DIGITAL REACH INITIATIVE ROADMAP

EAST AFRICAN HEALTH RESEARCH COMMISSION

Research for Health and Prosperity

Digital REACH Initiative Roadmap

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Definition of Terms

BACK-END SYSTEM REPOSITORIES
Where data is stored for information and analysis

DIGITAL HEALTH AND eHEALTH *(used interchangeably in this report)*
Umbrella terms to encompass all concepts and activities at the intersection of health and information and communications technologies (ICTs), including mobile health (mHealth), health information technology, electronic health records (EHRs), and telehealth, and encompassing three main functions:

- The delivery of health information, for health professionals and health consumers, through the Internet and telecommunications media
- The use of ICTs to improve public health services (e.g., through the education and training of health workers)
- The use of health information systems (HIS) to capture, store, manage, or transmit information on patient health or health facility activities

DIGITAL HEALTH SOLUTION
An individual product or service (or combination of multiple products or services) created to serve a specific health system objective, often encompassing a set of hardware, software, infrastructure, and services required to meet this objective

DIGITAL HEALTH SYSTEM
The interrelated set of technologies, processes, and structures within a digital health ecosystem, typically encompassing numerous solutions and organisations

TRANSFORMATIONAL TECHNOLOGY
A new technology that replaces an established technology, or an innovative technology that creates a completely new industry.

ENTERPRISE ARCHITECTURE
Blueprints or frameworks of information systems, commonly used to help ICT implementers design increasingly complex systems and describe how components will interact with each other and external applications

ENVIRONMENTAL ENABLERS
Components of the ecosystem that support digital health, namely: leadership and governance, strategy and investment, a workforce, harmonisation standards and interoperability, and legislation policy and compliance

FRAMEWORK
Conceptual structure guiding the Digital REACH Initiative components

GLOBAL GOODS
Reusable assets that are free and open source such as software, training guides, best practices, tools, and standard operating procedures. Global goods are supported by a strong community, are funded by multiple sources, deployed at significant scale, used in multiple countries, designed to be interoperable, have demonstrated effectiveness, and support the application of common standards. Examples include DHIS2, Commcare, RapidPro, ResourceMap, and Open MRS

HEALTH SYSTEMS
All the activities whose primary purpose is to promote, restore, and/or maintain health. This also refers to the people, institutions, resources, and policies that governments put in place to improve public health

ICT ENABLERS
Components of the ecosystem, specifically related to ICTs that support digital health, namely: infrastructure, services and applications

INITIATIVE
The Digital Regional East African Community Health (REACH) Initiative, a new standing body with a defined governance structure set up to oversee the creation of an enabling environment for digital health across the EAC region, and to implement digital health programs to improve regional health in the EAC

INTEROPERABILITY
The ability of different information technology systems and software applications to communicate, exchange data, and use the information that has been exchanged. Integration allows two applications to exchange information. Interoperability allows many.

mHEALTH
The delivery of health care services through the use mobile networks and devices

PARTNER STATES
Partner States of the East African Community (EAC) include the Republic of Burundi, the Republic of Kenya, the Republic of Rwanda, the Republic of South Sudan, the United Republic of Tanzania, and the Republic of Uganda

POINT-OF-CARE SERVICES
Applications and services used by health workers to collect and interact with information to deliver care

TRANSPORT LAYER
Responsible for end-to-end communication over a network, providing communication between applications running on different hosts

Abbreviations

AMREF   African Medical and Research Foundation

CB-HIPP   Cross-Border Health Integrated Partnership Project

CBHU   Cross-Border Health Unit

DHIS2   District Health Information Software 2

EAC   East African Community

EA-CBHS   East Africa-Cross Border Health Services

EAHRC   East African Health Research Commission

EAOSCH   East African Open Science Cloud for Health

EAIDSNet   East African Integrated Disease Surveillance Network

GHSA   Global Health Security Agenda

HIS   Health Information System

ICT   Information and Communication Technology

K4Health   Knowledge for Health Project

KPIs   Key Performance Indicators

M&E   Monitoring and Evaluation

MNO   Mobile Network Operators

MoC   Ministry of Communications

MoH   Ministry of Health

MoITC   Ministry of Information Technology and Communication

MoU   Memorandum of Understanding

OpenHIE   Open Health Information Exchange

PPP   Public Private Partnership

RAD   Regional Action Through Data

REACH   Regional East African Community Health Initiative

USAID   United States Agency for International Development

WHO/AFRO   World Health Organization Regional Office for Africa

Acknowledgments

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The full list of individuals who contributed to this roadmap can be found in Appendix A.

Foreword by the Executive Secretary – EAHRC

Professor Gibson Kibiki, MD, MMed, PhD
Executive Secretary – East African
Health Research Commission

Digital technology is expanding rapidly in Africa. We have all witnessed its ability to revolutionise communications and financial transactions in East Africa, and it is now time we harnessed this potential to do the same for health. The East African Community (EAC) has the opportunity to use digital technologies to transform the health sector by strengthening all aspects of the health system, and expediting the achievement of the UN Sustainable Development Goals for a healthy and prosperous East Africa.

A regional approach to digital health is necessary to support many of our health priorities. These include improving patient-centred health services, expanding cross-border health services, implementing the One-Health approach, and preventing and responding to global health security threats. Ebola was a bitter lesson; it revealed how vulnerable we are globally to disease outbreak in any locale and highlighted the importance of strengthening health systems regionally. Digital health can play a pivotal role in the implementation of real-time disease surveillance across the region and in the strengthening of each country's health system.

The East African Health Research Commission (EAHRC) was established to provide the EAC reliable information on health practice and research to guide knowledge generation, technological development, and policy formulation and practice. Technology-driven health is one of the mandates of EAHRC's 2016 – 2021 Strategic Plan, approved by the EAC Council and Partner States. During the 6th East African Health and Scientific Conference in March 2017, held in Burundi, one of the key recommendations was to scale uptake and utilisation of digital health in East Africa to improve healthcare service delivery and health outcomes.

To realise this vision, I am very pleased to present the Digital Regional East African Community Health Initiative (Digital REACH Initiative) roadmap, an innovative, first-of-its-kind effort to take a regional perspective in advancing digital technology for health. Bringing together governments of the EAC countries, development partners, and the private sector, the Digital REACH Initiative will build on and work with – rather than replace – national health programmes and strategies. It is an implementation-led initiative that strives to improve health outcomes across the region through the creation of a robust enabling environment and strategic regional digital health programmes.

This roadmap is the first step towards realizing the Digital REACH Initiative. It provides a detailed view of the Initiative's vision, mission, and outcome goals, as well the various workstreams, their phasing, strategic approaches, and both regional and partner-state responsibilities. The roadmap will be a guidepost for detailed planning, resource mobilisation, launch and ongoing management of the Initiative. This document also highlights the importance of institutionalising digital health and facilitating collaboration and coordination among countries, development partners, the private sector, and other stakeholders. Created and owned by the EAC,

development of the Digital REACH Initiative roadmap was an inclusive process, incorporating the design, direction, and input of over 100 cross-sector, regional stakeholders. The concept of the Digital REACH Initiative started in June 2016, when the EAHRC initiated discussions with partners and experts in the field. In March 2017, the EAHRC presented the EAHRC Commissioners with a concept note entitled Towards a shared commitment to improve health outcomes through digital technology. The EAHRC Commissioners, and later the EAC Sectoral Council of Ministers of Health and the Full EAC Council, approved the concept. In a coordinated manner, the EAHRC convened the Regional East Africa Digital Health Roadmap Conference in Kampala, Uganda in September 2017, a dedicated roadmap review workshop in Dar es Salaam, Tanzania later that month, and a final regional stakeholder review workshop in November 2017 in Entebbe, Uganda. The conference in Kampala was convened for digital health experts and Partner State stakeholders to discuss and build consensus on digital health, and to agree on a regional digital health roadmap that would be approved by the EAC. Throughout the process, core stakeholders provided direct input to the various drafts of the roadmap. This document is the result of all these efforts.

Subsequently, the EAC Sectoral Council of Ministers of Health approved the Digital REACH Initiative Roadmap at the 15th Ordinary Meeting of the EAC Sectoral Council of Ministers of Health that took place from 13th to 17th November 2017 in Kampala, Uganda. The EAHRC Secretariat was directed to continue its work by developing the strategic plan for implementation of the Digital REACH Initiative.

I would like to thank the EAC representatives, EAHRC Commissioners, experts from the EAHRC National Focal Points, health, ICT, and e-Health government officials from EAC Partner States, non-governmental and civil society organization representatives, technical experts, development partners, and implementing partners for all their assistance in moving forward this important work. By embracing digital health technology at a regional level, the EAC is leading the way and serving as a model for other regions of the world. This Digital REACH Initiative roadmap lays out the next steps for the EAC region to further harness the power of digital technology to strengthen the health sector and improve the health and wellbeing of its citizens.

Sincerely,

Professor Gibson Kibiki, MD, MMed, PhD
Executive Secretary – East African Health Research Commission

Executive Summary

THE OPPORTUNITY FOR DIGITAL HEALTH IN EAST AFRICA

Healthy populations are essential for the economic growth and prosperity of the East African Community (EAC). Socio-economic development is advanced when citizens are productive, and health security plays a key role in a nation's prosperity. A prosperous and healthy region is one that is free of health threats, where each nation has a resilient health system capable of providing equitable and effective care.

Digital technologies strengthen health systems by bolstering the access, use, and performance of health services in pursuit of improved health outcomes. They support health security by helping authorities prevent, track, and respond to health threats such as infectious diseases and epidemics that can rapidly spread across borders. Porous borders and the fluid movement of people across them underscore the need for a regional approach to tracking and responding to cross-border health needs and emergencies.

> Resilient health systems and coordinated digital health programs are vital to the EAC's goal of becoming a globally competitive, upper-middle-income region with well-educated and healthy human resources, providing access to health services to every EAC citizen by 2050.

While the EAC has led in digital health implementations, few have scaled to a level required to improve health delivery and outcomes. The profit potential for private-sector investment, the type that made digital financial services so successful in East Africa, is missing in the case of digital health. Therefore, there is a need for the public sector to take the lead and coordinate across Partner States, private companies, development partners, and other key stakeholders to bring digital technologies to scale. The concept of scaling digital technologies refers not only to increasing the coverage areas and usage levels of current and new digital health programs; it also considers how some of the EAC's current initiatives might be expanded into other usage categories or expanded to include new geographies or disease areas.

The EAC is well-positioned to take a leadership role in coordinating digital health activities and programs that improve the quality of health-service delivery within and across the region, realizing benefits and economies of scale that cannot be achieved by any one country alone. For example, building, maintaining, and governing a shared services cloud that allows multiple countries to use the same software and support would enable each Partner State in the region to share expertise and critical data. It would create large-scale efficiencies for the region while allowing resources to be concentrated on protecting the security and privacy of the data. Coordinated and shared digitized systems also enable capabilities such as real-time disease surveillance, cross-border health records management, and access to insurance coverage. This can strengthen the health security and prosperity of the EAC, and advance the Global Health Security Agenda (GHSA), the One-Health approach, as well as Partner State strategies and plans. In summary, taking a regional approach in the EAC would:

- **Achieve Economic Efficiencies** through cost savings, economies of scale, and sharing of digital health resources across the region.

- **Support Improved Health Systems** by enhancing data sharing, policies and standards, access and continuity of care, surveillance, and use of data for decision making.

- **Yield Faster and Better Implementation** by positioning the region as a digital health leader, accelerating implementation progress within and across Partner States, supporting the use of evidence for decision making, and sharing best practices.

INTRODUCTION TO THE DIGITAL REACH INITIATIVE ROADMAP

In September through November of 2017, the EAHRC convened stakeholders from across East Africa to discuss the needs, vision, goals, and responsibilities for the Digital Regional East African Community Health (REACH) Initiative. The stakeholders agreed that the focus of the initiative should be to bring together the EAC, EAC Partner States, development partners, the private sector, and other key stakeholders to improve health outcomes across the region through a robust enabling environment and the implementation of strategic regional health programs supported and facilitated by digital health solutions. This document summarizes the outcomes of these discussions into a roadmap that provides a common regional vision, guidance for the next phase of strategic planning and costing, clear articulation of responsibilities between the region and Partner States, and indicators for organisational requirements.

The Digital REACH Initiative Roadmap seeks to bring together governments of the EAC countries, development partners, the private sector, and other key partners to improve health outcomes across the region through a robust enabling environment and the implementation of strategic regional digital health programs

UNIFYING DIGITAL HEALTH FRAMEWORK

This roadmap introduces a unifying framework to organise the Digital REACH Initiative's focus and workstreams. The framework features digital health programs (or usage models) at the centre. These programs are enabled by two critical ICT components - services and applications, and infrastructure. They are also supported by an enabling environment comprised of leadership and governance, strategy and investment, a skilled health workforce, harmonised standards and interoperability, and the development and compliance of legislation and policy. The EAC will play a major role in creating and supporting the enabling environment for digital health and in the design and use of digital health solutions, to ensure sustainability and scale.

