and Evaluation]	WHO	Member
18	Specialist [ICT, Planning, Research or Monitoring and Evaluation]	UNICEF	Member

Table 1 - Proposed Membership to the eHealth Steering Committee

Meetings

The committee shall meet quarterly or at the call of the chairperson with three business days' notice.

Quorum

A simple majority of members shall constitute a quorum. Meetings may be held in person or via electronic connections that allow two-way involvement of all participants.

Decision Making

Decisions will be based on consensus. If consensus is not possible, the chairperson may call a vote. A simple majority vote of those members in attendance will be needed to resolve or approve any issues requiring a vote.

Planning, reporting and information sharing

The NeHSC shall develop an action plan that will identify key priorities in a particular year. The NeHSC will report on progress and bottlenecks to the Minister and HPACC meetings. At these meetings, progress on priorities will be reported, emerging concerns discussed, and recommendations suggested for high level decisions/actions.

2) eHealth Technical Working Group

The National eHealth Technical Working Group (NeHTWG) has the role of providing technical advice to the Ministry and stakeholders on the implementation of the National eHealth Strategy.

Roles and Responsibilities

(a) Provide technical support and guidance in line with the roles of eHealth by the bodies they represent;.
(b) Alignment of eHealth implementations to the different institutional strategies and plans to ensure harmonization and non-duplication;
(c) Monitor and report on implementations related eHealth;
(d) Facilitate sharing of information in relation to eHealth;
(e) Identify gaps (knowledge, human resources, funding, monitoring and evaluation, solutions, legal and regulatory, research, etc.) and propose priorities;
(f) Strengthen multi-sectoral coordination and promote partnerships;
(g) Identify and propose priority eHealth projects;
(h) Identify and propose health data collection, analysis and report mechanisms;
(i) Oversee the work of the eHealth Entity

Reporting and Accountability

The NeHTWG will report to the NeHSC through the chairperson and secretary. The committee submits monthly reports of progress made to the NeHSC.

The committee members are accountable to the broader health system. The committee will have an accountability mechanism in the form of an evaluation that the group will conduct annually to assess the following:

- Outcomes based on an agreed-upon work plan
- Adequacy of the established terms of reference.

Membership

The NeHTWG will be composed of no more than 9 voting members and will consist of one representative from MDAs, Hospitals, other government institutions, associations, partners and experts. The members shall be representative in their own right (not delegable) and shall be at the level of Manager or Asst. Commissioner.

Additional members will be selected at the discretion of the NeHTWG (not limited to MDAs). As noted previously, the committee is a system-level platform comprising the various sectors of the health services continuum. Members are not participating on behalf of their own individual organizations.

The involvement of agencies and sectors beyond those that constitute the technical working group membership will occur through processes that are employed to undertake the NeHTWG 's work.

Members shall be appointed for a two-year term, with a proportional rotation being established to ensure continuity of the group, and each member will sign the terms of reference (outlining their roles and responsibilities clearly) for their commitment for this term.

No.	Designation	Institution	Role
1	Head of the Division of Health Information	Ministry of Health	Chairperson
2	Head of ICT	Ministry of Health	Secretary
3	Manager/ Principal Officer	Health Service Commission	Member
4	Manager/ Asst Commissioner [ICT, Planning, Research or Monitoring and Evaluation]	Office of the Prime Minister	Member
5	Manager/ Asst Commissioner [ICT, Planning, Research or Monitoring and Evaluation]	Ministry of ICT	Member

6	Manager/ Asst Commissioner [ICT, Planning, Research or Monitoring and Evaluation]	Ministry of Local Government	Member
7	Manager/ Asst Commissioner [ICT, Planning, Research or Monitoring and Evaluation]	Ministry of Gender	Member
8	Manager/ Asst Commissioner [ICT, Planning, Research or Monitoring and Evaluation]	National IT Authority	Member
9	Manager/ Asst Commissioner [ICT, Planning, Research or Monitoring and Evaluation]	Ministry of Ethics and Integrity	Member
10	Manager/ Asst Commissioner [ICT, Planning, Research or Monitoring and Evaluation]	Uganda Bureau of Statistics (UBOS)	Member
10	Manager/ Asst Commissioner [ICT, Planning, Research or Monitoring and Evaluation]	Office of the President	Member
11	Member [ICT, Planning, Research or Monitoring and Evaluation] Committee	Allied Health Professionals Council (AHPC)	Member
12	Member [ICT, Planning, Research or Monitoring and Evaluation] Committee	Medical and Dental Practitioners Council	Member
13	Member [ICT, Planning, Research or	Uganda Nurses and Midwives Council	Member

