THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF HEALTH AND SOCIAL WELFARE

Tanzania National eHealth Strategy 2012 – 2018

Draft, 21 May 2013

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Foreword

The Tanzania mainland's healthcare system, through its ongoing health sector reforms, aims to improve health outcomes. As part of these reforms, the Ministry of Health and Social Welfare (MOHSW) has developed its strategic plan—the Health Sector Strategic Plan III (HSSP III)—to guide priority setting and deployment of resources in the health sector. 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 Tanzanian 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 MOHSW decided in 2009 to develop its National eHealth Strategy to guide the use of ICT in supporting health sector transformation. As part of this process, the Ministry, through the steering committee supported by the International Institute of Communication and Development (IICD), conducted a series of national consultations that included health sector professionals, partners, faith-based organizations, nongovernmental organizations (NGOs), and other stakeholders. As a result of these initiatives, a draft National eHealth Strategy I was produced.

In 2012, the Ministry, through technical and financial support from RTI International and Centers for Disease Control and Prevention (CDC) under the Monitoring and Evaluation Strengthening Initiative (MESI), reviewed the draft National eHealth Strategy, seeking areas for improvement. The review process also followed a participatory approach driven by HSSP III strategic objectives. The National eHealth Strategy provides an appropriate basis to guide the development of eHealth in Tanzania. It adopts an enterprise architecture (EA)-driven development approach to developing eHealth capabilities:

- Leverage what currently exists in the Tanzanian 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 aspirations of the National eHealth Strategy are articulated in the National Health Policy (2007) and the Primary Health Care Service Development Programme (known by its Swahili acronym MAMM, 2007). Both these and other related strategies and/or programs (including those listed under Section 2.4 of HSSP III) are contextualized by the Health Sector Reforms of 1994, with an initial emphasis on improvement of access, quality, and efficiency of health service delivery.

The implementation of this eHealth strategy will accelerate the ongoing reforms and sustain the gains witnessed in the sector since 2009, when the sector started the implementation of HSSP III. In addition, the strategy will address some of the key challenges experienced during HSSP III implementation, 2009–2015, 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.

A National eHealth 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. Tanzanian healthcare system enhancements will also drive stronger workforce productivity that is vital to Tanzania's long-term economic prosperity.

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

Hon. Dr. Hussein Mwinyi, MP

Minister of Health and Social Welfare

Acknowledgement

The realization of this strategy has been achieved through tremendous effort and commitment of several individuals, organizations, and partners who have contributed to the development of this strategy document.

This strategy has been developed in two phases. The first phase involved a participatory process that was spearheaded by a Steering Committee appointed by the Ministry of Health and Social Welfare (MOHSW). They held five formal meetings plus numerous informal sessions and technical consultations in a process launched with an inaugural meeting in November 2009. This process produced a draft eHealth Strategy. To each of the contributors to the draft strategy, as well as to those who assisted and supported them, we send our profound appreciation. Specific appreciation is given to the International Institute for Communication and Development (IICD) of The Hague for supporting the first phase of development.

The second phase of the National eHealth Strategy development also involved a participatory process, which was carried out with extensive input from stakeholders through workshops, discussion groups, interviews, review of the World Health Organization (WHO) eHealth development toolkit, and other surveys. The MOHSW wishes to thank all those who were involved in one way or another in this second phase of the development. Special thanks to RTI International and Centers for Disease Control and Prevention (CDC) for providing technical and financial support.

As part of the second phase, MOHSW conveys sincere gratitude to the University of Dar es Salaam Computing Centre for conducting ICT in the health situational analysis and facilitating the workshop that led to the development of the situational analysis.

Special thanks to the MOHSW, particularly Deputy Minister Hon. Dr. Seif Suleiman Rashid for his sincere encouragement and follow-up on eHealth issues, as well as stakeholders who participated in the workshops and contributed ideas that are the frame of this strategy.

MOHSW staff worked with vigor to make sure that the Ministry finalized its five-year National eHealth Strategy.

All contributions and efforts are highly appreciated.

Ms. Regina L. Kikuli,
Permanent Secretary,
Ministry of Health and Social Welfare

Abbreviations

CCHP	Comprehensive Council Health Plan
CDC	Centers for Disease Control and Prevention
CHMT	Council Health Management Team
DHIS 2	District Health Information System 2
EA	Enterprise Architecture
eGov	Electronic Government
eIDSR	Electronic Integrated Disease Surveillance and Response
EMR	Electronic Medical Records
eRFS	Electronic Referral System
ERP	Enterprise Resource Planning
GOT	Government of Tanzania
HIPAA	Health Insurance Portability and Accountability Act
HIS	Health Information System
HIV	Human Immunodeficiency Virus
HL7	Health Level 7
HMIS	Health Management Information System
HoMIS	Hospital Management Information System
HR	Human Resources
HRH	Human Resources for Health
HRHIS	Human Resources for Health Information System
HSSP III	Health Sector Strategic Plan III
ICD	International Classification of Diseases
ICT	Information and Communication Technology
IICD	International Institute of Communication and Development
LAN	Local Area Network
LMIS	Logistics Management Information System
M&E	Monitoring and Evaluation
MDA	Ministries, Departments, and Agencies
MNCH	Maternal ,Newborn and Child Health
MOHSW	Ministry of Health and Social Welfare
MSD	Medical Stores Department
NeE	National eHealth Entity
NeHSC	National E-Health Steering Committee

NGO	Nongovernmental Organization
NHIF	National Health Insurance Fund
NIMR	National Institute for Medical Research
PMO-RALG	Prime Minister's Office – Regional Administration and Local Government
PO-PSM	President's Office – Public Service Management
RCH	Reproductive and Child Health
RHMT	Regional Health Management Team
RTI	Research Triangle Institute
SO	Strategic Objective
SWAP	Sector-Wide Approach
SWIS	Social Welfare Information System
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TB	Tuberculosis
TCRA	Tanzania Communications Regulatory Authority
TFDA	Tanzania Food and Drug Administration
TFNC	Tanzania Food and Nutrition Centre
THEA	Tanzania Health Enterprise Architecture
WASH	Water, Sanitation and Hygiene
WHO	World Health Organization
WMS	Warehouse Management System

Executive Summary

The National eHealth Strategy is a directional document that describes Tanzania'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, centered on the National eHealth Steering Committee (NeHSC), that will help ensure the timely implementation of eHealth initiatives.

A concise definition of eHealth: the 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.

This document fulfills one of the key objectives of the NeHSC—to define a strategic plan for eHealth in Tanzania, including a clear vision of how the initial systems will function over the next five years, what needs to be done to realize that vision, and the role of the NeHSC in ensuring the successful implementation of eHealth.

The strategy has been developed through a participatory process, carried out with extensive input from stakeholders through workshops, a survey, discussion groups, interviews, and review of the World Health Organization (WHO) eHealth strategy development toolkit.

Vision

By 2018, eHealth will enable a safe, high-quality, equitable, efficient, and sustainable health system for all citizens by using ICT to enhance planning, managing, and delivering health services.

Mission

To support the transformation of the Tanzanian healthcare system by leveraging ICT to improve the health and social welfare of all citizens.