Credit: Inspired by Theory of Change developed by PATH and Vital Wave and used in Tanzania's digital health roadmap

ASSESSING DIGITAL HEALTH FOR EAST AFRICA

The EAHRC has conducted a review of digital health programs in EAC Partner States to contextualize the roadmap and identify existing assets that can be leveraged across the region. While countries are at differing stages of implementing their own national HIS, national strategies and plans for digital health are in place across the region. Many services and applications are present, and countries are using common technologies such as the DHIS2 platform and OpenHIE components. The use of common technologies combined with the fact that countries face similar challenges (e.g., the lack of digital health expertise, limited infrastructure, unreliable connectivity, and fragmented eHealth initiatives) indicates a strong opportunity to share experiences and assets. Opportunities also exist to use common global goods across Partner States and to leverage existing regional surveillance initiatives (e.g., EAIDSNet), organisations (e.g., AMREF), bodies (e.g., WHO/AFRO) and programs (e.g., RAD, EA-CBHS). The fact that Partner States are in different stages of development with their digital health strategy and implementation points to an opportunity to share information and reusable assets to help countries advance and close gaps in country-specific digital health deployments.

THE DIGITAL REACH INITIATIVE

The following presents the **vision and mission statement** for the Digital REACH Initiative.

VISION 2028
Interconnected health systems for a healthy and prosperous East Africa

MISSION STATEMENT
Maximise the power of digital health in East Africa by ensuring an enabling environment and by implementing scaled, coordinated, transformational, and innovative approaches.

The activities of the Digital REACH Initiative are designed to achieve specific outcome goals related to the need for quality and timely data collection in different health-program categories, including:

Public Health Education and Awareness
Improve direct provider-to-patient care, community knowledge and services, as well as patient education for preventive care and behaviour change

Diagnostic and Treatment Support
Share health records to improve access, continuity and efficiency of care and support portability of health insurance at the regional level

Health Worker Education and Training
Support capacity building through training, knowledge sharing, and performance management

Surveillance and Response
Build capacity and improve surveillance to prevent, detect, and respond to infectious diseases, emergencies, and outbreaks

Supply Chain Management
Improve supply chain efficiency and drug procurement, and economies of scale through better tracking and bulk purchasing

Resource Allocation and Management
Develop a long-term sustainable financing strategy, facilitate resource planning, management, and tracking that optimizes resource mobilization and deployment

Population Health Status
Optimize data sharing, track regional priority patient indicators, and promote use of health research to support health policies and health agenda

This roadmap identifies the responsibilities of the region and Partner States across nine workstreams. The management and oversight of all nine workstreams will require the creation of a multi-dimensional organisation to provide a strong mechanism for collaboration, guidance, project management, and technical expertise. This multi-disciplinary organisation would sit within the EAC and complement existing EAC digital initiatives and country strategies. Managed at the regional level, it would be supported by Partner States, technical advisors, and other experts in the field, including the private sector and development partners. A key focus of the Initiative will be the implementation of health programs that drive the design and use of digital health solutions to realize Initiative goals and strengthen the enabling environment.

These health programs are to include:

- **East Africa Open Science Cloud for Health (EAOSCH)**
  Establish a real-time regional data warehouse for capturing, storing, retrieving, analysing, and managing national and regional health in East Africa. This would support implementations like the EA-CBHS and the One-Health approach, by establishing a supporting structure for the seamless sharing of health data across EAC Partner States and facilitating the tracking of key performance indicators (KPIs).

- **Regional and cross-border program implementations**
  Drive regional cross-border implementations that address key challenges associated with delivering quality health services to mobile populations and border communities. This includes the use of innovative health technology for disease surveillance, detection, and response. One example of this is the EA-CBHS, a regional program that seeks to utilise digital technology to improve health outcomes for cross- border mobile priority populations.

- **Support of country-specific program implementations**
  Provide technical assistance for country-specific implementations in individual Partner States to enable integration with regional digital health programs. Examples include the provision of pooled technical implementation expertise to support country implementations, and support for Partner States in implementing unique IDs, telemedicine infrastructure, and national strategies and policies that align with regional objectives.

- **Design of implementations using transformational technologies**
  Lead the development, testing, and use of new, transformational technologies in regional or country-specific health programs to identify new efficiencies. Examples include the use of geographic information system (GIS) technology for predicative risk modelling for surveillance and response, blockchain technology for secure electronic healthcare records, precision health applications for personalized medicine, and automated data mining for early disease outbreak alerts.

Creating an evidence base will be crucial to securing this investment over the ten-year period. Throughout the lifespan of the Initiative, a critical part of all implementations will be monitoring and evaluation (M&E). This will include ongoing and careful performance management, as well as the identification and building of an evidence base demonstrating the impact of health programs. This is especially important given the current lack of longitudinal data and evidence of digital health efficacy that is desired by the global health community. This approach is a ground-breaking dimension of this Initiative, making it possible to not only identify evidence of impact, but also apply that evidence in a way that structures and drives work on the enabling environment and subsequent implementations.

The following summarizes **region and Partner State responsibilities** outlined in this roadmap by workstream.

WORKSTREAM	SUMMARY OF REGION RESPONSIBILITIES	SUMMARY OF PARTNER STATE RESPONSIBILITIES
1. ORGANISATION FORMATION AND MANAGEMENT	Drive organisation development and determine the supporting frameworks, structures, staff, partners, and financing mechanisms to manage and maintain the initiative. Conduct M&E across workstreams and collect evidence to support continued investment.	Support organisation development and management activities of the region.

WORKSTREAM	SUMMARY OF REGION RESPONSIBILITIES	SUMMARY OF PARTNER STATE RESPONSIBILITIES
2. HEALTH PROGRAMS	Analyse health program data and platform usage. Drive cross-border program implementations. Support country-specific program implementations. Design innovative implementations with transformational technologies.	Utilise regional cloud platforms to implement and improve health platforms based on evidence. Support EAC cross-border implementations. Share information on country-specific programs that would benefit from regional support. Enable innovation and new technologies. Share information on implementations to build evidence base.
3. INFRASTRUCTURE	Identify, build, and host common technology components on a regional digital health services cloud. Provide knowledge repository platform for digital health training and eLearning. Provide regional tech support for digital health systems.	Agree on and enable information to be uploaded to the digital health regional services cloud. Budget for platform maintenance, and contribute resources and content. Make digital health training a continuing professional development and education requirement.
4. SERVICES AND APPLICATIONS	Coordinate regional population health surveys and research. Provide monitoring and evaluation services. Use digital tools to disseminate localised public health messages to health workers. Develop regional architecture for common services and applications.	Adopt regional indicators, terminology and surveys. Adopt common protocols, legislation and standards. Agree on topics and develop rollout strategy for public health messages to health workers. Adopt and integrate with regional services and applications.
5. LEADERSHIP AND GOVERNANCE	Coordinate logistical management and related systems, negotiate partnerships, and ensure integration in existing EAC initiatives.	Implement logistical management and related systems. Support the creation and adoption of policies, standards, regulations, and frameworks.
6. STRATEGY AND INVESTMENT	Develop regional strategies and financing mechanisms for resource mobilization, telemedicine, and infrastructure expansion. Perform demand aggregation and regional negotiations to lower costs.	Develop, implement, and share strategies to support regional plans in telemedicine, resource mobilization and infrastructure expansion. Commit to using goods, tools, and resources negotiated or financed by the region.

WORKSTREAM	SUMMARY OF REGION RESPONSIBILITIES	SUMMARY OF PARTNER STATE RESPONSIBILITIES
7. LEGISLATION, POLICY, AND COMPLIANCE	Lead formation and harmonisation of data policies and standards. Develop cross-border agreements, software testing standards, and KPIs and policies for managing health emergencies.	Develop in-country guidelines, protocols, and platforms for data sharing between programs. Implement common data policies, best practices, and bilateral agreements for cross-border health service delivery. Adopt KPIs and guidelines.
8. WORKFORCE	Harmonize health and digital health training and performance monitoring and evaluation programs. Facilitate human resources sharing across the region.	Agree on training credentials and update in-country training curricula. Monitor agreed regional performance indicators for human resources. Create bilateral agreements and protocols to facilitate human resource sharing.
9. HARMONISATION, STANDARDS, AND INTEROPERABILITY	Develop and promote regional principles on data sharing and unique IDs. Harmonise best practices for technical architecture and interoperability. Create minimum data set for diagnostic algorithms and referral guidelines.	Support regional guidelines with policies, regulations, and legislation. Agree on regional reference architecture and adopt best practices and middleware. Implement clinical referral guidelines along national guidelines.

This roadmap is the first step toward realising the Digital REACH Initiative. Critical to the success of the Initiative will be its ability to secure and sustainably pursue financing from the very start. To realise this, the path forward features a strategic plan and costing that will include a sequencing of activities, a breakdown of key dependencies to determine the appropriate timing for each activity, as well as a detailed scoping for each of the workstreams. This will allow the EAHRC to obtain funding and develop plans to launch full-scale operations at the end of 2018. This document is a resource to support discussions and fundraising.

CONCLUSION

Digital Health systems have evolved to a point where health systems and the digital technologies that support them are inseparable. As the divide between "health" and "digital health" fades, an opportunity has emerged for the region to take a leadership role to build a robust enabling environment and implement digital programs at a regional scale for better health outcomes in the EAC. This roadmap lays out a strategy for coordinated regional action in digital health that will bring economies of scale, enhance continuity of care across the region, and maximize financial investments, while at the same time strengthening the sustainability of health programs to reduce dependence on donor funding. It provides a foundation for coordinated action, building upon collective momentum and creating a regional strategy for digital health. It is a living document that will continue to evolve over a ten-year period, calling for strong leadership and governance to generate large-scale cost efficiencies, improved health outcomes, and faster and better implementations.

Introduction

The vision of a healthy and prosperous East Africa, supported by the free movement of people, services and goods throughout the region, relies on an effective health system. Citizens of all EAC Partner States should be able to obtain quality, affordable healthcare wherever they are. Technology is an important part of this vision. There is a clear opportunity for East Africa to utilize digital technologies to advance the health and prosperity of the region and its citizens.

East Africa is already a world leader in the use of digital technology for delivering financial services. Expanded financial services in East Africa, led primarily by the private sector, started with a single telecommunications operator, Safaricom, offering Kenyans the ability to transfer money with their mobile phones. As demand for this service grew, so did the need for mobile network operators (MNOs) to facilitate transfers between their networks. This required common approaches and shared technical infrastructure. Now, MNOs in East Africa are building regional and even continental infrastructure to enable services such as cross-border payments and international remittances. This in turn has created new markets and opportunities.

A relatively small number of MNOs and clear market incentives have facilitated rapid progress in connecting digital financial services across regions. While East Africa has also led in the use of digital technology for health, programs have been smaller and not connected across countries. Uncertain financing mechanisms and the large number of service providers from both the private and public sectors have made it difficult to develop wide-scale digital health systems across the region. Additionally, while the expansion of digital financial services was led by the private sector, the business case for profitability – essential for the private sector – is less compelling. In this context, the EAC is best suited to accelerate digital systems for improved health by leveraging its ability to work at the regional level with all health stakeholders, including governments, development partners, and the private sector.

Nations thrive when their citizens are productive, and health security plays a critical role in this prosperity. Regional prosperity is inextricably linked to a safe and secure environment in all Partner States, free of cross-border health threats. Prosperity is also reliant on shared responsibility and coordination; it cannot be fully achieved by individual Partner States acting alone. The implementation of a regional digital health initiative can have a profound impact on health security and prosperity in the EAC, while advancing the **Global Health Security Agenda (GHSA)** and the **One-Health** approach. A regional approach to digital health infrastructure and shared assets would create economies of scale that would dramatically improve the quality of health-service delivery within each EAC Partner States, realizing benefits that cannot be achieved by any one country alone. The porous nature of regional borders and the fluidity of movement between countries also create an urgent need for a regional approach. The 2014 Ebola outbreak in West Africa was a clear warning sign of how vulnerable regions can be without appropriately interconnected, digitized systems. Coordinated and shared systems enable capabilities such as real-time disease surveillance, cross-border health records management, and access to broader insurance coverage.