	Monitoring and Evaluation] Committee		
14	Member [ICT, Planning, Research or Monitoring and Evaluation] Committee	Pharmacy Council	Member
15	Member [ICT, Planning, Research or Monitoring and Evaluation] Committee	Uganda National Academy of Sciences (UNAS)	Member
16	Officer [ICT, Planning or M and Evaluation]	WHO	Member
17	Officer [ICT, Planning or M and Evaluation]	UNICEF	Member

Table 2 - Proposed Membership to the eHealth Technical Working Group

Meetings

The NeHTWG shall meet monthly or at the call of the chairperson with three business days' notice.

Quorum

A simple majority of members shall constitute a quorum. Meetings may be held in person or via electronic connections that allow two-way involvement of all participants.

Decision Making

Decisions will be based on consensus. If consensus is not possible, the chairperson may call a vote. A simple majority vote of those members in attendance will be needed to resolve or approve any issues requiring a vote.

Planning, reporting and information sharing

The NeHTWG shall develop an action plan that will identify key priorities in a particular year. The NeHTWG will report on progress and bottlenecks to the NeHSC meetings. At these meetings, progress on priorities will be reported, emerging concerns discussed, and recommendations suggested for high level decisions/actions.

3) Department of Health Information

The Department of Health Information shall be the National eHealth Entity and coordinates and oversees the eHealth investment and the execution of the implementation plan. The operating model should support discrete functions focused on strategy, investment management, implementation plan execution, standards development, Data Analysis & Reporting, Research & Innovation and eHealth solutions compliance. The Unit should be overseen and governed by the National eHealth Steering Committee. The Unit shall reside in the MoH using existing structures.

Roles and Responsibilities

The Unit should have the following set of responsibilities.

(a) **Strategy** – the review and monitoring of eHealth strategy outcomes and the development of strategic recommendations and priorities for consideration by the National eHealth Steering Committee
(b) **Investment** – the development of eHealth investment submissions and business cases for consideration by the National eHealth Steering Committee, and the budgeting and tracking of national eHealth investment funds
(c) **Execution** – the coordination of specific project initiatives across the foundations, adoption and change, and eHealth solutions work streams, focusing on the delivery of on-time and on-budget projects; the reporting of project progress; and the management of project dependencies, risks, and issues
(d) **Standards Development** – the definition, maintenance, and enhancement of national eHealth Enterprise Architecture and Interoperability Framework and the implementation of a consistent process for undertaking this work
(e) **Solutions Compliance** – the testing of whether eHealth software products and solutions satisfy nationally agreed upon certification criteria and standards
(f) **Data Analysis and Reporting** – the collection, integration, analysis and reporting on health information in line with the national, regional and international requirements;
(g) **Research and Innovation** – provide technical support to eHealth Innovators in developing concepts, development, incubation, scaling and tasking to the market eHealth Innovations

(h) **Leadership** –provide technical support to affiliated health institutions and agencies to ensure smooth implementation of eHealth strategies in their respective areas. In addition, the Unit in collaboration with District Structures, will provide technical support eHealth implementation to local government and health facilities.

(i) **Regulatory Framework** – The Unit shall also be responsible for the reviewing the implementation and enforcement of national eHealth regulatory frameworks by the eHealth Regulatory Function. Regulatory frameworks should cover areas such as the establishment and implementation of unique healthcare identifiers for individuals, care providers, and care provider organizations; the integrity, privacy, and security of personal healthcare information; and the licensing conditions and compliance arrangements for electronic health record operators.

These functions should initially reside within this single eHealth entity to allow them to be established in a coordinated manner. Once the functions have matured, consideration can be given to separating those functions that may best operate as distinct entities in the long term.