Strategic Goals

i. Enable more efficient use of healthcare resources through replacing paper-intensive processes and providing better information management.

ii. Enable the health sector to operate more effectively as a connected system, overcoming fragmentation and duplication of service delivery.

iii. Make patient care safe and effective by ensuring that the correct information is available in a timely manner, where it is needed and to whom it is needed.

iv. Enable electronic access to appropriate healthcare services for patients in remote, rural, and disadvantaged communities.

v. Support improved multi-way communication and sharing of information among clinicians, patients, and caregivers within the health sectors and across partner agencies.

vi. Support evidence-based policy, investment, and research decisions through access to timely, accurate, and comprehensive reporting of healthcare system information.

Strategic Principles

i. Guarantee of patient information rights, integrity, and confidentiality in line with emerging public health access needs

ii. Cost-effective, efficient, and benefit-driven solutions in a limited resources environment that lead to future growth potential

iii. Exploitation of existing structures and use of an incremental approach

iv. Technology development, standardization, and convergence

v. Collaboration and consultation with stakeholders

vi. Strong leadership and governance mechanism

vii. Ensuring availability of local skilled human resources (HR) to ensure sustainability of the eHealth solutions

viii. Ensuring business continuity mechanism for implemented eHealth system

Strategic Areas of 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

Strategic Objectives (SOs)

eHealth Foundations

SO1. Enhance ICT infrastructure and services to improve communication and information sharing across the health systems and at all levels.

SO2. Establish eHealth standards, rules, and protocols for information exchange and protection.

SO3. Establish comprehensive health facility, provider, and client registries with complete and current information that meets stakeholders' needs.

eHealth Solutions

SO4. Enable electronic financial management to ensure effective collection, allocation, and use of health financial resources at all levels in accordance with health plan priorities.

SO5. Strengthen an electronic HR system to improve planning and management of health professionals at all levels.

SO6. Enable an electronic logistics and supplies system to ensure adequate quality and quantities of health commodities are always available at the point of service to meet patient demand.

SO7. Enable electronic delivery and interventions of health services to reduce child mortality; maternal mortality; and the burden of HIV/AIDS, tuberculosis (TB), malaria, and non-communicable diseases.

SO8. Strengthen an electronic health management information system (HMIS) to support evidence-based health care and decision making.

SO9. Establish telehealth services to enable electronic delivery of quality health care to individuals in remote areas lacking needed expertise.

SO10. Enable an electronic communication and information sharing mechanism for the referral system to improve quality of service.

SO11. Enable healthcare workers to have access to continuous professional development through e-learning and digital resources.

SO12. Strengthen disease prevention, surveillance, and control by using a hybrid ICT solution to facilitate early detection and rapid reporting and response.

SO13. Enable electronic management of social welfare services, beneficiaries, and providers to improve access and quality of service delivery.

SO14. Establish an electronic water, sanitation and hygiene (WASH) management information system to support evidence-based planning and investment in service delivery

Change and Adoption

SO15. Establish a comprehensive change and adoption strategy to promote and enforce the development and use of eHealth solutions for both public and private care providers at all levels in the health continuum.

eHealth Governance

SO16. Establish and Institutionalize an eHealth governance structure and mechanism to ensure effective management and oversight of eHealth Strategy implementation.

Governance

At a higher level, the NeHSC will provide the overall leadership and governance of eHealth implementations. The role of the NeHSC is to direct, monitor, and evaluate the eHealth implementation. The MOHSW ICT Unit serves as the secretariat of the NeHSC. Therefore, the ICT Unit shall lead actual implementation of the eHealth project, supported by three technical working groups structured around health systems building blocks: healthcare delivery, healthcare management, and public health.

Implementation

The Ministry and stakeholders agreed to adopt enterprise architecture (EA) as a framework to guide the development and implementation of the integrated national health information system (HIS). The implementation of the National eHealth Strategy is organized into phases, each phase covering a set of HIS components that address specific priority areas.

The national HIS is a collection of integrated (loosely or tightly coupled) standards-based information systems that support operations, management, and decision making in the health sector.

Budget

An estimate of TZS 46 billion is required for implementation of the strategy over the period of five years, with the amounts required being 7 billion, 23 billion, 8 billion, and 7 billion for years 1, 2, 3, and 4 respectively.

1. Introduction

Information and communication technologies (ICT) are transforming the lives of Tanzanians and, indeed, individuals across the world in education, health, and governance. The Tanzanian Ministry of Health and Social Welfare (MOHSW) leadership has recognized the potential of ICT to support and transform the delivery of quality healthcare services with a mandate to adopt and effectively use ICT throughout the health sector. eHealth is the commonly applied term for the application of ICT in the health sector.

1.1 eHealth Defined

According to World Health Organization (WHO), eHealth is defined as the cost-effective and secure use of ICT in support of health and health-related fields, including healthcare services; health surveillance; health literature; and health education, knowledge, and research.

The definition introduces a range of services such as electronic health records to ensure continuity of patient care across time, mobile health services (mHealth), telehealth, health research, consumer health informatics to support individuals in health decision making, and e-learning by health workers. In practical terms, eHealth is a means of ensuring that correct health information is provided in a timely manner, where it is needed and to whom it is needed, in a secure, electronic form for the purpose of improving the quality and efficiency of healthcare delivery and prevention programs.

1.2 Tanzania's Mainland Healthcare System

In planning for the more systematic and expanded application of eHealth to the health sector in Tanzania, it is important to understand the organization of the healthcare system within the mainland. The Tanzanian mainland is divided into 25 administrative regions and 113 districts with 133 councils.[1] 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 Government of Tanzania (GOT) has dedicated significant effort, through public and private providers, to deliver primary healthcare services to its citizens. Currently there are approximately 4,679 dispensaries and 481 health centers throughout the country. About 90% of the population lives within five kilometers 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.

Tanzania mainland has approximately 237 public and private hospitals. Of these, 57 are district hospitals owned by the GOT, and 35 are designated district hospitals, owned by faith-based organizations. Also, there are 5 other government hospitals at the district level, 4 of them military. There are 27 government regional hospitals and 10 faith-based referral hospitals at the regional level functioning as referral hospitals for district hospitals. Lastly, there are 9 national and "super-specialist" hospitals.[2]

Statistics show that qualified health workers in the Tanzanian health sector fill only 35% of positions, leaving Tanzania with a severe human resources (HR) crisis in the health sector (Health Sector Strategic Plan [HSSP] III, 2010). This crisis, together with other

[1] The number of regions and districts changes over time, based on government allocation and population growth.
[2] MOHSW, December 2012.

challenges facing the Tanzanian health sector, calls for the immediate formulation and implementation of an eHealth strategy as a way of supporting progress in the sector.

1.3 Challenges

Some of the key pressures facing the healthcare sector include the following (from HSSP III):

- 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

In order for eHealth to successfully respond to the needs of the health sector, there are several specific ICT challenges that must be overcome. An assessment to identify these challenges was carried out through key stakeholder consultation. 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 patients' 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. The key challenges include the following:

- Lack of coordination on ICT matters among ministries, departments, and agencies (MDAs), as well as partners, etc.
- A fragmented landscape of eHealth pilot projects and stakeholders
- Numerous data and health information systems (HIS) silos
- Lack of ICT infrastructure
- Lack of ICT workers, in particular those who are well trained

A more detailed analysis of the current strengths, weaknesses, opportunities, and threats (SWOT) in the health sector tied to ICT capability are depicted in **Table 1** below.