The EAC goals include being a globally competitive, upper-middle-income region with well-educated and healthy human resources, providing access to health services to every EAC citizen by 2050. To achieve this, East African governments and their partners must continue to promote and invest in resilient health systems and coordinated digital health programs. This document upholds and adds critical detail to this vision. It presents the Digital Regional East African Community Health (REACH) Initiative roadmap, the first step toward realizing the Digital REACH Initiative, a new regional standing body which seeks to bring together the EAC, Partner States, development partners, the private sector, and other key stakeholders to improve health outcomes across the region through the creation of a robust enabling environment and the implementation of strategic regional health programs, which are supported and facilitated by digital health solutions. The roadmap will be followed by a strategic plan and costing exercise which will allow the East African Health Research Commission (EAHRC) to pursue the funding necessary to launch the Initiative and plan for full-scale operations by late 2018.
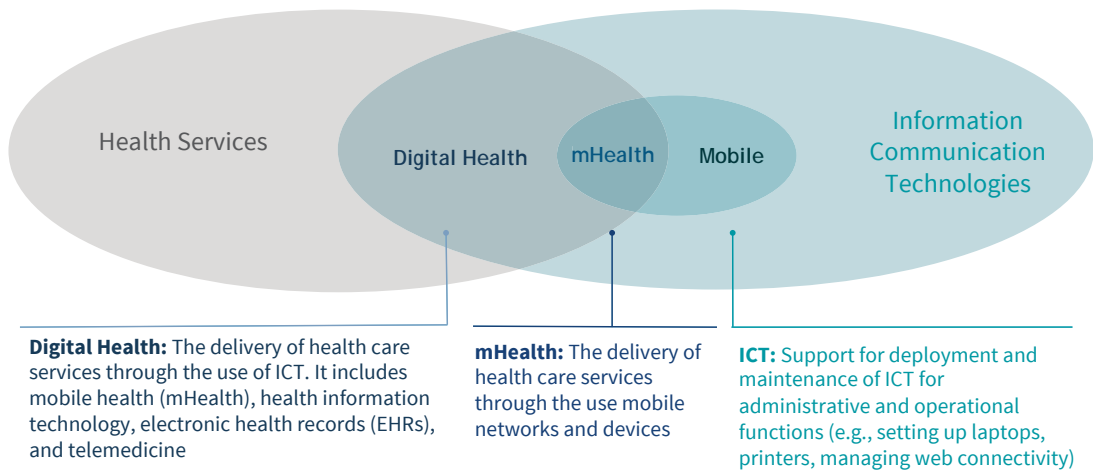
Digital Health Overview

Digital health (also sometimes referred to as eHealth) is a way of augmenting health services through the use of ICT. It includes mobile health (mHealth), health information technology, electronic health records (EHRs), and telemedicine.

W hile the clinical health benefits for digital health are still being determined, data has started to emerge on its ability to reduce the cost of health services[1]. Technologies can include medical equipment, computers, satellite communication, cloud technology, and mobile phones and devices. Figure 1 defines key terms and illustrates the overlap between health services, digital health, mHealth, and ICT.

Figure 1: Key Definitions in Digital Health

Health Services

Digital Health

mHealth

Mobile

Information Communication Technologies

Digital Health: The delivery of health care services through the use of ICT. It includes mobile health (mHealth), health information technology, electronic health records (EHRs), and telemedicine

mHealth: The delivery of health care services through the use mobile networks and devices

ICT: Support for deployment and maintenance of ICT for administrative and operational functions (e.g., setting up laptops, printers, managing web connectivity)

The central element of nationally scaled digital health is the health information system (HIS). The purpose of a national health information system is to drive better decision making across the health system through the availability and use of data. There are four major purposes for which data can be used:

1. **PROGRAM PERFORMANCE**
   Tracking and improving the performance and management of health programs and specific interventions, and the sharing of research and program data.

2. **STRATEGIC AND OPERATIONAL MANAGEMENT**
   Improving business processes and efficiency and allocating resources

3. **REPORTING**
   Mapping indicators that respond to and satisfy government and donor reporting to evaluate progress and identify trends

4. **HEALTHCARE DELIVERY OR CONTINUITY OF CARE**
   Making better treatment decisions at the point of care; identifying and communicating with patients in hard-to-reach, underserved communities (e.g., using spatial maps)

It is important to note that there is a catalytic relationship amongst these categories of health data use. For instance, using data to improve program performance will impact delivery of care, and using data for care delivery will in turn influence data use for improving business processes and resource allocation. Making better decisions in any of these areas is difficult without and a digital HIS.

Canada Health Infoway, Benefits Evidence—Pan–Canadian Studies, https://www.infoway-inforoute.ca/en/what-we-do/progress-in-canada/benefits-evidence-pancanadian-studies

The Opportunity for Digital Health in East Africa

There is an opportunity today within the EAC to improve access to health services and health outcomes for citizens through a unified approach to digital health. Currently, the region has varying degrees of digital health implementation among Partner States.

Great advances are being made, yet there many opportunities to harmonise policy and standards, and to create shared assets such as data science clouds, training programs, and functional expertise. A robust, region-wide enabling environment would allow Partner States to deliver health services that are more effective than country-specific health initiatives. A regional digital health program would also support broader EAC goals, such as the free movement for services, persons, and goods, universal access to healthcare, and better tracking and surveillance, especially in cross-border communities where patients travel between countries to seek care.

More specifically, a regional initiative for digital health, guided by a unified vision, will create economic efficiencies, improve health outcomes, and enable faster implementations, as detailed in Figure 2. These advances would be more difficult for any one Partner State to attain individually. A regional approach allows for economies of scale, improved services, shared engineering capacity, and lower support costs. For example, building, maintaining, and governing a shared services cloud (i.e., with multiple countries using the same software and support) would allow each Partner State to share expertise and critical data, to create large-scale efficiencies, and to focus additional resources on data security and privacy. Another advantage of regional standardisation is that services providers might prioritize EAC requests because they promise greater impact than health programs in individual countries, effectively allowing the EAC region to set the technology agenda with their Partners. The implementation of a common digital health initiative would be supported by global tools and guidance such as the **Principles of Digital Development** to the **WHO/ITU eHealth Strategy Toolkit**.

> Shared regional infrastructure, capacity, and learnings will enable large-scale cost efficiencies, improved health outcomes, and faster and better implementations.

Figure 2: Value of Digital Health in East Africa

ECONOMIC EFFICIENCIES

- Generates stronger evidence base for cost savings associated with international health
- Creates opportunity for model agreements and approaches that can be replicated in Partner States
- Introduces economies of scale for infrastructure, hosting, and procurement
- Establishes a "community of practice" to share best practices and local experts across the region
- Creates opportunity for key resources to be shared and leveraged across the region
- Increases negotiating power with service providers, suppliers, and international partners

IMPROVED HEALTH SYSTEMS

- Enhances ability to share public heath data across countries
- Allows evidence-based digital service delivery strategies to be implemented for target health priorities
- Introduces need for harmonised standards and policies which support the free movement of services and people
- Increases access to health services and continuity of care across the region
- Enhances surveillance capabilities, improved access to and use of data for regional and national decision making

FASTER AND BETTER IMPLEMENTATION

- Enables region to position itself as a new leader in digital health implementation
- Accelerates implementation progress at the Partner State and region level
- Supports health research and use of evidence to design targeted and effective implementations
- Allows for sharing of best practices and local experts across the region for implementations
- Increases bargaining power for Partner States to negotiate changes and enhancements with service providers, setting the technology agenda

DIGITAL HEALTH IN ACTION

There are a variety of usage scenarios for digital health, listed in Figure 3. These usage scenarios are evident at the country level and at the regional level. For instance, individual Partner States are responsible for providing medical care throughout the country, including border zones; however, cross-border emergency surveillance and response capabilities ensure greater public health security on a regional basis. An example of region-level Surveillance and Response would be cross-border disease management for infectious disease tracking and community surveillance. The EAC's EAIDSNet Initiative – a network of national Ministries of Health and national health research and academic institutions in East Africa – plays this role through the exchange and dissemination of information on emerging diseases. Other regional examples include supply-chain management, cross-border access to insurance coverage, and integrated mobility tracking.

Figure 3: Usage Scenarios for Digital Health

PUBLIC HEALTH EDUCATION AND AWARENESS
Support individual wellness, disease prevention, and public health and behaviour change through Push, Pull, and General Awareness channels

DIAGNOSTIC AND TREATMENT SUPPORT
Diagnose at the point of care and treat patients remotely, including maintenance of health provider appointments and medication regime adherence

HEALTH WORKER EDUCATION AND TRAINING
Improve access to information and resources and deliver remote training and education for health workers

SURVEILLANCE AND RESPONSE
Collect real-time patient data, including healthcare data related to vital statistics, disease incidence, outbreaks, and public-health emergencies

SUPPLY CHAIN MANAGEMENT
Monitor drug distribution to increase availability and reduce counterfeiting

RESOURCE ALLOCATION AND MANAGEMENT
Allocate resources according to population and health indicators

POPULATION HEALTH STATUS
Understand population health trends and convey them to stakeholders, including funders

For the impact of digital health to be realised in any of these usage scenarios in a scaled and sustainable way, solutions need 1) careful and contextualized implementation within 2) a robust enabling environment. Both of these conditions are essential for regional success.

The Digital REACH Initiative seeks to bring together governments of the EAC countries, the private sector, development partners, and other key stakeholders to improve health outcomes across the region through a robust enabling environment and the implementation of strategic regional digital health programs.

This document lays out a ten-year roadmap for the Digital REACH Initiative. It is a forward-facing document that describes goals, key milestones, strategic approaches, considerations for implementation, and organising principles for advancing digital health in the EAC.

The roadmap identifies a set of coordinated strategic activities, across all aspects of the health sector, to be undertaken by the EAHRC, with support from Partner States, over the next ten years, from 2018 to 2028, as part of the Digital REACH Initiative. This roadmap focuses primarily on the roles and activities to be undertaken in the context of this Initiative. It also delineates the responsibilities between the region and Partner States and provides overarching strategies to guide the organisational approach and use of Initiative resources.

Given its ten-year duration, and the rapid pace of technology change, this roadmap is a living tool. It is expected that it will be refreshed every two years with updated regional information, technological advances, and changes in global health. A deeper revision of the goals and milestones should be conducted after five years.

Users of this Roadmap

EAC STAFF AND PLANNING PARTNERS
Will use this roadmap to further define overall regional needs and capacities, make decisions on regional priorities, and develop actionable implementation plans. They will also use this roadmap to secure financial support for the set up and implementation of the Digital REACH Initiative.

PARTNER STATES
Will use this roadmap to identify their role in supporting the Digital REACH Initiative, including any human resources (e.g., health, data, and IT specialists) and other resources (e.g., reusable assets such as standards, guidelines, or code) that can support the Initiative.

OTHER PARTNERS
Partners, including development partners and the private sector, will use this roadmap, along with future strategic and costing plans, to validate and align financial investments.

VALUE OF A REGIONAL ROADMAP

A regional roadmap is an important step toward coordinated regional action in digital health. The Digital REACH Initiative roadmap provides:

- A common regional vision
- A realistic plan for regional collaboration
- Guidance for the next phase of strategic planning and costing
- A clear articulation of responsibilities between the region and Partner States
- Indicators of organisational requirements which can be used for tracking and managing multi-party agreements
- A platform for development partners and private sector discussions to drive coordination and shared investment

PATH TO IMPLEMENTATION

The path to implementation begins with the roadmap. The roadmap will facilitate a strategic planning and costing process to support the mobilisation of resources for the specific tasks and responsibilities outlined in this document.

The roadmap covers a ten-year period and will allow the EAHRC and its stakeholders to move directly into discussions with development partners, investors, about how best to accomplish these goals and approach its programs strategically. Together, the roadmap, strategic plan, and the costing plan will position the EAHRC and Partner States to pursue the funding necessary to launch the Digital REACH Initiative and plan for full-scale

Figure 4: The Path to Implementation

Roadmap	Strategic Plan	Costing	Resource Mobilisation	Initiative Lanuch and Execution
What: Responsibilities and corresponding activities	**When:** Detailed timeline that considers dependencies and synergies	**How:** Resources required to implement activities through detailed scoping and costing exercise		
Who: Region and country responsibilities	**How:** Detailed strategic approach supported by a refined activity plan			
How: High-level description of strategic approach, including strategic guidelines for implementation, critical success factors, and initial set of activities	**Who:** Specific roles and responsibilities (e.g., bodies, departments, working groups)			

This roadmap is the product of a consultative process with digital health stakeholders from across the East African region, including the Republic of Burundi, the Republic of Kenya, the Republic of Rwanda, the Republic of South Sudan, the United Republic of Tanzania, and the Republic of Uganda. Multiple stakeholder consultations, in-person workshops, and regional meetings were held with Partner States and digital health experts from April to November 2017 to gather input and buy-in on the roadmap.

Unifying Digital Health Framework

Digital health initiatives, like the one envisioned in this roadmap, focus on integrating information and communication technologies into new and existing health programs and services. For digital health solutions to effectively integrate into health programs, a common set of enablers needs to be in place.