Structure

Operational support for the NeHSC and the NeHTWG will be provided by the Department of Health Information through four different offices:

Strategy Division: The Strategy Division will oversee the execution of the eHealth Strategy and monitor the progress against the Implementation roadmap. A number of monitoring and reporting mechanisms will be established by the PMO section within the Strategy Office. Initially, the Strategy Office will focus on the development and refinement of national eHealth and Data Management operational plans that will guide the program as a whole. A clear gating process with decision making points will be put in place to ensure that only projects are executed that are aligned with the Vision and Strategy. Besides monitoring progress, the Strategy Division will also perform data analysis and measure the realization of the intended benefits of each project across the following five dimensions of eHealth Benefits:

- Better Health Outcomes;
- Increased Patient Safety;
- More Effective and Integrated System(s);
- Access to Better Quality Data;
- Development of a Knowledge Industry.

eHealth Technology and Services Division: The Technology Division will plan, implement and direct the activities as prescribed in the eHealth Enterprise Architecture and Interoperability framework in support of the national eHealth Strategy.

In addition, the Technology and Services Division shall oversee the procurement, implementation and management of the National eHealth services and solutions included in the National eHealth Enterprise Architecture and Interoperability Framework.

Enterprise Architecture and Standards Division: will support the establishment and maintenance of National eHealth Enterprise Architecture and Interoperability Framework and Standards. This includes the development of the framework & standards, setting up processes to publish and maintain these framework and standards, and helping to ensure proper compliance. Alignment with international standards is also a key function within the Standards Office.

In addition the Office will also help establish supporting policies to cover the data management life cycle (creating, using, sharing, archiving and destroying data) and the standards management lifecycle (standards selection, release management, deprecation).

The Adoption and Innovation Division: The Adoption and Innovation Division will support adoption and uptake of key outputs from the eHealth Programs such as eHealth Enterprise Architecture and Interoperability Framework and Standards and national eHealth services and solutions. Communication material, tools and methodologies will be developed and provided by the Adoption and Innovation Division to support this function. Benefits Evaluation and Realization National E-Health Blueprint National E-Health Services and Solutions National eHealth Enterprise Architecture and Interoperability Framework and Standards and Policies Support Adoption and Engage Stakeholders National E-Health and Data Management Strategy Draft for Stakeholder Consultation .The Adoption and Innovation Office will also be responsible for all external communications for the eHealth program and will disseminate new services and solutions across the country. In addition, it will promote activities in support of best practices in respect to change management and training, to healthcare stakeholders. Another key function within the Adoption and Innovation Division is to establish clear minimum requirements that must be met to safeguard the eco-system and to enhance the ability for organizations to safely and securely exchange information. A certification process will be set up certify eHealth solutions and organizations against these requirements. Ultimately, organizations will only be allowed to participate if the eHealth Solution and the organization using the solution are certified. Direction for the certification program will be drawn from eHealth Enterprise Architecture and Interoperability Framework, policies and underlying technical requirements. Finally, this office will also be responsible to monitor and promote the use of new, innovative technologies that support the goals of the eHealth Program. Using pilot implementations, innovation competitions and other similar campaigns, new solutions will be tested and evaluated to determine their clinical value, extensibility and integration with the national eHealth services.