Table 1. SWOT analysis

Strengths	Weaknesses
1. Existence of political will by the government of Tanzania to advocate healthcare reform and the use of ICT to improve the efficiency and efficacy of the healthcare system 2. Existence of medical and ICT training institutions 3. Existence of institutions and agencies that are responsible for provision of various services (Medical Stores Department [MSD], National Institute for Medical Research [NIMR], Ifakara Health Institute, nongovernmental organizations [NGOs], etc.) with their own data and information systems 4. Existence of a national ICT policy promoting the use of ICT throughout all sectors of the country 5. Existence of national e-Government strategy that recognizes eHealth as a priority area 6. Existence of disease surveillance systems at health facility level reporting to national programs 7. Coordination and participation of partners in public-private partnerships in promoting ICT in the health sector 8. Availability of national fiber backbone to support data and communications throughout the country	1. Inadequate ICT infrastructure throughout the health sector 2. Lack of availability of proper information sharing systems within and outside the health sector 3. Absence of national eHealth strategy to guide implementation of eHealth initiatives 4. Lack of reliable health information/data collection and sharing among health providers 5. Lack of biomedical and medical informatics experts and trained ICT professionals 6. Inadequate integration of eHealth skills into existing health professional training curricula 7. Lack of guidelines on research and use of data/information 8. Lack of compliance with eHealth standards and systems interoperability 9. Lack of a governance structure to guide the development of eHealth across the health sector
Opportunities	**Threats**
1. Existence of donor-supported programs/ projects 2. Availability of new technologies such as mHealth 3. Existence of public-private partnerships to support eHealth development projects 4. Availability of Internet bandwidth at reduced rates to support data exchange as well as communication among health providers 5. Initiative by the GOT to establish National Identification Cards	1. Lack of governance structure to guide the development of eHealth across the health sector 2. Lack of reliable power supply from the national grid 3. Financial constraints 4. Inadequate application of information security standards on shared networks 5. Absence of legal frameworks/legislation to support eHealth development

1.4 Response

This National eHealth Strategy document responds to the current challenges and situational analysis. This includes a comprehensive eHealth plan to guide the planning and implementation of eHealth interventions. This is supported by an eHealth governance structure for the health sector and identifies priorities and supporting strategies for adopting eHealth throughout the health sector.

There are numerous examples of successful eHealth interventions from across the world that can help to inform eHealth strategies in Tanzania, including the following:

- Use of mobile phones to track and respond to epidemics
- Integration and interoperability of HIS to support more efficient access to needed data and information for policy development and delivery of health care, collecting data once and using many times
- Use of telehealth to extend access to specialty health care through two-way communication and image sharing
- Use of mobile phones to take pictures of blood samples and determine drug resistance (e.g., drug-resistant TB)
- Use of distance-learning technologies in the professional development of health professionals

2. National eHealth Vision, Mission, and Strategic Goals

2.1 Vision

By 2018, eHealth will enable a safe, high-quality, equitable, efficient and sustainable health system for all citizens by using ICT to enhance planning, managing, and delivering health services.

2.2 Mission

To support the transformation of the Tanzanian healthcare system by leveraging ICT to improve the health and social welfare of all citizens.

2.3 Strategic Goals

Strategic goals describe health outcomes in qualitative terms that reflect a realistic focus of the Ministry and its direction for achieving the eHealth mission and vision.

i. Enable more efficient use of healthcare resources through replacing paper-intensive processes and providing better information management.

ii. Enable the health sector to operate more effectively as a connected system, overcoming fragmentation and duplication of service delivery.

iii. Make patient care safe and effective by ensuring that the correct information is available in a timely manner, where it is needed and to whom it is needed.

iv. Enable electronic access to appropriate healthcare services for patients within remote, rural, and disadvantaged communities.

v. Support improved multi-way communication and sharing of information among clinicians, patients, and caregivers within the health sectors and across partner agencies.

vi. Support evidence-based policy, investment, and research decisions through access to timely, accurate, and comprehensive reporting of healthcare system information.

3. National eHealth Strategy

The National eHealth Strategy includes *Strategic Principles* and *Strategic Objectives* linked to *Strategic Initiatives*. The strategic principles underpin the planning and implementation of the eHealth strategy as enumerated below. They are living principles, and when any eHealth solution is being evaluated for adoption, these should always be included as part of the evaluation criteria.

Strategic objectives are expected results with specific targets for improved performance in achieving eHealth vision and long-term goals. Strategic initiatives are courses of action undertaken to accomplish specified eHealth strategic objectives.

3.1 Strategic Principles

The following principles will guide and underpin the planning and implementation of the eHealth strategy to ensure effectiveness and sustainability of eHealth in Tanzania:

i. *Guarantee of patient 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 health information to ensure privacy and integrity. However, the protection of patient 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.

ii. *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 Tanzania healthcare system and patient care.

iii. *Exploitation of existing structures and use of an incremental approach*

Realizing an integrated national HIS requires a long-term implementation plan that builds from existing solutions in an incremental and pragmatic way while focusing in strategic areas where eHealth will bring more valuable outcomes and impacts.

iv. *Technology development, standardization, and convergence*

The themes underpinning developing the technology and standards that support eHealth will 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.

v. *Collaboration and consultation with stakeholders*

The health sector involves many diverse stakeholders. Therefore, eHealth implementation requires effective collaboration and involvement of all the stakeholders, including early adopters of key activities and decision making in defining eHealth solutions.

vi. *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. Although at a higher level the leadership will be provided through the NeHSC, a strong leadership and governance mechanism for individual eHealth projects is needed to ensure the expected results are met.

vii. *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.

viii. *Ensuring business continuity mechanism for implemented eHealth system*

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.

3.2 Strategic Areas of Intervention: the Four Pillars

The following pillars represent the four 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.*

- ***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 the 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 the implementation of the national eHealth program

3.3 Strategic Objectives (SOs) and Initiatives

The overarching aim of the National eHealth Strategy is to deliver the eHealth contribution to key strategies of the HSSP III. Therefore, the eHealth SOs have been developed by matching HSSP III strategic objectives against best practices for implementing an integrated national HIS.

The following are the eHealth SOs, built around the four strategic pillars (noted above) that are necessary to achieve the eHealth vision and long-term health sector business goals.

3.3.1 eHealth Foundations

The eHealth Foundations pillar's SOs focus on implementing the basic infrastructural building blocks required to enable the effective electronic sharing of information across the Tanzanian health sector.

SO1. Enhance ICT infrastructure and services 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 network connectivity and core services that underpin a national eHealth environment. Although there are several initiatives for establishing ICT infrastructure by the GOT, 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:

- Facilitate health sector institutions, including health facilities, to establish ICT strategic plans that are aligned with their respective business functions and priorities.
- Coordinate and support health sector institutions, including health facilities, to establish sustainable ICT infrastructure and services.
- Support health sector institutions to be connected to the national optical fiber network as a priority in order to share a common connectivity advantage.
- Operationalize an information-sharing policy to facilitate open sharing of information, meeting all privacy laws.