Figure 5 illustrates how various health and ICT enablers interact to create a unifying digital health framework. The framework features digital health programs (or usage models) at the centre. These programs are enabled by two ICT components: services and applications, and infrastructure. These two ICT enablers are critical for every digital health program. Supporting the successful implementation of digital health programs is an enabling environment made up of **leadership and governance, strategy and investment**, a health **workforce, legislation, policy and compliance**, and **harmonisation, standards and interoperability**. These environmental enablers also ensure sustainability and scale.

While it is possible for an individual country to create its own enabling environment, there are significant benefits to addressing these components in whole or in part at the regional or even global level. Some infrastructure and service components, such as data clouds, training programs, and health information systems, can be developed, refined, and used across multiple geographies, resulting in economies of scale and better quality components. Additionally, the creation and application of internationally agreed standards and policies enables cross-border health programming and research that is otherwise difficult to achieve.

Credit: Inspired by Theory of Change developed by PATH and Vital Wave and used in Tanzania's digital health roadmap

Figure 5: Unifying Framework for Digital Health Programs

These framework components are further described below and will be referenced throughout the roadmap for discussing both region and Partner State roles in a scaled digital health environment. One of the major roles the region has to play is in creating and supporting the enabling environment for digital health and global health security.

One of the major roles the region has to play is in creating and supporting the enabling environment for digital health.

HEALTH PROGRAMS are an integrated set of planned, sequential, health-related strategies, activities, and services designed to promote improved health outcomes. They can be completely or partially digital, or not at all.

SERVICES AND APPLICATIONS support current and planned products and services that provide tangible means for enabling digital health services and systems access, or the exchange and management of information and content. Users include the general public, patients, and health and insurance providers. The means may be supplied by government or the private sector. They typically include Point-of-Care Systems (mobile or stationary) used by health system staff to collect and interact with information to deliver care. Global goods are an example of a type of service and application.
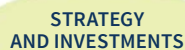
INFRASTRUCTURE creates the foundation for digital health across borders and disease areas. This includes the physical infrastructure (e.g., networks), core services, and applications that underpin a digital health ecosystem, including the technical support required to maintain systems over time. Global goods also are designed to function as core software in the infrastructure.

LEADERSHIP AND GOVERNANCE includes activities to direct and coordinate digital health at the national and regional levels, ensure alignment with health goals, seek broad political support, raise awareness, and engage stakeholders. It involves the use of expertise, coordination, and partnerships to develop or adopt other digital health enablers (e.g., standards, policies). It supports and empowers the required change, implementation of recommendations, and monitoring of results

STRATEGY AND INVESTMENT ensures a responsive strategy and plan for the digital health ecosystem. It involves leading budgeting and planning, with involvement of major stakeholders and sectors. It also includes aligning financing with priorities, and identifying donor, government, and private-sector funding for medium term.

LEGISLATION, POLICY, AND COMPLIANCE includes the development of policies and legislation in priority areas, and reviewing sectoral policies for alignment and comprehensiveness. It involves the creation of a legal and enforcement environment to establish trust and protection for consumers, health facilities, and the private sector in digital health practice and systems. It also involves monitoring compliance through a governing body, with incentives or penalties to promote compliance.

WORKFORCE involves activities to make digital health knowledge and skills available through internal expertise, technical cooperation, or the private sector. It includes building national, regional, and specialized networks for digital health implementation and establishing eHealth education and training programs for capacity building.

HARMONISATION, STANDARDS, AND INTEROPERABILITY enable consistent and accurate collection and exchange of health information across health systems and services in the region. Standards include technical (e.g., ID systems), content (e.g., curricula, case definitions), policy (e.g., data security and responsible data practices), and common indicators (e.g., agreed KPIs to enable data comparison). The best way to achieve interoperability is to develop a sound enterprise architecture that allows different applications to communicate through a Health Information Exchange (HIE).

EAST AFRICAN SITUATION ANALYSIS

Across the EAC region the health strategic plans of Partner States demonstrate commitment to health as a cornerstone of national and regional development. An overview of the current status of digital health in the region indicates a wealth of existing assets that can be leveraged for a coordinated approach. Many services and applications are present, and while countries are at differing stages of implementing their own national HIS, national strategies and plans are in place across the region to advance the digital health agenda. Opportunities also exist to use common global good software platforms across Partner States, and to leverage existing regional surveillance initiatives (e.g., EAIDSNet), organisations (e.g., AMREF), bodies (e.g., WHO/AFRO), programs (e.g., RAD and EA-CBHS), and Partner State existing commitments (e.g., GHSA and One-Health). These platforms could be supported by a regional services cloud, which would host critical components of an enterprise architecture, yielding cost and support efficiencies and ensuring interoperability.

It is also important to note that the challenges experienced by countries in their digital health services are fairly common across the region. These include a lack of human resources with digital health skills and capacity, limited infrastructure and unreliable connectivity (particularly in rural and remote areas), a lack of coordination between government ministries and between development partners, and siloed and fragmented health systems. In addition, electrification and mobile penetration rates vary from country to country, which must be considered when designing a strategy for how to implement digital health regionally. A more detailed view of the current status of digital health for each Partner State can be found in Appendix B.

IMPLICATIONS FOR THE DIGITAL REACH INITIATIVE

here are a number of key digital health trends across Partner States that can be leveraged to expand digital health throughout the region. Similar challenges, such as the lack of digital health expertise, limited infrastructure, unreliable connectivity, and fragmented eHealth initiatives with multiple development partners and misaligned timeframes, all present opportunities for coordinated regional action.

It is also clear, however, that there are distinctions between EAC Partner States which could pose a challenge to regional collaboration. For instance, Partner States are at different stages of development with regards to their digital health strategy and implementation, and clear governance structures for coordinating digital health have not been established in all countries. These distinctions allow Partner States to share information and reusable assets in order to determine local priorities and close gaps in digital health deployments.

Trends and distinctions between EAC Partner States signal an opportunity to strengthen digital health in the region by leveraging existing assets and closing country gaps.

The observed trends and distinctions have implications for the Digital REACH Initiative. These implications are presented in Figure 6, below.

Figure 6: Trends and Distinctions in Digital Health and Corresponding Implications for Digital REACH

	TRENDS AND DISTINCTIONS	IMPLICATIONS FOR DIGITAL REACH *Opportunity for region to…*
DIGITAL HEALTH TRENDS IN EAC PARTNER STATES	Drive organisation development and determine the supporting frameworks, structures, staff, partners, and tools to manage the initiative.	Support organisation development and management activities of the region.
	All countries are implementing or have implemented DHIS2	Leverage existing DHIS2 infrastructure to share data across countries, shared hosting and support
	Countries face similar challenges, including lack of digital health capacity and skills	Utilize resource sharing across countries
	Implementation of OpenHIE components in a number of countries	Leverage existing assets and develop shared and regionally supported OpenHIE architecture for the provision of services across the region
	Majority of countries have digital health (eHealth) strategies in place	Align regional implementation plans with country strategies
	A number of countries are members of the GHSA	Capitalize on existing momentum and commitment to strengthen surveillance and response to advance health security in region
	Existing regional and cross-country initiatives, and organisations working on regional health strengthening and surveillance (e.g., EAIDSNet, WHO/AFRO, AMREF)	Leverage existing networks and partner with organisations already working on regional health system strengthening

Figure 6: Trends and Distinctions in Digital Health and Corresponding Implications for Digital REACH (con't)

	TRENDS AND DISTINCTIONS	IMPLICATIONS FOR DIGITAL REACH *Opportunity for region to...*
DIGITAL HEALTH DISTINCTIONS IN EAC PARTNER STATES	Different stages of digital health implementation and strategy development	Support countries to utilize existing implementations by other EAC countries
	Varied governance structures in place for digital health	Develop leadership and governance structures to support countries in implementing digital health
	Multiple, diverse services and applications in use across region	Leverage existing assets to identify best-in-class services and applications that can be applied across the region
	Human resources and infrastructure capacity vary significantly between countries	Align investments from both the public and private sectors to provide regional support and resources to avoid redundancy
	Variety of standards and policies in place across Partner States	Align on key standards and policies across the region to facilitate sharing of resources

DIGITAL REACH VISION AND MISSION STATEMENTS

An East African political union supported by the free movement of people, services, and goods across the region relies on a healthy population. Through the use of digital technologies and political will, the region can realise seamless access to improved healthcare services for all EAC citizens, enhanced surveillance and real-time response to outbreaks, and market-driven distribution of the health workforce to achieve a healthy and wealthy East Africa. Additionally, the regional implementation of digital-health infrastructure and other enabling components that can be shared by Partner States in their country-level strategies will create efficiencies and capabilities that would not be achieved otherwise.

This section lays out the goals, key milestones, strategic approaches, considerations for implementation, and organising principles for advancing digital health in the EAC. It offers a multi-dimensional, holistic view of how the region can move forward with digital health by laying out key roles and responsibilities for the region and for EAC Partner States. It also describes key strategic approaches for how this roadmap can be implemented through the Digital REACH Initiative. The Digital REACH Initiative is guided by the following vision and mission:

Vision 2028

Interconnected health systems
for a healthy and prosperous East Africa

Mission Statement

Maximise the power of digital health in East Africa by ensuring an enabling environment and by implementing scaled, coordinated, transformational, and innovative approaches.

DIGITAL REACH OUTCOME GOALS AND OUTPUTS

The activities of the Digital REACH Initiative serve specific outcome goals. These fall under specific health-program categories (Figure 7). Underlying all outcome goals is the need for quality and timely data collection and use across the region. Together, they will support the realisation of the vision and mission.

Figure 7: Outcome Goals of Digital Health through Combined Region and Country Efforts

Public Health Education and Awareness
- Improve direct provider-to-patient care and community knowledge and services (awareness, knowing when to seek care, demand for services, patient satisfaction)
- Improve patient-initiated behaviour and provider-initiated services
- Provide patient education for preventative care and behaviour change

Diagnostic and Treatment Support
- Optimize sharing health records
- Improve access, continuity and efficiency of care across countries (collection of and access to info across health system levels, referral processes, telemedicine services, task shifting and decision support for health workers)
- Support portability of health insurance at regional level

Health Worker Education and Training
- Improve health worker capacity building and performance monitoring
- Provide platforms for training, eLearning, and knowledge sharing for health workers and students
- Provide standardised and recognized training and capacity building for digital health

Surveillance and Response
- Strengthen regional health security by building capacity to prevent, detect, and respond to infectious diseases
- Respond in a timely and coordinated manner to emergencies and outbreaks
- Improve surveillance across the region and in cross-border communities

Supply Chain Management
- Improve supply chain efficiency
- Improve drug procurement and reduce counterfeiting
- Achieve economies of scale through bulk purchasing

Resource Allocation and Management
- Facilitate work planning, budgeting, and resource tracking
- Develop a long-term financing strategy that addresses all of the potential sources of sustainable funding
- Optimize health resource mobilization and deployment, especially in rural areas, including health workers and commodities

Population Health Status
- Optimize data sharing for programs
- Track regional priority indicators at the patient level
- Support health research and use of evidence to create policies and promote health agenda

GUIDE TO THE DIGITAL REACH INITIATIVE ROADMAP

The following presents a ten-year roadmap for the Digital REACH Initiative. This roadmap is organised around nine major workstreams that correspond with each of the components of the unifying framework, presented above. An overarching workstream for Organisational Formation and Management has been added to capture organisational activities required to lead and manage the Initiative, including the execution, oversight, and management of the other workstreams. Workstreams will run in parallel to each other and include the leadership or support of specific, digitally enabled health programs, such as cross-border and country-specific programs, as well as innovative technology implementations.

For each workstream, this roadmap presents:

- **INTRODUCTION**
  High-level description of the workstream

- **WORKSTREAM OUTCOME GOALS**
  Ultimate goals and final outcomes of workstream

- **REGION RESPONSIBILITIES**
  Key areas of focus within each workstream that have been identified through stakeholder workshops as primarily a regional responsibility

- **PARTNER STATE RESPONSIBILITIES**
  Key responsibilities for Partner States that are required to directly support regional responsibilities. These responsibilities complement the work being done at the regional level. They are not intended to replace the activities or responsibilities identified in country-specific digital health strategies or plans. Country responsibilities were determined by country representatives during conferences and workshops.

- **IMPLEMENTING STRATEGIES**
  The essential strategic approaches for how to implement each workstream. The strategies consider key implementations dimensions (policies, partnerships, staff, rollout structures, and technologies) discussed in Workstream One.

- **INTERMEDIARY OUTCOME GOALS**
  Key outcomes of each workstream at the end of three key phases:

  - **PLAN**
    This phase, at the foundation of the Digital REACH Initiative, includes the establishment of organisational and management structures, the completion of initial assessments, and the development of detailed operational plans at the workstream and sub-workstream levels.