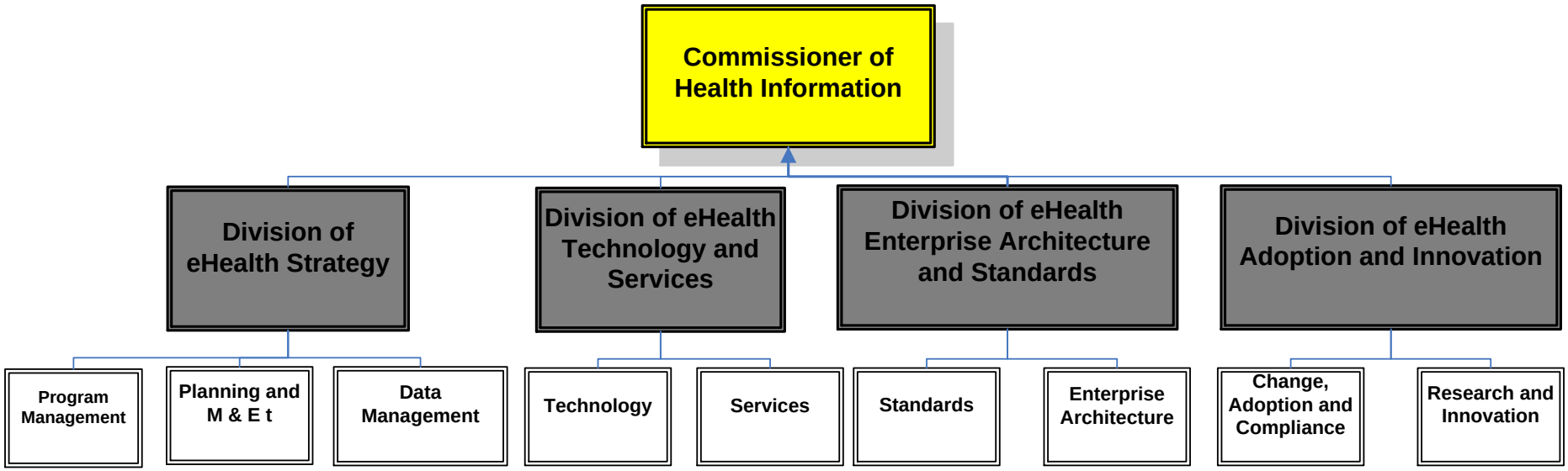


Figure 6 Organizational Structure - Department of Health Information

National eHealth Society

The aims of the National eHealth Society are to promote the health of the population through eHealth and to disperse expert knowledge within health care.