SO2. Establish eHealth standards, rules, and protocols for information exchange and protection.

For successful implementation of an eHealth strategy, eHealth standards, rules, and protocols are required to ensure national and international interoperability and compliance. Although there are widely accepted international eHealth standards, it is necessary to localize and formally adopt them in the Tanzanian environment. Therefore, in this SO, the Ministry intends to establish nationally adopted standards, rules, and protocols to enable the implementation of affordable, cost-effective, and accessible technology that complies with these standards.

Strategic Initiatives:

- Establish national eHealth information standards (e.g., Health Level Seven [HL7] standards, International Classification of Diseases [ICD], business coding).
- Establish a privacy and regulatory framework to ensure appropriate privacy safeguards and consent processes for access to and use of health information.
- Review existing acts for information related to providing patient rights. This includes the existing act defining code of conduct for providers (Medical Council). This review

includes record retention, confidentiality, privacy, and security based on the eHealth activities.

- 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).

SO3. Establish comprehensive health facility, provider, and client registries with complete and current information that meets stakeholders' needs.

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

Strategic Initiatives:

- Develop a harmonized data element specification for the health facility, provider, and client registries.
- Provide support to the revised registration process for public and private facilities and providers.
- Implement the facility, provider, and client registry system.
- Develop management and maintenance guidelines for facility and provider registries.

3.3.2 eHealth Solutions

The eHealth Solutions pillar's SOs focus on implementing the specific electronic systems and tools to address the high-priority needs of consumers, care providers, and healthcare managers that improve efficiency and effectiveness.

SO4. Enable electronic financial management to ensure effective collection, allocation, and use of health financial resources at all levels in accordance with health plan priorities.

Hospital reforms and healthcare financing strategies aim to improve the quality, equity, and availability of hospital services by enhancing the rationality and the efficiency in hospital resources management. With reference to current practices, two main areas of improvement toward the introduction of electronic financial management practices are identified: (1) comprehensive planning, budgeting, and reporting between central level and recipients (district, region, and national) and (2) control of cost, revenue collection, capture of all financial transactions, and management of all resources in health facilities.

Strategic Initiatives:

- Implement a hospital management information system (HoMIS) to manage health financial and HR information in the health facilities.

- Implement a data warehouse to foster and support more highly informed decision making by MOHSW and other stakeholders on health sector resources.
- Implement an integrated planning software system to support a comprehensive council health profile.
- Implement improved communication and remote financial services for rural workers.

SO5. Strengthen an electronic HR system to improve planning and management of health professionals at all levels.

Human resources for health (HRH) strategies aim to strengthen planning and effective utilization of HR. The MOHSW has adopted the HRHIS for collecting, processing, managing, and disseminating data and information on HRH. The HRHIS has been rolled out in all the 24 regions, the 133 councils, and all 8 national hospitals. However, information exchange across multiple HR management systems, including professional registration bodies, Prime Minister's Office – Regional Administration and Local Government (PMO-RALG), MOHSW, President's Office – Public Service Management (PO-PSM), Tanzania Nursing and Midwifery Council, and other private health service providers, is lacking. Therefore, in this SO, the Ministry intends to integrate existing HR systems with HRHIS to enable exchange of information.

Strategic Initiatives:

- Implement a health professional provider registry.
- Identify and integrate existing HR systems (HRHIS, PMO-RALG, etc.) into the professional registry.
- Refine processes for managing and maintaining the health professional provider registry.

SO6. Enable an electronic logistics and supplies system 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 MOHSW and its development partners. Therefore, in this SO, the Ministry intends to develop a technology platform that will incorporate the existing system (enterprise resource planning [ERP], warehouse management system [WMS], etc.) to assist in data collection, dissemination, and processing.

Strategic Initiatives:

- Implement a nationwide electronic LMIS, leveraging existing systems.
- Integrate the system with existing ERP, WMS, eHealth, and HMIS systems.

SO7. Enable electronic delivery and interventions of health services to reduce child mortality; maternal mortality; and the burden of HIV/AIDS, TB, malaria, and non-communicable diseases.

HSSP III is committed to the achievement of the Millennium Development Goals. The plan includes strategies to improve access and quality of maternal, newborn, and child health (MNCH) services delivery. In addition, HIV/AIDS, TB, and malaria are among the most important infectious diseases in Tanzania; therefore, the control, or eradication in the case of malaria, is among the Ministry's strategies. Overall, the assessment confirmed that the delivery of MNCH services as well as HIV and TB interventions are difficult to monitor because of lack of information and inadequate data management across the service continuum. Therefore, in this SO, 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 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:

- Implement and promote an electronic system (including mHealth services) to enable patient tracking, monitoring, identification and referral of at-risk patients, provision of accurate information to patients, and improvement of communication with health facilities in emergency cases.
- 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 (i.e., diabetes).
- Implement and promote health information exchange and a shared health record to allow sharing of information among health providers.

SO8. Strengthen an 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 MOHSW has adopted DHIS 2 as its core HMIS software, which includes M&E reporting, data management, and some HMIS data warehouse functions. The MOHSW has successfully completed its pilot use of DHIS 2 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 specialized referral 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 DHIS 2, and developing a true data warehouse that can be used to support this strategic area as well as others.

Strategic Initiatives:

- Integrate/link related information systems and vertical programs (HIV/TB/malaria) HMIS information into DHIS 2.

- Collect and integrate/link community-based health information and services.
- Collect and integrate/link health data from referral hospitals into DHIS 2.
- Implement a community-based HIS that is linked to the HMIS software.

SO9. 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 clients 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. In this SO, the Ministry intends to use ICT to implement telehealth and tele-education services to enable provision of healthcare services at a distance.

Strategic Initiatives:

- Develop telehealth services and program.
- Implement required telehealth infrastructure.
- Implement telehealth services.

SO10. Enable electronic communication and information sharing mechanism for the referral system to improve quality of service.

Included in the referral hospital services strategies is the aim 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 patients 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:

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

SO11. Enable healthcare workers to have access to continuous professional development through e-learning and digital resources.

Included in the HRH strategies is the aim 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:

- Develop and approve methodology for delivering blended learning, including basic ICT training for health workers to enable them to use blended learning.
- Develop program and electronic content for various health professionals.
- Implement health sector e-learning platform.
- Develop digital resources to enable offline learning for areas with limited Internet access along with online learning.

SO12. Strengthen disease prevention, surveillance, and control by using a hybrid ICT solution 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 SO, 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:

- Implement an electronic integrated diseases surveillance and response system that is linked to the HMIS system.
- Implement an electronic information system (including the use of television, radio, etc.) to provide health education and promotion.

SO13. Enable electronic management of social welfare services, beneficiaries, and providers to improve access and quality of service delivery.

Social welfare and protection strategies aim to improve social services and protection of vulnerable groups in the society. Although there are several initiatives by the GOT, NGOs, and private institutions that provide social services, the actual needs in the country are not yet fully mapped. In addition, social welfare is fragmented and mostly institution-based. Understanding and calculating how and where to allocate the limited resources is difficult. To provide these services, there is a need to store and organize information related to social need, providers, and target beneficiaries. Therefore, in this objective, the Ministry intends to use ICT to enable monitoring of social service provision and demand across the country.