  - **DEVELOP**
    This phase includes the development and creation of supportive policies, standards, guidelines, and system components (i.e., infrastructure, services, and applications) driven by initial implementations in target demonstration sites.

  - **INSTITUTIONALISE**
    This phase represents the ultimate outcome goal of each workstream and includes systemisation of processes for scale, the regional expansion of successful implementations from the "Develop" phase, and the institutionalisation of best practices and systems.

Given its ten-year duration, and the rapid pace of technology change, this roadmap will be refreshed every two years with updated regional information, technological advances, and changes in global health. A deeper revision of the goals, responsibilities, and workstreams should be conducted after five years.

Roadmap Workstreams

1. Organisational Formation and Management

2. Health Programs

3. Infrastructure

4. Services and Applications

5. Leadership and Governance

6. Strategy and Investment

7. Legislation, Policy, and Compliance

8. Workforce

9. Harmonisation, Standards, and Interoperability

DIGITAL REACH INITIATIVE WORKSTREAMS

The Digital REACH Initiative will focus on the creation of an enabling environment for digital health that can be shared across Partner States. It serves as a complement to country plans and strategies, creating economies of scale which result in efficiencies and capabilities that Partner States would not be able to achieve individually. The Initiative will direct the building and use of this enabling environment through a number of strategic health programs. Workstreams will run parallel to each other. An overview of the Initiative and different workstreams can be found in Figure 8 below.

Figure 8: The Digital REACH Initiative

ORGANISATION FORMATION AND MANAGEMENT WORKSTREAM

HEALTH PROGRAMS WORKSTREAM
Drive the Design and Use of Solutions

ESTABLISH THE EAST AFRICA OPEN SCIENCE CLOUD FOR HEALTH (EAOSCH)

A real-time regional data warehouse for caturing, storing, retrieving, analysing, and managing national and regional health data

See Appendix E for more details

DRIVE REGIONAL AND CROSS-BORDER PROGRAM IMPLEMENTATIONS

Drive regional and cross-border implementations that realise the value of coordinated regional action in digital health.

SUPPORT OF COUNTRY-SPECIFIC PROGRAM IMPLEMENTATIONS

Provide technical assistance for country-specific implementations in Individual Partner States to enable integration with regional digital health programs.

DESIGN IMPLEMENTATIONS USING DISRUPTIVE TECHNOLOGIES

Lead the development, testing, and use of new, disruptive technologies in regional or country-specific health programs to identify new efficiencies.

SUPPORTIVE REGIONAL ENABLING INFRASTRUCTURE AND ENVIRONMENT

INFRASTRUCTURE WORKSTREAM

Establishes the foundational technical components that suport all other workstreams, allow for timely data access and sharing, and enable services and applications to function through a regional services cloud.

SERVICES AND APPLICATIONS WORKSTREAM

Support the access, exchange, and management of data and content through specific service offerings and software tools.

LEADERSHIP AND GOVERNANCE WORKSTREAM

Regional advocacy and leadership

STRATEGY AND INVESTMENT WORKSTREAM

Regional advocacy and leadership

LEGISLATION, POLICY, AND COMPLIANCE WORKSTREAM

Regional policy alignment and guidelines

WORKFORCE WORKSTREAM

Human resource sharing, standards for health education, accreditation, performance

HARMONIZATION, STANDARDS, AND INTEROPERABILITY WORKSTREAM

Principles for data sharing, interoperability, and tool design.

Each workstream warrants focus and programmatic resources to help fully achieve the desired state across the entire ecosystem. The following section of the roadmap outlines the region and Partner State responsibilities and strategic approach to realizing this Initiative by workstream.

Each workstream warrants focus and programmatic resources to help fully achieve the desired state across the entire ecosystem. The following section of the roadmap outlines the region and Partner State responsibilities and strategic approach to realizing this Initiative by workstream.

ORGANISATIONAL FORMATION AND MANAGEMENT WORKSTREAM

The Digital REACH Initiative aims to improve health outcomes across the East Africa region through the implementation of specific health programs and the creation of a robust digital health enabling environment to support those implementations. Realising the implementation of the Digital REACH Initiative will require careful planning and consideration of the partnership and financing models, staffing, solutions, as well as operating and rollout structures required to support each of the workstreams.

The **Organisational Formation and Management** workstream establishes the essential structures required to implement the Digital REACH Initiative. It articulates the organisational and operating mechanisms to manage the Initiative, including the execution of responsibilities contained within the other eight workstreams. In addition, it provides strategic organisational direction, and guides the management of governance structures, advisors and partnerships, and carries out fundraising. As such, this workstream runs parallel to, and is integrated with, the other eight workstreams. It is a vehicle for managing change at both the regional and Partner State level and for answering critical implementation questions like: Who are the right staff and partners to support the implementation and what structures need to be set up and managed to run each of the workstreams? What is the appropriate long-term financing strategy to support the workstreams? What operating and management structures need to be created or changed to support the Initiative? What new solutions and tools need to be designed to support the implementations?

> Critical to the success of the Digital REACH Initiative will be its ability to secure and sustainably pursue financing from the very start. Creating an evidence base will be crucial to securing this investment over the ten-year period.

Critical to the success of the Digital REACH Initiative will be its ability to secure and sustainably pursue financing from the very start. Financing strategies and mechanism including Public-Private Partnership (PPP) structures, and investment from governments and development partners will need to be set up, managed, and sought throughout the Initiative's lifetime by its management body. Creating an evidence base will be crucial to securing this investment over the ten-year period. To ensure this, M&E should be built into each workstream, overseen and managed by the Organisational Formation and Management workstream, and used to mobilise funding based on tangible results and outputs. Appendix C elaborates on the activities that will need to be carried out for each workstream across the Plan, Develop, and Institutionalise phases.

ORGANISATIONAL FORMATION AND MANAGEMENT IMPLEMENTING STRATEGIES

A set of implementing strategies have been developed for the Digital REACH Initiative. Figure 9 elaborates on these within the four key implementation areas described above: partners and financing, staff, rollout, and solution design. The Organisational Formation and Management Workstream will be responsible for implementing and managing these across all workstreams.
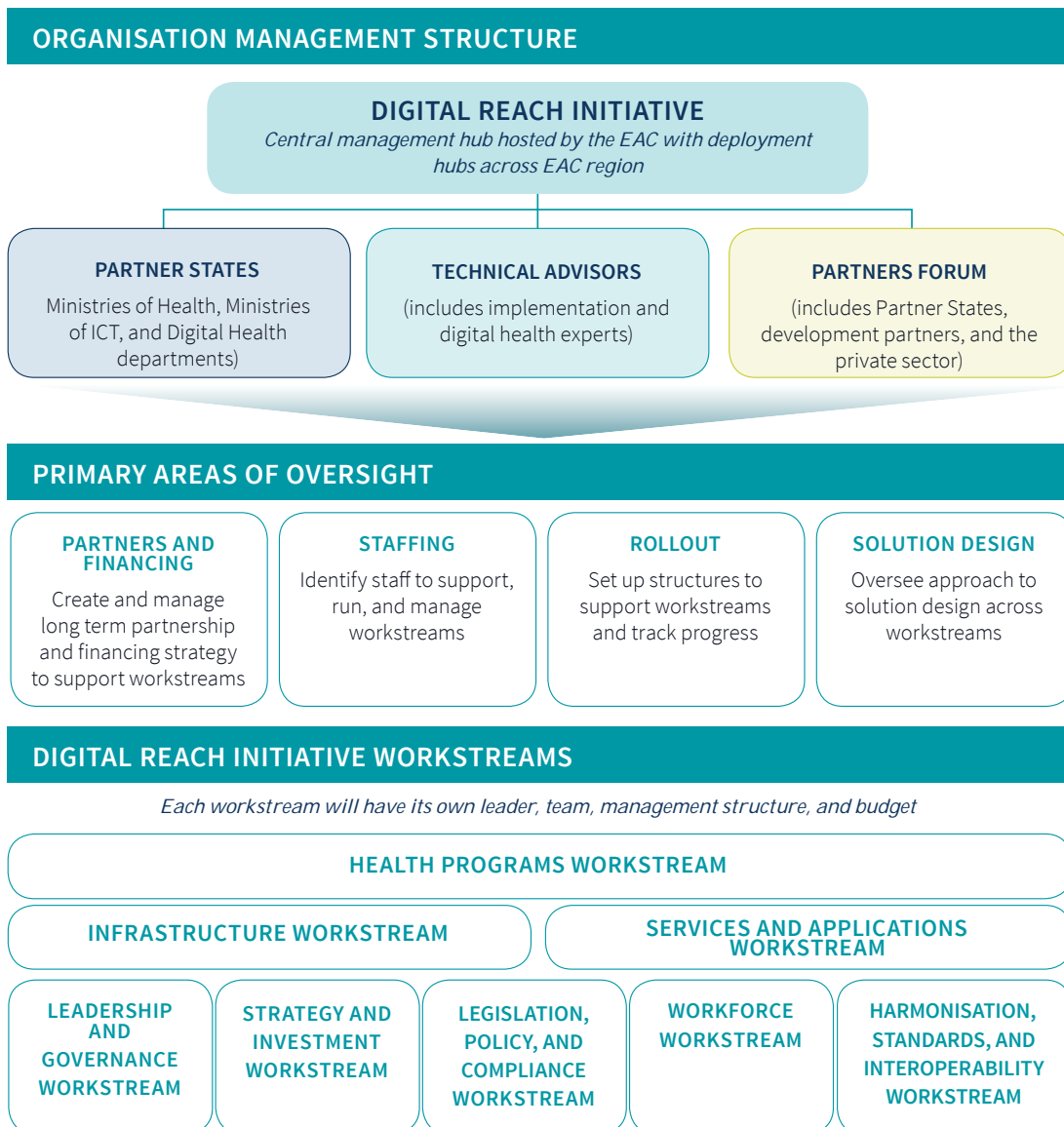
Figure 9: Strategic Guidelines for the Digital REACH Initiative

PARTNERS AND FINANCNING	Define a long-term financing strategy from the start. Manage and pursue strategic financial partnerships throughout the life of the Iinitiative. Assess and leverage existing investments when possible (e.g., using WHO's Digital Health Atlas) to reduce redundant systems and investments. Register new investments. Identify sustainable partners for the long-term (i.e., institutions and organisations that support and understand the value of a coordinated regional approach to digital health). Structure partnerships to avoid or diminish dependence on a single partner for specific roles. Involve the private sector in a sustainable way. Define a PPP structure for region that creates appropriate incentives for everyone to stay involved in digital health. Pursue PPPs where appropriate to reduce dependence on donor funding. Build accountability structures. Perform a value chain analysis for partnerships across public-private continuum to identify the value proposition for all involved.
STAFF	Establish a multi-disciplinary and gender inclusive initiative. Manage and coordinate from a newly established central headquarters (HQ) office within the EAC. Other resources can be based elsewhere in East Africa as needed. Prioritize working with existing function expertise in the region and build capacity as needed. Leverage human resources from country ministries and existing digital health departments where possible. Link Initiative's capacity-building efforts among ministry staff to existing processes and strategies in each country. Develop a health professionals network to facilitate regional communication and shared learnings. Develop an implementation-led resource and staffing plan. Include a role focused on coordinating with other regional initiatives and organisations.
ROLLOUT	Take an evidence-based, implementation-led approach, using implementations to demonstrate cost and health benefits. Implementations should: • Link to country priorities in digital health. They should complement activities in Partner States. • Be regional in scope, tackling issues that cannot be address by single country, like cross-border surveillance. • Actively contribute to an enabling environment. Allow implementations to lead timing and priority of key enablers, specifically policy and standards. • Inform the size and shape of institutions that support them (for reusability). • Build capacity of the workforce. Conduct M&E from the very beginning to include health impact, gender inclusivity, and cost savings. Develop and continuously track indicators for each workstream from Initiative inception. Create a culture that encourages sharinged learnings across workstreams, including what has not worked. Leverage implementations in the region to create a lab for issues that relate to multiple implementations at one time. Create differentiated regional and national models for implementation. Take a holistic approach to delivering digital health education.
SOLUTION DESIGN	Utilize the Principles of Digital Development as standards for solution design. Implement solutions that are problem-led. Develop the minimum viable solution. Utilize existing solutions and components where possible. Think about the whole solution design, including the technology as well as the processes, training, change management, and budgeting that surrounds it. Consider the lifetime of solutions when assessing total cost of ownership and requirements for maintenance. Conduct monitoring and evaluation (M&E) from the very beginning that includes both health impact and cost savings.

ORGANISING PRINCIPLES AND MANAGEMENT

The management and oversight of all nine workstreams requires the creation of a multi-dimensional organisation to provide a strong mechanism for collaboration, oversight, guidance, project management, resource mobilisation, and technical expertise. This multi-disciplinary organisation would sit within the EAC, supported by Partner States, technical advisors, and other experts in the field (see potential organisation structure on Figure 10 below).