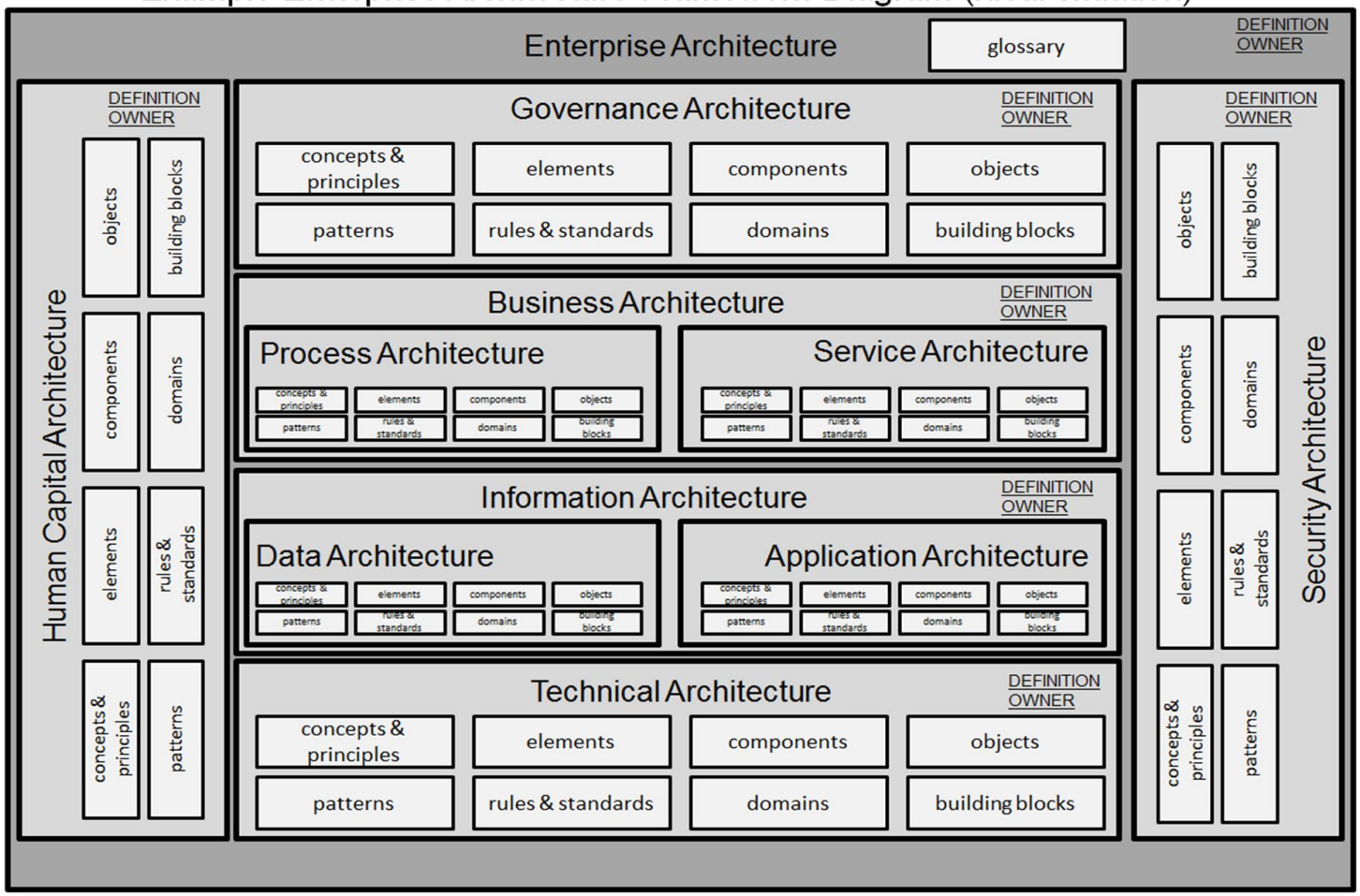
Roles and Responsibilities

(a) Arrange seminars
(b) Conduct lectures and presentations
(c) Arrange courses and symposia
(d) Develop a functioning electronic communication system between the members
(e) Conduct publishing activities
(f) Support research and innovation within the discipline

(g) Formulate statements on issues dealing with eHealth
(h) Maintain contact with other eHealth organisations.

Appendix E) Enterprise Architecture Ideal Situation

Example Enterprise Architecture Framework Diagram (ideal situation)



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Appendix F) Priority Medical Institutions and Facilities – Connection to the NBI

No.	Institution/Hospital
Institutions	
1	Ministry of Health Headquarters
2	National Medical Stores
3	Health Service Commission (HSC)
4	National Drug Authority (NDA)
5	National Medical Stores (NMS)
6	Uganda Aids Commission
7	Uganda National Health Research Organisation (UNHRO)
8	Central Public Health Laboratory (CPHL)
9	Uganda Blood Transfusion Services (UBTS)
10	Uganda Virus Research Institute (UVRI)
11	Natural Chemotherapeutics Research Laboratory
Referral Hospitals	
12	Butabika National Referral Hospital
13	Mulago National Referral Hospital
Regional Hospitals	
14	Arua Regional Referral Hospital
15	Fort Portal Regional Referral Hospital

16	Gulu Regional Referral Hospital
17	Hoima Regional Referral Hospital
18	Jinja Regional Referral Hospital
19	Kabale Regional Referral Hospital
20	Lira Regional Referral Hospital
21	Masaka Regional Referral Hospital
22	Mbale Regional Referral Hospital
23	Mbarara Regional Referral Hospital
24	Moroto Regional Referral Hospital
25	Mubende Regional Referral Hospital
26	Soroti Regional Referral Hospital
Other Hospitals	
27	Entebbe General Hospital
28	Kawempe General Hospital - Kawempe, Kampala
29	Kiruddu General Hospital - Makindye Division, Kampala
30	Naguru General Hospital - Naguru, Kampala

Appendix G) eHealth Pilot Solutions

No.	eHealth Solution	Implementer
mHealth		
	Strategic information (SI) mobile app	
	Health Informatics Mapper (HiMAP)	
teleHealth		
	Rural Extended Services and Care for Ultimate Emergency Relief (RESCUER)	
	TeleInViVo project	
	TeleMedicine	
	HealthNet	

Appendix H) Key Stakeholders

The Key Stakeholders include but are not limited to the following;

a) Ministries, Departments, Agencies and Local Government

b) Health Regulatory Councils
c) Health professional associations
d) Hospital and health services associations
e) Academic, research institutes and think tanks
f) Health and disability insurance entities
g) Patient/client associations
h) Private care providers including private health organizations, NGOs and charitable affiliates.

Stakeholders from beyond the health sector will also play an important role in delivering the national eHealth Strategy. They may contribute resources (expertise or services) and may have a strong interest in the outcome of the eHealth environment; for example in creating new business opportunities. Examples of these types of stakeholders include:

a) ICT/Telecommunications ministries and service providers
b) Professional education agencies and academic institutions
c) Social welfare and community services
d) Consumer Protection organizations
e) Innovation, industry and science representatives
f) Ministry of Finance, Planning and Economic Development
g) International organizations and Development Partners.