Strategic Initiatives:

- Implement social welfare service information system for managing and monitoring of social services, beneficiaries, and providers.

SO14. Establish an electronic water, sanitation and hygiene (WASH) management information system to support evidence-based planning and investment in service delivery

Improving access to water and sanitation is a target under Millennium Development Goal 7. Access to safe water and basic sanitation, and adoption of good hygiene practices is vital to everyone's life. Safe water sources, basic sanitation, and improved hygiene practices can prevent water related diseases, other illness and death. The use of quality and timely water, sanitation and hygiene (WASH) information by stakeholders is essential for effective planning and investment in service delivery. However, much of the current information about water, sanitation and hygiene is inaccessible, incomplete, or missing. In this strategic objective, the MOHSW intends to use ICT solutions to address the information gaps in the WASH sector by transforming the way WASH data is generated, communicated, and shared.

Strategic Initiatives:

- Implement an electronic (mobile phone supported) information system to support the management and monitoring of WASH service delivery
- Integrate the WASH system with the HMIS software system

3.3.3 Change and Adoption

The Change and Adoption pillar's SO 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.

SO15. 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 and adoption strategy to promote and enforce the use of these solutions at all levels in the health system.

Strategic Initiatives:

- Establish national awareness and education campaigns on eHealth programs.
- Review existing health facility and provider accreditation acts to enforce the use of eHealth solutions and required standards.
- Build eHealth skills capacity and capability by establishing national coordination of changes to higher education programs.
- Promote and empower local companies with the capacity and capability to develop and maintain large-scale eHealth solutions.

3.3.4 eHealth Governance

The eHealth governance strategic objectives focus on establishing the appropriate national eHealth governance to provide leadership, coordination and oversight to ensure successful delivery of eHealth.

SO16. Establish and institutionalize an eHealth governance structure to ensure effective management and oversight of eHealth Strategy implementation.

For successful implementation of the eHealth Strategy, a well-defined governance structure is required to provide improved visibility, coordination, and control of eHealth activities that are occurring across the country's health sector. 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. The main components of the eHealth governance structure are the NeHSC and National eHealth Entity (NeE). In this SO, the Ministry intends to define and institutionalize these components.

Strategic Initiatives:

- Establish and institutionalize NeHSC—to direct, monitor, and evaluate the eHealth implementation.
- Establish and institutionalize NeE—for planning, coordination, and standards development and enforcement.

4. Implementation

4.1 Framework

The eHealth mission is to transform the Tanzanian healthcare system by leveraging ICT to improve health and social welfare for all citizens. However, to drive these transformations, the health sector needs to understand completely what it is that is being transformed and what effect those changes will have. In addition, stakeholders need to have a roadmap that supports this transformation. To understand more completely and plan a way forward, the Ministry and health sector stakeholders agreed to adopt enterprise architecture (EA) as the framework to guide the development of an integrated national HIS. The national HIS is the collection of interconnected (loosely or tightly) coupled information systems that support healthcare operations, management, and decision making in the health sector. The national HIS consists of components such as electronic medical records, facility registers, healthcare provider registers, LMIS, HMIS, etc.

EA is a complete specification of all of the key elements and relationships that constitute an organization. EA defines the structure for design and implementation of health information systems, linking the systems to be interoperational 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. The EA approach allows important interrelationships to be identified, including which components need to be aligned to which parts. In so doing, the health sector as a whole experiences reduced risks of fragmentation, fewer duplications of effort, and greater interoperability.

The Ministry aims to develop a Tanzania Health Enterprise Architecture (THEA) to guide the development of the national integrated HIS. The THEA will be developed following the strategic principles outlined in this National eHealth Strategy. THEA will allow the Ministry and other stakeholders who want to invest in eHealth to accomplish the following:

- Leverage what currently exists in the Tanzanian eHealth landscape.
- Understand what the new components are and where they fit into existing structures.
- Define data 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.

Figure 1. Enterprise architecture-driven development

4.2 Roadmap

The THEA initiative is an opportunity to engage the systematic approach for computerization and transformation of the core business processes in the health sector. The ambition is to cover all priority areas as articulated in the National eHealth Strategy. Therefore the implementation of the National eHealth Strategy is organized into phases, each phase covering a set of HIS components that address specific priority areas. 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.

Phase 0: Establishing eHealth Foundations and Governance (January 2013–September 2013)

Phase 0 focuses on establishing the basic building blocks to ensure successful implementation of eHealth solutions. The purpose of this phase is as follows:

- Define, establish, and institutionalize the governance structure to support implementation of the e-Health Strategy.
- Develop eHealth EA for health information exchange (HoMIS, data warehouse, electronic LMIS [eMLIS], DHIS, Tanzania Food and Drug Administration (TFDA), Tanzania Food and Nutrition Centre (TFNC), National Health Insurance Fund [NHIF], etc.).
- Establish eHealth standards, rules, and protocols for information exchange and protection.
- Implement underlying physical computing and networking infrastructure in hospitals/institutions and connectivity to the national backbone (hospitals, MDAs, etc.).
- Promote broad-based and coordinated stakeholder dialogue and engagement toward operationalization of the e-Health strategy.

Phase 1: Implement an EA to support effective use and management of health resources (June 2013–December 2016)

Phase 1 focuses on implementing an EA to support effective use and management of health resources (financial, medicine, HR, etc.). This phase includes implementation of the HoMIS to manage finance, medicine, and HR at health facilities. In addition, this phase includes implementation of a centralized health resources performance management system (i.e., data warehouse for health resources).

Included in this phase is the implementation of the eLMIS. More specifically, the purpose of Phase 1 is the following:

- Implement the HoMIS at a health facility level.
- Implement a health resources performance management system (i.e., data warehouse for health resources).
- Implement the eLMIS.
- Implement a health information mediator and integrate existing information systems.
- Implement an integrated planning software system to support a comprehensive council health profile.

Phase 2: Implement the EA to support reproductive and child health (RCH) services, HIV/AIDS, TB and non-communicable diseases interventions (January 2014–December 2017)

Phase 2 focuses on implementing an EA to support RCH services and HIV and TB intervention services. This phase includes implementation of an EMR system to support maternal health and newborn services delivery and HIV and TB interventions. The EMR implementation will be built as a component of HoMIS from Phase 2. Included in this phase is the implementation of a shared health record and health information exchange, enabling information sharing among health authorities and creating seamless information transfer among care providers across the health facilities.

- Implement EMR for MNCH services and HIV and TB interventions.
- Implement the health information exchange that supports mobile services.
- Implement an electronic referral system.