Figure 10: Potential Organisational Structure

ORGANISATION MANAGEMENT STRUCTURE

DIGITAL REACH INITIATIVE
Central management hub hosted by the EAC with deployment hubs across EAC region

PARTNER STATES
Ministries of Health, Ministries of ICT, and Digital Health departments)

TECHNICAL ADVISORS
(includes implementation and digital health experts)

PARTNERS FORUM
(includes Partner States, development partners, and the private sector)

PRIMARY AREAS OF OVERSIGHT

PARTNERS AND FINANCING
Create and manage long term partnership and financing strategy to support workstreams

STAFFING
Identify staff to support, run, and manage workstreams

ROLLOUT
Set up structures to support workstreams and track progress

SOLUTION DESIGN
Oversee approach to solution design across workstreams

DIGITAL REACH INITIATIVE WORKSTREAMS

Each workstream will have its own leader, team, management structure, and budget

HEALTH PROGRAMS WORKSTREAM

INFRASTRUCTURE WORKSTREAM

SERVICES AND APPLICATIONS WORKSTREAM

LEADERSHIP AND GOVERNANCE WORKSTREAM

STRATEGY AND INVESTMENT WORKSTREAM

LEGISLATION, POLICY, AND COMPLIANCE WORKSTREAM

WORKFORCE WORKSTREAM

HARMONISATION, STANDARDS, AND INTEROPERABILITY WORKSTREAM

Given the range of activities involved across all workstreams, the Initiative will require a mix of skills and capabilities, leveraging existing country resources where possible and bringing in key international resources and capabilities where necessary.

Figure 11: Potential Organisational Principles for Digital REACH Initiative

1. MANAGE REGIONALLY Coordination and management conducted at central management hub, with local hubs across EAC region	**2. BUILD FLEXIBLE STRUCTURES** Flexible governance structure that can be adjusted or dismantled as the Initiative progresses
3. ENSURE A MULTI-DISCIPLINARY AND GENDER INCLUSIVE APPROACH Multi-disciplinary and gender inclusive initiative, with support from key ministries and digital health partners in all Partner States, as well as local and international digital health experts	**4. CREATE MECHANISMS FOR FEEDBACK** Mechanism to incorporate new and expert voices (e.g., additional development partners, partner feedback, and technical feedback) through Partners Forum and Technical Advisors
5. OVERSEE AND MEASURE PROGRESS ACROSS WORKSTREAMS Oversight and M&E for each workstream. Workstreams will have their own budget, leadership, team, management structure, and progress indicators, but report to a central organisation	**6. PURSUE PARTNERSHIPS AND FINANCING** Manage and pursue strategic partnerships and financing throughout the life of the Initiative through involvement of government, development partners, and the private sector

Over the ten-year period of the Digital REACH Initiative, the organisation will transition to an entirely locally owned, run, and managed body. Appendix D provides a preliminary list of skills that will be required for each of the Digital REACH Initiative workstreams.

HEALTH PROGRAMS WORKSTREAM

The function of the **Health Programs** workstream is to drive the design and use of the infrastructure and common goods that are being developed through the Digital REACH Initiative, in order to scale uptake and use of digital health for improved health service delivery and outcomes. In this way the implementations or health programs will drive the needs and mandate for the other seven workstreams. In additionto establishing an East Africa Open Science Cloud for Health (EAOSCH) to drive the standardisation of care, health programs will also include regional and cross-border implementations and country-specific implementations that will receive technical support and guidance to better align with regional health programs. This workstream also supports the application of distruptive technologies to benefit national and regional healthcare.

WORKSTREAM OUTCOME GOALS

Establish an EAOSCH for capturing, storing, retrieving, analysing, and managing national and regional health in East Africa.

Drive regional and cross-border implementations that realize the value of coordinated regional action in digital health.

Provide technical assistance for country-specific implementations in individual Partner States to enable integration with regional digital health programs.

Lead the development, testing, and use of new, transformational technologies in regional or country-specific health programs.

REGION RESPONSIBILITIES

- Analyse health program data and platform usage and performance to identify areas for improvement and standardisation of care
- Drive regional and cross-border program implementations.
- Support of country-specific program implementations.
- Design innovative implementations with transformational technologies (e.g., blockchain).

PARTNER STATE RESPONSIBILITIES

- Utilise regional cloud platforms to implement health platforms
- Work with region to improve health programs based on evidence from science cloud
- Support EAC regional and cross-border implementations.
- Share information on country-specific programs that would benefit from regional support.
- Support and enable innovation and new technologies for health.

IMPLEMENTING STRATEGIES

- Drive the design and use of solutions developed through the Digital REACH Initiative
- Ensure alignment with health goals and secure political support for regional and cross-border implementations and new technologies.
- Promote awareness of region's role in implementations.
- Use mechanisms, expertise, coordination, and partnerships to develop or adopt other digital health enablers (e.g., standards, policies).
- Support and empower required change, implementation of recommendations, and monitoring results for delivery of expected benefits.
- Use and promote standards in data security and privacy for all health program implementations

For a list of intermediary activities required to accomplish each outcome goal, see Appendix C.

POTENTIAL HEALTH PROGRAMS

The Digital REACH Initiative seeks to bring together governments of the EAC countries, the private sector, development partners, and other key stakeholders to improve health outcomes across the region through a robust enabling environment and the implementation of strategic digital health programs. To accelerate progress and achieve the expected outcomes, this Initiative will take an implementation-led approach. This means the Initiative will focus on implementing projects that drive the priorities and needs of the other workstreams. It will leverage existing capacities and functional expertise, bringing in additional resources and expertise when needed.

The implementation of a regional digital health infrastructure and other enabling components will create economies of scale which result in capabilities that Partner States would not be able to achieve individually. The Digital REACH Initiative will coordinate the building and use of this enabling environment through a number of strategic health programs. These include:

> The design and use of solutions developed through the Digital REACH Initiative will be driven by health program implementation needs and evidence gathered through those implementations.

- **AN EAOSCH**
  Implement a real-time regional central data store for capturing, storing, retrieving, analysing, and managing national and regional health data.

- **REGIONAL AND CROSS-BORDER IMPLEMENTATIONS**
  Drive implementations that realize the value of coordinated regional action in digital health and increase public health security in the region.

- **COUNTRY-SPECIFIC PROGRAM IMPLEMENTATIONS**
  Provide technical assistance for country-specific implementations in individual Partner States to enable integration with regional digital health programs.

- **INNOVATIVE IMPLEMENTATIONS USING TRANSFORMATIONAL TECHNOLOGIES**[2]
  Lead the development, testing, and use of new, transformational technologies in regional or country-specific health programs to identify new efficiencies in public health.

Further details of these potential health programs can be found in Figure 12 below.

[2] *A new technology that replaces an established technology to disrupt an industry, or an innovative technology that creates a completely new industry.*

Figure 12: Potential Health Programs for the Digital REACH Initiative

ESTABLISH AN EAOSCH (MORE DETAILS IN APPENDIX E)	Establish a real-time regional data warehouse for capturing, storing, retrieving, analysing, and managing national and regional health in East Africa. This would support implementations like the EA-CBHS project and the One-Health approach, by establishing a supporting structure for the seamless sharing of health data across EAC Partner States
	Examine the social dynamics of access and utilisation of health services, including health systems governance and health financing (e.g., remittances), from the perspective of global changes in demographics, mobility, migration, and technology
	Strengthen the continuous and ongoing analyses of health science data to achieve lasting systems transformation through innovation, governance, and sustainable financing
	Promote and facilitate accessibility, sustainability, predictability, effectiveness, and quality of healthcare services in low-income, rural communities, and post-conflict areas, and among vulnerable groups such as the elderly, and children
	Serve as the regional knowledge repository platform for digital health training and eLearning, including health worker training on digital tools
	Disseminate tailored and timely public health messages to health workers and EAC citizens through digital tools, e.g., alerts on outbreaks
DRIVE REGIONAL AND CROSS-BORDER HEALTH SERVICE PROGRAM IMPLEMENTATIONS	Implement a technology-driven East Africa Cross-border Health Service program
	Address key challenges associated with provision of quality health services to mobile populations and communities residing along strategic border areas
	Use innovative health technology to address risks that transcend borders to improve healthcare service delivery and health outcomes
	Use digital technology to transform disease surveillance, detection, and response
SUPPORT OF COUNTRY-SPECIFIC PROGRAM IMPLEMENTATIONS	Provide pooled technical implementation expertise as a regional resource that can be used for country implementations
	Build capacity for a new workforce in digital health, including education and training in ICT4Health at university level
	Support national ID implementations for a regional unique ID
	Support implementation of telemedicine infrastructure across EAC Partner States
	Support strategy and policy development that aligns with regional objectives
DESIGN INNOVATIVE IMPLEMENTATIONS WITH TRANSFORMATIONAL TECHNOLOGIES	Employ GIS technology for predicative risk modelling for surveillance and response
	Use blockchain to create secure electronic healthcare records
	Develop precision health applications for personalized medicine
	Automate data mining for early disease outbreak alerts
	Integrate use of social media and communications platform like WhatsApp, Facebook, Twitter for outreach and public health messaging

BUILDING AN EVIDENCE BASE THROUGH IMPLEMENTATIONS

Throughout the lifespan of the Initiative a critical part of all implementations will be M&E. This will include ongoing and careful performance management as well as the identification and building of an evidence base demonstrating the impact of health programs. It will also include the sharing of learnings across workstreams.

Building an evidence base will be a fundamental element of all implementations. This is especially important, given the current lack of longitudinal data and evidence of digital health efficacy that is desired by the global health community. This approach is a ground-breaking dimension of this Initiative, making it possible to not only identify evidence of impact, but also apply that evidence in a way that structures and drives work on the enabling environment and subsequent implementations.

INFRASTRUCTURE WORKSTREAM

The **Infrastructure** workstream establishes the foundational technical components that support all other workstreams, allows for timely data access and sharing, and enables services and applications to function. This includes data dictionaries, registries, sharing platforms, and repositories. This workstream also defines the technical architecture to support regional implementations and regional tech support.

WORKSTREAM OUTCOME GOALS

Develop and support a regional software enterprise architecture and regionally supported applications

A single EAC learning platform available to health workers for training on digital tools

A fully functional knowledge repository on digital health tools is available
to health workers and maintained by a designated body

Regional tech support across identified digital health systems is available to
Partner States to support digital tools

REGION RESPONSIBILITIES

- Identify, build, and host common technology components on a regional digital health services cloud (e.g., data dictionary and terminology management service, training and knowledge management platform, facility registry, unique ID registries) to enable timely information sharing and access to health data and eliminate existing data siloes.

- Provide a knowledge repository platform for digital health training and eLearning, including health worker training on digital tools.

- Provide regional tech support for digital health systems (e.g., a regional call centre to support use of digital tool software and content).

- Develop regional architecture for common services and applications (e.g., web portal, application performance management (APM) platform)

PARTNER STATE RESPONSIBILITIES

- Agree on information to be uploaded to the digital health regional services cloud, revisit national ICT strategies and guidelines, and provide an enabling framework that allows for the sharing of up-to-date information to the regional cloud and the adoption and use of regionally hosted components. Set aside resources for maintenance of platform in national budgets.

- Contribute to the development, adoption, and use of platform through the contribution of resources and content and integration of national systems.

- Make digital health training a continuing professional development and education (CPD, CPE) requirement.

- Adopt and integrate with regional services and applications.

INFRASTRUCTURE WORKSTREAM

IMPLEMENTING STRATEGIES

- Establish trusted hosting environment with appropriate regional and national cyber security policies, standards, and safeguards.
- Expand accessible, affordable, and reliable internet connections, leveraging public-private partnerships (PPPs) where suitable (e.g., with MNOs).
- Implement secure information sharing portal at regional level.
- Pool investments in local content.
- Leverage a regional cloud with applications that can work offline and sync.
- Develop legislation allowing all data to be hosted in the local cloud and update national legislation to align.
- Develop a regional services cloud and support services and applications for regional and national use.
- Promote regional trade policy liberalization (e.g., no tariffs) and regionally negotiated rates that are shared to facilitate building of infrastructure and reduce costs.
- Choose and support prioritized software needs for the region by:
    - Establishing maintenance guidelines for software and hardware
    - Implementing pooled software engineering support and regional 24-hour technical support
    - Selecting what application are supported, prioritizing common applications and global goods
    - Using open source software solution where appropriate

For a list of intermediary activities required to accomplish each outcome goal, see Appendix C.

SERVICES AND APPLICATIONS WORKSTREAM

The **Services and Applications** workstream supports the access, exchange, and management of data and content for the EAC region through specific service offerings and software tools used by Partner States. This includes coordination of health surveys to collect foundational data, as well as support for quality assurance in the supply chain, data analytics and intelligence. This workstream also includes activities to publish and localize messages to health workers across the region.

WORKSTREAM OUTCOME GOALS

Routine regional population health surveys and research as a service to Partner Countries

M&E and data analytics services are provided for expanded set of use categorie
and are in line with quality assurance protocols

Health workers in public facilities across the region receive public health messages;
private-sector facilities are aware of the service and able to sign up

Public health messages are disseminated and are customised and tailored
to account for different languages and cultures

Shared services and applications are built for regional and national use

REGION RESPONSIBILITIES

- Coordinate regional population health surveys and research.
- Provide monitoring and evaluation, quality assurance protocols, and data analytics services (both human- and algorithm-based) across use categories (e.g., ensure drug quality in supply chain, ensure high quality in patient and surveillance data).
- Dissemination of public health messages to health workers through digital tools (e.g., SMS).
- Provide message translations to suit different communities in different countries based on language and customs.

PARTNER STATE RESPONSIBILITIES

- Adopt regional indicators, terminology and surveys.
- Adopt and comply with common protocols, legislation and standards.
- Agree on topics for public health messages to health workers and choose messages from common templates.
- Develop a regional framework and rollout strategy of public health messages.

IMPLEMENTING STRATEGIES

- Implement regional service provision team to support Partner States in configuring and using regional services and applications.
- Ensure compliance with agreed standards and shift to architecture where common middleware exists.
- Ensure that compliance and certification are supported regionally.
- Encourage regional software sharing with local translation.
- Choose common applications (global goods), show cost savings and support for global goods software supported to decentralized districts/administrative units.
- Develop guidelines for usability and accessibility.
- Ensure compliance with common standards and reporting.
- Develop national standardisation around certain software packages (review what exists), based on national interest.
- Choose standards regionally, publish them, and support their adoption.

For a list of intermediary activities required to accomplish each outcome goal, see Appendix C.

LEADERSHIP AND GOVERNANCE WORKSTREAM

The **Leadership and Governance** workstream includes activities to coordinate the actions of Partner States and negotiate collaborative partnership with development partners, research bodies, and the private sector. The workstream also influences other workstreams through advocacy for policies, standards, and practices that support health programs within Partner States and across the EAC region.

WORKSTREAM OUTCOME GOALS

Widespread coordination of management systems within the region

Key partnerships with development partners, academics, and economic blocks are in place

Co-planned regional activities and implementations take place

REGION RESPONSIBILITIES

- Coordinate use of logistical management, supply chain management, and procurement management systems.

- Negotiate collaborative partnerships with other entities in health or other sectors, such as development partners (e.g., CDC, WHO), academia, economic blocks for resource sharing and capacity building (e.g., technology transfer, technical support, training).

- Ensure all roles integrate into existing EAC initiatives.

- Provide training to Partner State representatives on leadership and advocacy strategies.

PARTNER STATE RESPONSIBILITIES

- Implement or upgrade (according to agreed standards) logistical, supply chain, and procurement management systems to support regional coordination.

- Establish and advocate for frameworks, guidelines, and regulations that allow sharing and harmonisation of data. Contribute to development of regional and country guidelines, implement any relevant policies and comply with standards. Adopt regionally supportive open source software.

- Own all processes and management of supply chain procurement. Coordinate country-specific procurement needs.

- Shift from bilateral to regional partnership on per-issue basis, develop and adhere to framework for collaboration, facilitate the acquisition of equipment to help access services (e.g., reduction of tax and other barriers), and approve partnerships negotiated through the EAC. Coordinate agreed partner functions, develop PPP MoUs, and conduct M&E to monitor the framework.

- Integrate EAC initiatives into country strategies.

- Effectively advocate for regional coordination and Digital REACH workstream activities.

LEADERSHIP AND GOVERNANCE WORKSTREAM

IMPLEMENTING STRATEGIES

- Perform necessary political advocacy and change management to allow digital health to be fully implemented.

- Put national policies in place to enable the full operationalisation of digital health across the region.

- Create new (and support existing) Partner State national structures that enable digital health. Review existing structures and available resources and capacities.

- Facilitate and coordinate dialogue with digital health stakeholders to advance and support partnerships and collaborations in digital health.

- Ensure accountability and timely reporting of funds.

- Establish collaboration across the health sector, regulators, MoC and MoITC, and internet and data service providers.

- Effectively coordinate partnership at the Partner State level.

- Structure partnerships to diminish dependence on a single partner for specific roles and build accountability into partnership models.

For a list of intermediary activities required to accomplish each outcome goal, see Appendix C.

STRATEGY AND INVESTMENT WORKSTREAM

The **Strategy and Investment** workstream includes activities to align various EAC initiatives and negotiate agreements on behalf of Partner States, leveraging economies of scale to derive greater economic benefits for the region.

WORKSTREAM OUTCOME GOALS

Regional solutions for resource mobilisation and telemedicine are implemented, data are being shared between the region and Partner States, and decisions are being made effectively based on that data

Data on supply chain, connectivity, and infrastructure needs are routinely compiled and used in negotiations with MNOs, infrastructure vendors, and suppliers

Regional solutions for regional demand aggregation are implemented, data on purchase and usage of supplies and commodities are being shared between the region and Partner States, and procurement decisions are made effectively based on that data

Expanded communication infrastructure in areas with low connectivity is implemented

Region provides support to Partner States to plan, budget, and develop sustainable digitalhealth business models

Common SMS codes are implemented on an ongoing basis to support regional and country health programs

REGION RESPONSIBILITIES

- Develop regional strategies and financing mechanisms for resource mobilisation and telemedicine.

- Speak with one regional voice for negotiations on supply chain, data connectivity, and infrastructure costs.

- Demand aggregation (e.g., same diagnostics can facilitate bulk purchase of tests across the region).

- Develop an investment mechanism to expand communication infrastructure in areas with low connectivity (e.g., satellite services).

- Support work planning, budgeting, and business modelling.

- Negotiate use of common SMS short-codes with MNOs to share information among citizens of Partner States (SMS or USSD).

- Train Partner State representatives on strategy and investment.

PARTNER STATE RESPONSIBILITIES

- Share medium-term plans, health outcome priorities, and digital health strategies, and commit to use of collectively financed tools and resources. Develop and implement national strategies for telemedicine, including infrastructure and resource mobilization, and provide adequate infrastructure.

- Shift from bilateral to regional negotiations on per-issue basis. Commit to using negotiated goods and services and share data.

- Negotiate with EAC Partner States on standard diagnostic algorithms, and with suppliers and development partners on standard diagnostics. Once agreement is reached, adhere to the harmonised regional protocol and adopt regional standards and algorithms into country procurement strategies.

- Assess needs that will inform strategy to expand communication infrastructures nationwide.

- Continue harmonisation efforts and develop work plans, budgeting, and business models to support digital health.

- Advocate with regulatory authorities to provide frameworks and platforms to allow cross-border sharing of information and implement by regional agreement.

- Effectively guide strategy and investment in line with local and regional priorities.

STRATEGY AND INVESTMENT WORKSTREAM

IMPLEMENTING STRATEGIES

- Allow implementation needs to inform timing and sequencing of workstreams.

- Highlight obvious benefits, economies of scale, and reduced costs of a regional approach.

- Allow implementation needs to inform the size and shape of institution that supports it.

- Structure partnerships to diminish dependence on a single partner for specific roles and build accountability into partnership models.

- Engage with the private sector in a mutually beneficial way.

- Conduct a value chain analysis for partnerships to identify the value proposition for all stakeholders.

- Develop clear prioritisation of issues for investment and implementation.

For a list of intermediary activities required to accomplish each outcome goal, see Appendix C.

LEGISLATION, POLICY, AND COMPLIANCE WORKSTREAM

The **Legislation, Policy, and Compliance** workstream establishes common policies, guidelines, and protocols to facilitate digital health program implementation. This includes policies and legislation that enable program operation and scale, such as through responsible data collection and management. An important function of this workstream is that it supports the alignment of national policies with a regional approach.

WORKSTREAM OUTCOME GOALS

Regional implementation and adherence to harmonised guidelines, policies, and protocols

Regional adoption of policies and regulations, and adherence to best practices
for data privacy, ownership, security, and sovereignty

Frameworks and cross-border agreements are implemented regionally

Performance data are collected routinely and feedback provided to Partner States

Implementation and adherence to regional policy across EAC Partner States

REGION RESPONSIBILITIES

• Lead the formulation and harmonisation of policies, guidelines, and protocols for data sharing and communication across program categories.

• Create and promote regional policies, regulations, and best practices for data privacy, ownership, security, and sovereignty.

• Develop a regional service delivery framework, including cross-border agreements.

• Create the means to test software for compliance to standards and quality and certify services and applications.

• Set key performance indicators (KPIs) to support and monitor adoption of digital health systems by countries (e.g., establish service level agreement on timely retrieval of patient data).

• Establish a policy for how to manage public health emergencies.

PARTNER STATE RESPONSIBILITIES

• Develop national guidelines and protocols for data sharing between programs, develop and manage a common platform for program data sharing and communication, and ratify and integrate into country strategies.

• Implement common policies, regulations, and best practices for data privacy, ownership, security, and sovereignty.

• Develop and implement bilateral agreements for cross-border health service delivery.

• Create the regulatory and compliance requirements to match the regional guidelines using the regional testing and certification tools.

• Adopt KPIs and conduct national performance monitoring for relevant digital health systems.

• Develop an emergency plan, implement the EAC policy, and promote collaborations and partnerships for public health events and emergencies.

LEGISLATION, POLICY, AND COMPLIANCE WORKSTREAM

IMPLEMENTING STRATEGIES

- Highlight obvious benefits and reduced costs for harmonised policies across the region.

- Perform a baseline Cost-Benefit Analysis to identify required changes.

- Align proposed policies with international norms.

- Allocate specific funding, have regional software testing and certification, and tie to Results Based Financing for Health (RBF) for facility.

- Brief social services committees of parliament on harmonisation, engaging early in legislation, lobbying, advocacy, and education at ministerial level, for health and other sectors.

- Dedicate staff to create reference guidance, costing, educational, and advocacy materials.

- Develop clear priorities and comprehensive frameworks for policies and bills.

- Align with work on data standards to ensure that data collection and management maximizes benefits while minimising harm to individuals, groups, and communities.

For a list of intermediary activities required to accomplish each outcome goal, see Appendix C.

WORKFORCE WORKSTREAM

The **Workforce** workstream supports building the capacity of health workers across the region. It includes working with educational partners and accreditation bodies to remove roadblocks to human resource sharing across borders. It promotes harmonised regional practices and guidelines for health curricula, licensure, accreditation, and performance management.

WORKSTREAM OUTCOME GOALS

Full and common recognition of healthcare credentials across the region to improve resource allocation and allow health workers to move freely from one country to another

Health workers move freely from one country to another based on demand

REGION RESPONSIBILITIES

- Review existing digital health training and harmonise across countries to apply minimum standards in teaching curricula (including use of digital tools and ICT, data sharing and security), entry criteria, licensure, and credentialing, and align with current work by East African qualification framework.

- Harmonise performance monitoring mechanisms, reporting, evaluation, and accreditation for health workers, teachers, researchers, training institutions, and research institutions (including private institutions).

- Facilitate human resource sharing across countries.

PARTNER STATE RESPONSIBILITIES

- Agree on credentials per health subject and develop, review, and update national training curricula to align with harmonised regional digital health curricula. Mutually recognize certification for training.

- Agree on regional performance indicators for human resources and monitor performance, providing up-to-date information to the region.

- Create bilateral agreements and protocols to facilitate sharing of human resources for health, including workers with disease specializations. This will include agreed recognition of equivalent academic qualifications. Human resource data will also be collected, maintained, and shared by each country.

IMPLEMENTING STRATEGIES

- Build the digital health and ICT skills of Partner State health workers.

- Support the availability of a health worker database or inventory.

- Facilitate free movement of labour across the region based on demand, including:

  - Facilitation of EAC work permit approvals

  - Support for peer-to-peer learning across borders

  - Harmonisation of salary scales, remunerations, and incentives

  - Recognitions of healthcare credentials across the region

For a list of intermediary activities required to accomplish each outcome goal, see Appendix C.

HARMONISATION, STANDARDS & INTEROPERABILITY WORKSTREAM

The **Harmonisation, Standards, and Interoperability** workstream sets common and shared standards for digital health that enable cross-border healthcare across the EAC region. This includes developing and promoting regional principles for data sharing, system interoperability, and digital tool design. Focus areas for this workstream include the development of unique IDs and EAC passport linkage with medical centres, as well as alignment of standards with country-level data policies.