Phase 3: Other eHealth solution implementation (January 2013–December 2018)

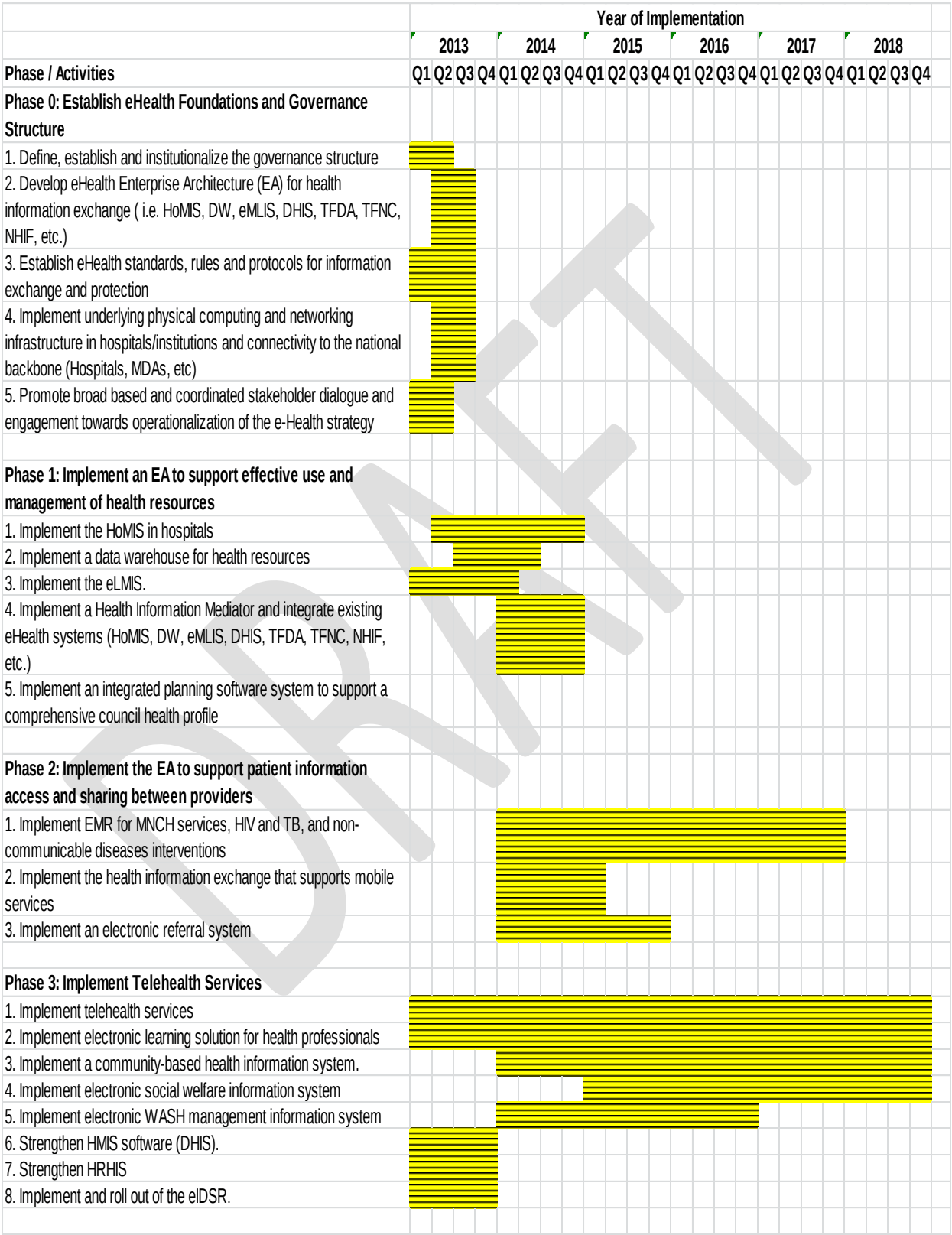
Phase 3 will focus on implementing telehealth services, a community-based health information system. More specifically, the purpose of Phase 3 includes the following:

- Implement telehealth services.
- Implement electronic learning solution for health professionals.
- Implement a community-based health information system.
- Implement an electronic social welfare information system.
- Implement an electronic WASH management information system

While the Ministry is working to develop its eHealth strategy, it currently implements several eHealth solutions, including HMIS software strengthening, HRHIS, and implementation of the electronic integrated disease surveillance and response (eIDSR) system. More specifically, the Ministry is working to achieve the following:

- Strengthen and roll out HMIS software (DHIS).
- Strengthen HRHIS.
- Implement eIDSR.

Table 2. Tanzania health EA implementation roadmap



5. Monitoring and Evaluation (M&E)

M&E is a core part of any strategy, program, or project that is undertaken in the health sector. This allows the management of such work to assess whether objectives are being met, or how to redirect resources to better achieve the stated objectives if they are not being met. Having a good M&E framework for the National eHealth Strategy enables the Ministry and NeHSC to track and assess the results of carrying out the eHealth implementation plan.

The M&E approach focuses on measuring the execution of the roadmap and is central in answering the question of whether the Ministry is on track in terms of its implementation of the National eHealth Strategy. The evaluation as shown in **Table 3** focuses on two main components:

1. *Activities*: These correspond to the activities defined in the roadmap.
2. *Outputs*: These are the deliverables, such as eHealth components, resulting from the activities undertaken.

To measure changes delivered (contributions) by the eHealth implementation, two more components need to be measured:

1. *Outcomes:* the strategic outcomes that eHealth outputs enable or contribute to
2. *Impact:* the change that eHealth outcomes create for health and non-health sector stakeholders

Table 3. M&E of the execution of the eHealth implementation roadmap

Strategic Objectives	Strategic Initiatives	Indicator/Milestone	Target
eHealthFoundation			
1. SO1. Enhance ICT infrastructure and services to improve communication and information sharing across the health systems and at all levels	1.1. Establish ICT strategic plans for hospitals and other institutions	Number of hospitals/institutions with implemented ICT Strategic Plan	Have ICT strategic plans for all regional, zonal, and national referral hospitals and other institutions
	1.2. Establish sustainable ICT infrastructure and services.	Number of hospitals/institutions installed with LAN and other infrastructure	All regional, zonal, and national referral hospitals installed with LAN
	1.3. Connect health facilities and institution to the national optical fiber network	Number of hospitals/institutions connected to the national backbone	All regional, zonal, and national referral hospitals/institutions connected to the national backbone network
	1.4. Operationalize an information-sharing policy	Availability of functional information sharing policy	Information sharing policy crafted by June 2014
2. *SO2. Establish eHealth standards, rules, and protocols for information exchange and protection*	2.1. Establish national eHealth information standards (e.g., HL7, ICD, business coding)	Number of Hospitals using the National eHealth Standards	Approved eHealth standards by December 2013
	2.2. Establish a privacy and regulatory framework to ensure appropriate privacy safeguards and consent processes for access to and use of health information	Presence of functional privacy and regulation framework	At least each hospital will have a copy of privacy and regulatory framework by December 2014
3. SO3. Establish comprehensive health facility registries with complete and current information that meets stakeholders' needs.	3.1. Develop a harmonized data element specification for the health facility, provider, and client registries	Availability of agreed data element specification sets for facility and provider master list	Annually as per review of several indicators and data elements
	3.2. Provide support to the revised registration process for public and private facilities and providers	Facility and provider registration business process map established	Facility and provider registration process institutionalized by December 2013 and December 2014 respectively
	3.3. Implement the facility, provider, and client registry system.	Presence of functional facility and provider registries	Facility registry and provider registry implemented by June 2013 and June 2014 respectively
	3.4. Develop management and maintenance guidelines for facility and provider registries	Management and maintenance guidelines developed and used	Facility registry and provider registry management and maintenance guidelines developed and used by June 2013 and June 2014 respectively

Strategic Objectives	Strategic Initiatives	Indicator/Milestone	Target
eHealth Solutions			
4. *SO4. Enable electronic financial management to ensure effective collection, allocation, and use of health financial resources at all levels in accordance with health plan priorities.*	4.1. Implement a hospital management information system (HoMIS) in the health facilities	Number of hospitals implemented with HoMIS	HoMIS implemented in 33 regional , 5 zonal and 1 national, referral hospitals
	4.2. Implement a data warehouse for health resources (finance, medicine, HR, etc.)	Number of hospitals/institutions that provide data to the data warehouse	Data collected from regional , zonal and national, referral hospitals and other institutions
	4.3. Implement an integrated planning software system to support a Comprehensive Council Health Plan (CCHP) profile	Number of councils using planRep software in their annual CCHP planning	To have the planning software implemented in all councils
	4.4. Implement improved communication and remote financial services for rural workers	Percent of health workers with improved communication and financial services	
5. *SO5. Strengthen an electronic HR system to improve planning and management of health professionals at all levels.*	5.1. Implement a health professional provider registry	Proportion of health professionals registered	All health professionals registered in the health professional registry that is integrated with all HR systems (HRHIS, PMO-RALG, PO-PSM, etc.)
	5.2. Identify and integrate existing HR systems (HRHIS, PMO-RALG, etc.) into the professional provider registry	Number of functional integrated HR systems in place	All HR systems integrated into the professional provider registry
	5.3. Refine processes for managing and maintaining the health professional provider registry	Proportion of registered health professionals managed and maintained	All professionals registered
6. *SO6. Enable an electronic logistics and supplies system to ensure adequate quality and quantities of health commodities are always available at the point of service to meet patient demand.*	6.1. Implement a nationwide eLMIS, leveraging existing systems	Proportion of health facilities using eLMIS	eLMIS implemented and used by December 2013
	6.2. Integrate the system with existing ERP, WMS, eHealth, and HMIS systems	Number of systems integrated with eLMIS	All candidate systems integrated into eLMIS
7. *SO7. Enable electronic delivery and interventions of health services to reduce child mortality; maternal mortality; and the burden of HIV/AIDS, TB, malaria, and non-communicable diseases.*	7.1. Implement an electronic medical records (EMR) system with clinical decision support tools	Proportion of hospitals using EMR system	EMR implemented in regional, zonal and national referral hospitals.
	7.2. Implement a shared health record and health information mediator that support mobile services	Proportion of hospitals and clinics integrated into the health information mediator	All hospitals and clinics integrated into the Health Information Exchange (HIE) and patient information is available from any connected facility

Strategic Objectives	Strategic Initiatives	Indicator/Milestone	Target
8. *SO8. Strengthen an electronic health management information system (HMIS) to support evidence-based health care and decision making.*	8.1. Integrate related information systems and vertical programs (HIV/TB/malaria) information into DHIS 2.	Number of systems and vertical program integrated to DHIS 2	All target systems and vertical program integrated into DHIS 2
	8.2. Integrate data from referral hospitals into DHIS 2	Number of referral hospitals with available data in the DHIS 2	Health information collected from all referral hospitals
	8.3. Implement a community-based HIS that is linked to the HMIS software	Proportion of required health information entered in the system	All appropriate information captured into the Community Based HIS (CBHIS)
9. *SO9. Establish telehealth services to enable electronic delivery of quality health care to individuals in remote areas lacking needed expertise*	9.1. Develop telehealth services	Developed telemedicine services	All appropriate telemedicine services developed
	9.2. Implement required telehealth infrastructure	Number of health facilities with functional telemedicine infrastructure	Required infrastructure implemented in all regional, zonal, and national referral hospitals
	9.3. Implement telehealth services	Number of health facilities using telehealth services	Telemedicine/telehealth services implemented in all regional, zonal, and national referral hospitals
10. *SO10. Enable electronic communication and information sharing mechanism for the referral system to improve quality of service.*	10.1. Develop health professional collaborative network using mobile device technology	Number of doctors connected in the network	All medical doctors in regional, zonal, and national referral health facilities in the network
	10.2. Implement an electronic referral system	Proportion of patients treated in health facilities referred from other facilities (horizontal or vertical referral) supported by the electronic system	Electronic referral system is functional both horizontally and vertically from district to regional and from regional to zonal level
11. *SO11. Enable healthcare workers to have access to continuous professional development through e-learning and digital resources.*	11.1. Develop and approve methodology for delivering blended learning	Availability of blended learning methodology	Blending learning methodology by June 2015
	11.2. Develop program and electronic content for various health professionals	Proportion of electronic learning content developed	Electronic content developed by December 2015
	11.3. Implement health sector e-learning platform	Number of health professionals using the system	All health professionals using the system by December 2016
	11.4. Develop digital resources to enable offline learning program	Number of digital resources for health professionals	To have digital resources for all programs by December 2016
12. *SO12. Strengthen disease prevention, surveillance, and control by using a hybrid ICT solution to facilitate early detection and rapid reporting and response.*	12.1. Implement an electronic integrated diseases surveillance and response system that is linked to the HMIS system	Functional eIDSR system	To have eIDSR functional by December 2013
	12.2. Implement an electronic information system to provide health education and promotion	Number of health education and promotion programs supported by electronic system	Health education and promotion programs implanted

Strategic Objectives	Strategic Initiatives	Indicator/Milestone	Target
13. SO13. Enable electronic management of social welfare services, beneficiaries, and providers to improve access and quality of service delivery.	13.1. Implement social welfare service information system for managing and monitoring of social services, beneficiaries, and providers	Number of services registered and managed by the Social Welfare Information System (SWIS)	All social welfare services and recipients supported by the SWIS
14. SO14. Establish an electronic water, sanitation and hygiene (WASH) management information system to support evidence-based planning and investment in service delivery	14.1. Implement the WASH system	WASH management system is deployed and used	The WASH system is rolled out in all urban and rural areas
	14.2. Integrate the WASH with the HMIS system	WASH and HMIS systems integrated	The WASH information is available in the HMIS system by 2018
Change and Adoption			
15. SO15. 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	15.1. Establish a national awareness campaigns on eHealth programs	Number of eHealth awareness campaign programs held	At least 4 campaign programs held annually (quarterly)
	15.2. Review existing health facility and provider accreditation acts to enforce the use of eHealth solutions and required standards to support the operation, management, and decision making	Reviewed facility and provider accreditation acts	Reviewed facility and provider accreditation acts by December 2014
	15.3. Develop a curriculum to guide the building of Tanzania's eHealth skills capacity and capability	Number of institutions adopted the curriculum	All health training institution to have adopted the curriculum by 2015
	15.4. Promote and empower local companies with the capacity and capability to develop and maintain large-scale eHealth solutions	Number of local companies empowered for eHealth solutions development and use	
eHealth Governance			
16. SO16. Establish an eHealth governance structure and mechanism to ensure effective management and oversight of eHealth Strategy implementation.	16.1. Establish and institutionalize NeHSC	Number of NeHSC meetings held	To have two steering committee meetings by December 2013
		Percentage of eHealth solutions requests reviewed by NeHSC	All eHealth solutions to be approved by the NeHSC
	16.2. Establish and institutionalize NeE	Functional NeE	Functional NeE by December 2013

APPENDICES

Appendix A: eHealth Strategy Review Workshop – Methodology

Day 1: Select business goals and challenges where eHealth will have the most impact.

1. Review health strategy, goals, and priorities (HSSP III).
2. Select business goals and challenges where eHealth will have the most impact.

Day 2: Establish a national eHealth vision (where we want to go).

1. Describe how eHealth will support selected goals/challenges.
2. Draft an initial eHealth vision.
3. Draft the eHealth mission.
4. Define higher level goals to describe the eHealth vision in detail.

Day 3: Define a national eHealth strategy (how we will get there).

1. Define strategic principle.
2. Define eHealth strategic objectives to achieve the eHealth vision.
3. Define strategic initiatives to support the achievement of each eHealth Strategic Objective.

Day 4: Define eHealth governance structure and implementation plan.

Day 5: Develop eHealth implementation M&E.

Appendix B: Linking eHealth Strategic Objectives to Health Sector (HSSP III) Strategies

	District Health Services	***Referral Hospital Services***	***Central-Level Support***	***Human Resources for Health***	***Health Care Financing***	***Public-Private Partnerships***	***Maternal, Newborn, and Child Health***	***Prevention and Control of Communicable and Non-Communicable Diseases***	***Emergency Preparedness and Response***	***Social Welfare and Social Protection***	***Monitoring, Evaluation, and Research***	***Medicine and Supplies***	***ICT in Health***
SO1													√
SO2													√
SO3													√
SO4	√	√			√								√
SO5				√									√
SO6												√	√
SO7							√	√			√		√
SO8											√		√
SO9	√	√											√
SO10	√	√											√
SO11	√			√									√
SO12							√	√	√		√		√
SO13										√			√
SO14								√			√		
SO15													√
SO16													√

Appendix C: eHealth Governance Structure

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.

The main components of the eHealth governance structure are the National eHealth Steering Committee (NeHSC) and National eHealth Entity (NeE).

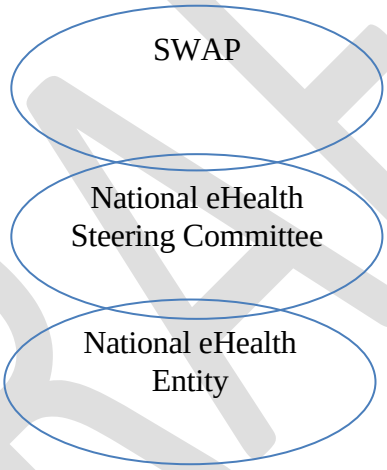


Figure 2. eHealth governance structure

NeHSC

The NeHSC is an important component in ensuring the overall success of the National eHealth Strategy in Tanzania. 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 HSSP III.

Roles and Responsibilities

- Provide leadership and strategic guidance in moving forward with eHealth as aligned with ongoing priority projects, the National eHealth Strategy, and the HSSP III.
- Provide eHealth and eGov expertise and knowledge to the broader health system.
- Oversee the implementation of the National eHealth Strategy.
- Champion eHealth initiatives at national, regional, and district levels.
- Set and prioritize 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.
- Coordinate the formulation and review of the National eHealth Strategy.
- Oversee eHealth plans, standards, and harmonious execution of all projects.
- Establish criteria for identification and selection of eHealth solutions.
- Identify opportunities for collaboration with key national and international eHealth partners.
- Pursue funding opportunities and leverage existing investments to support the National eHealth Strategy.
- Provide advice to the Ministry and stakeholders on the allocation or reallocation of resources as appropriate to achieve the National eHealth Strategy.

Reporting and Accountability

The committee will report to the Sector-wide Approach (SWAP) through the chairperson (chief medical officer) and secretary (head of eHealth/ICT). The committee submits quarterly reports of progress made to the SWAP.

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 20 voting members and will consist of one representative from MDAs, Hospitals, other government institutions, associations, partners and experts.

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 will 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.

The NeHSC chairperson will be the chief medical officer, and the secretary will be MOHSW head of eHealth/ICT.

Meeting

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 favourable vote of those members in attendance will be needed to resolve or approve any issues requiring a vote.

National eHealth Entity (NeE)

The MOHSW ICT unit shall play the role of the NeE. The NeE coordinates and oversees the eHealth investment and the execution of the implementation plan. The NeE's operating model should support discrete functions focused on strategy, investment management, implementation plan execution, standards development, and eHealth solutions compliance. The NeE should be overseen and governed by the National eHealth Steering Committee.

Roles and Responsibilities

The NeE should have the following set of responsibilities.

- **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
- **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
- **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
- **Standards Development** – the definition, maintenance, and enhancement of national eHealth standards and the implementation of a consistent process for undertaking this work

- **Solutions Compliance** – the testing of whether eHealth software products and solutions satisfy nationally agreed-upon certification criteria and standards
- **Leadership** – The NeE will provide technical support to affiliated health institutions and agencies to ensure smooth implementation of eHealth strategies in their respective areas. In addition, the NeE, in collaboration with the PMO-RALG, will provide technical support eHealth implementation to local government and health facilities.
- **Regulatory Framework** – The MOHSW ICT unit shall also be responsible for the implementation and enforcement of national eHealth regulatory frameworks. 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.

Technical Working Groups/Project Governance

The NeE shall be supported by technical working groups or project steering committees:

- Each working group or project will have an appropriate governance structure that is accountable for effective delivery of business benefits on time and within budget.
- Each working group will include representation from key stakeholders and be chaired by a business department/unit lead from a delivery area. The secretary of the project steering committee will be the representative from NeE, in this case ICT Unit.
- Terms of reference and membership of each working group will be subject to approval by the NeHSC.
- The chair of each subcommittee is a member of the other subcommittees.

Appendix D: eHealth Steering Committee Members

S/N	Designation	Institution	Role
MOHSW			
1	Director of Policy and Planning	MOHSW	Chairman
2	Head ICT	MOHSW	Secretary
3	Director of Curative Services	MOHSW	Member
4	Ass Director Reproductive and Child Health Section	MOHSW	Member
5	Ass Commissioner SW	MOHSW	Member
MOHSW -Vertical programs			
6	Program Manager	NACP	Member
7	Program Manager	NMCP	Member
8	Program Manager	TB/Leprosy	Member
MOHSW - MDA			
9	Director ICT	MSD	Member
10	Director General	NHIF	Member
11	Director General	TFDA	Member
Hospitals			
12	Executive Director	Muhimbili	Member
13	Executive Director	Bugando	Member
14	RMO	Dodoma	Member
Other Government Institutions			
15	CEO	eGov	Member
16	Director ICT	PMO-RALG	Member
17	Director ICT	MSCT	Member
18	Director General	COSTECH	Member
19	Coordinator Health Systems	UDSM	Member
20	Representative	MUHAS	Member
Associations			
21	ICT Coordinator	CSSC	Member
Partners and Advisors			
22	HMIS/HIS Advisor	CDC	Member
23	Chief Research Officer	IHI	Member

24	Representative	RTI	Member
25	Representative	PATH	Member