WORKSTREAM OUTCOME GOALS

Regional principles and capabilities for data sharing and digital tool design are in place and used

Unique IDs are used for identification of patients, health workers, facilities, and drugs across the region

Best practices for interoperability, data sharing, and integration are in place and used regionally

Set of agreed diagnostic algorithms developed and used regionally

REGION RESPONSIBILITIES

- Develop and promote regional principles on data sharing (e.g., based on FAIR principles, shared cloud services, etc.) and digital tool design (e.g., mobile first).

- Support and promote unique IDs for patients, health workers, facilities, drugs, etc. and link EAC passport system to medical services.

- Harmonise and champion best practices for interoperability, enterprise architecture, data sharing, and integration in digital health and other sectors.

- Create minimum data set for diagnostic algorithms and clinical referral guidelines.

PARTNER STATE RESPONSIBILITIES

- Commit to drafting policies or regulations, and passing legislation based on regional guidelines.

- Adopt or translate standards, common middleware and link with national ID implementations.

- Agree on regional reference architecture and adopt best practices and middleware sharing common global good software.

- Review and implement clinical referral guidelines against national guidelines on case-by-case basis; align existing tools and adopt WHO nomenclature and terminology.

IMPLEMENTING STRATEGIES

- Facilitate a bilateral data-sharing agreement, including definitions of data to be shared, as well as policies for privacy and data security.

- Get political buy-in to create policy and legislation for standard data practices and align national data protection laws to ensure that data collection and management maximizes benefits while minimising harm to individuals, groups, and communities.

- Harmonise tools and adoption of international standards (e.g., ICD10, ISO) for data collection.

- Learn from other regions that have implemented shared standards.

- Strive to create common or translatable Patient ID, Health Worker ID, Facility ID, commodity ID terminology across the region.

- Set and implement harmonised interoperability standards at national level that will be reflected at regional level.

- Comply to the approved standard and allow accreditation.

- Implement scalable, flexible, and expandable platform.

For a list of intermediary activities required to accomplish each outcome goal, see Appendix C.

The Path Forward

Developing a long-term financing strategy for the implementation of the Digital REACH Initiative is essential to its success. The roadmap lays the groundwork for the development of a comprehensive strategy and costing plan that can be used to align and coordinate donor, government, and investor financing based on the priorities set by the region. Financing strategies should consider a wide range of stakeholders across the public-private continuum, identifying the incentive and value proposition for all those involved and forming partnerships that reduce dependence on one single partner.

As a concrete next step to realizing the Digital REACH Initiative, a Strategic Plan and Costing will be developed in preparation for donor roundtables in Q2, 2018. This will allow the EAHRC to pursue the funding necessary to launch the Initiative and plan for full-scale operations by late 2018. Once strategic plans are approved and required funds to begin implementation are obtained, the Initiative can move into the execution phase, beginning with Organisational Formation and completion of the Plan phase. Strategic Planning and Costing can begin upon EAC approval of this roadmap. These exercises will include a detailed timeline for each of the workstreams and their associated activities, as well as detail on resources and rollout plans to achieve the outcome goals for each workstream. This includes identifying potential investment mechanisms to support the Digital REACH Initiative, and developing a strategy and plan for specific implementations. Figure 13 shows the expected timeline.

Figure 13: Next Steps for the Digital REACH Initiative

Next Steps: The Path Forward

Roadmap	**Strategic Plan**	**Costing**	**Resource Mobilisation**	**Initiative Launch and Execution**
EAC Approval	Q1-Q2 2018	Q1-Q2 2018	Q3-Q4 2018	By end of 2018
By end of 2017				

A NOTE ON EXISTING REGIONAL EFFORTS

It is important to note that the Digital REACH Initiative intends to complement current regional activities and initiatives by forming strategic partnerships and leveraging existing networks (e.g., EAIDSNet), bodies (e.g., WHO/AFRO), organisations (e.g., AMREF), country strategies and commitments (e.g., One-Health, GHSA), where possible. The strategic plan will include further details, including partnerships with institutions involved in existing networks and alignment with global health agendas to strengthen health systems and regional surveillance and response capabilities.

THE IMPORTANCE OF REGIONAL STRATEGY AND WHY IT MATTERS NOW

The distinction between "digital health" and the broader health system is growing smaller by the year. ICT adoption among all health stakeholders – from patients to health ministers – has occurred so quickly and thoroughly that the term "digital health" is losing its meaning. This signals the need for coordination across the ecosystem, moving away from a fragmented approach to digital health, characterised by siloed applications, waste, and variable data, to a holistic digital health model, where investments are coordinated and common assets leveraged across multiple health programs.[3] Strong leadership and governance can drive this[4], preventing duplication of effort across the region, in favour of alignment that generates large-scale cost efficiencies, improved health outcomes, and faster and better implementation. The purpose of the Digital REACH Initiative is to harness this opportunity for digital health technologies through coordinated regional action.

This roadmap provides a foundation for this coordinated action. It builds upon collective momentum and understanding to create a regional strategy for digital health which allows the EAC and its Partner States to:

- Leverage existing assets and strengths across countries, allowing Partner States to take advantage of advances in other Partner States for sustainable infrastructural development
- Harmonise standards and policies to support the free movement of services and people by increasing access to and continuity of care across the region, enhancing surveillance capabilities, and improving access to and use of data for regional and national decision making
- Benefit from economies of scale with regards to the investment in and maintenance of shared infrastructure, resources, and applications
- Increase bargaining power with third parties like private companies and donor organisations by speaking with one regional voice on strategic digital health issues
- Maximise donor and private-sector coordination and investment
- Enhance sustainability of health programs in the EAC region and reduce dependence on donor funding

This roadmap provides a common vision for ratification by Partner States, guidance for the next phase of strategic planning and costing, clear articulation of responsibilities between the region and Partner States, indicators for organisational requirements, and a resource for donor discussions and fundraising.

KEEPING THIS DOCUMENT FRESH AND RELEVANT

Strategic roadmaps and plans are living documents. It is expected that this roadmap, and detailed strategic plans created as the "Plan" phase advances, will continue to evolve over a ten-year period. A process to revisit and revise these plans in detail will be built in at the five-year mark. In addition, Figure 14 explains how the EAHRC and Partner States can continue to keep the contents of this document fresh. This will be undertaken by the organisational management team detailed in the Organisation Formation and Management Workstream.

[3]GSMA – Scaling Digital Health in Developing Markets, June 2017
[4]Broadband Commission Report on Digital Health, February 2017

Figure 14: Activities to Keep this Roadmap Fresh

1. UPDATE ROADMAP EVERY TWO YEARS
Formally review the roadmap every other year. Make any required adjustments to responsibilities (region and Partner States) and phase objectives. Ensure responsibilities and activities are on track to meet objectives.

2. MEASURE PROGRESS
Measure progress of the region and Partner States as they move through Plan, Develop, and Institutionalisation phases. This could include a dashboard managed by the Digital REACH Initiative organising structure to track and compare progress across workstreams, Partner States, and implementations.

3. SOLIDIFY DOCUMENT OWNERSHIP AND UPDATING PROCESS
Create a small, accountable digital health team to ensure the roadmap remains a living document. This team can be made up of one individual from each Partner State, as well as a regional coordinator under EAHRC. This team would own the roadmap document, collecting ongoing feedback, making minor updates, and tracking course shifts that may impact the biennial revision.

4. SOCIALIZE AT RELEVANT GATHERINGS
Socialize the roadmap with multi-sector stakeholder groups to gather ongoing feedback and elicit support for roadmap activities.

Appendix A: Full Acknowledgements

The roadmap was developed in a highly consultative and collaborative way and involved inputs from key decision makers in East Africa through conferences and smaller workshops. Special thanks are extended to the contributors to this roadmap listed below.

THE 6TH EAST AFRICAN HEALTH AND SCIENTIFIC CONFERENCE IN ON 28 - 30 MARCH 2017, BUJUMBURA, REPUBLIC OF BURUNDI

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REGIONAL EAST AFRICA DIGITAL HEALTH ROADMAP CONFERENCE IN KAMPALA, 6 -8 SEPTEMBER 2017, KAMPALA, REPUBLIC OF UGANDA

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FINAL REGIONAL EAST AFRICAN DIGITAL HEALTH ROADMAP WORKSHOP, 3 NOVEMBER 2017, ENTEBBE, REPUBLIC OF UGANDA

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Appendix B: East African Situation Analysis Overview

Figure 15 below provides an overview of the current state of digital health programs and systems in each EAC Partner State. It describes the strategies in place, as well as services and applications that support those strategies. It also presents the challenges that each country is facing for expanding digital health implementations. Challenges were identified by Ministry of Health and Ministry of ICT staff in each country.

FIGURE 15: CURRENT STATE OF DIGITAL HEALTH IN EAC PARTNER STATES

	Current Status of Digital Health	Strategy and Illustrative Services and Applications	Self-Identified Challenges
The Republic of Burundi	*Comprehensive strategy with strong governance structures in place* -Recently implemented DHIS2 scaled to health centre level -In a stage of country-wide program adoption -Implementation plan for eHealth in place -Implementation of a Laboratory Information System (Labware)	**Strategy in Place** -National Health Policy -National Development Plan on Health Informatics -National plan for the development of eHealth **Illustrative Services & Applications** -DHIS2 -OpenClinic -OpenPharmacy -eHealth Learning Portal -OpenRBF System	Poor infrastructure and unreliable connectivity Insufficient technical skills Low levels of computer literacy among staff in some health facilities Lack of ICT coordination by MoH Numerous initiatives in place, mainly run by development partners
The Republic of Kenya	*Plans to expand digital health implementations over coming year* -Nationwide implementation of DHIS2 -No governance structure in place, but proposed Health Sector Coordination Committee -ICT, interoperability, and EMR standards developed and implemented -Plans to implement Unique ID	**Strategy in Place** -Kenya National eHealth Policy 2016 – 2030 **Illustrative Services & Applications** -DHIS2 -EMRn	Fragmented systems and interoperability Poor support and maintenance of ICT infrastructure in remote areas Low levels of computer literacy
The Republic of Rwanda	*Comprehensive strategy with strong governance structures in place* -Nationwide implementation of DHIS2 -Comprehensive digital health strategy -Technical Working Group reviews existing and new initiatives and provides recommendations to MOH -High coordination between MoH and MITECH -OpenHIE framework implemented	**Strategy in Place** -Smart Rwanda Smart Plan 2020 -eHealth Policy and Strategic Plan -Rwanda eHealth Framework -ICT Security Policy **Illustrative Services & Applications** -RHMIS (using DHIS2) -EMR (OpenMRS) -ERP -Alert system (Rapid SMS) -Health Information Exchange -electronic Logistics Management Information System (eLMIS) -Health resource tracking tools - Financial management systems	Fragmented systems and interoperability Poor support and maintenance of ICT infrastructure in remote areas Low levels of computer literacy Electricty and ICT infrastructure

	Current Status of Digital Health	Strategy and Illustrative Services and Applications	Self-Identified Challenges
The Republic of South Sudan	*Nascent strategy. Implementation plan still under formulation* -Nascent strategy and DHIS2 implementation -Governance structure unclear	**Strategy in Place** -National Health Policy 2016 - 2025 **Illustrative Services & Applications** -DHIS2 partial implementation	Political instability Poor infrastructure No clear eHealth strategy in place
The United Republic of Tanzania	*Ambitious digital strategy and clear roadmap in place* -Nationwide implementation of DHIS2 -Health facility registry in place -eHealth Steering Committee with several technical working groups -Implementation of telemedicine -Implementation of OpenHIE currently ongoing (Health Information Mediator and Data Repository, Client registry, Shared Health Records)	**Strategy in Place** -eHealth Strategy 2013 – 2018 -ICT Policy Guideline for Health -Digital Health Investment Roadmap 2017 – 2023 **Illustrative Services & Applications** -DHIS2 -iHFeMS (ERP) -EMR	Inadequate coordination in MDAs Fragmented landscape of pilot projects Infrastructure and unreliable connectivity Inadequate funding
The Republic of Uganda	*Early adopter seeking organised approach to implementing digital health technologies* -Nationwide implementation of DHIS2 eHealth Technical Working Group – meets monthly and reports to MoH policy and decision makers -Consolidation of various systems ongoing -Development of ehealth enterprise architecture and HIE framework ongoing	**Strategy in Place** -National eHealth Strategy -National eHealth Policy -eGovernment Policy Framework **Illustrative Services & Applications** -DHIS2 -RapidPro -OpenMR -UgandaEMR (OpenMRS) -iHRIS -Community HW Registry (Pilot in 11 districts) -MTrac (essential medicines monitoring) -Lab. Information System (LIS) -Pharmacy Information Portal (PIP) -Logistics Mgt Info. System (LMIS) -Knowledge Mgt Portal (KMP) -Doctors registration status with the Uganda Medical and Dental Practitioners Council through mobile SMS	Hiring and retaining eHealth and IT professionals Lack of interoperability and standardisation between existing systems Infrastructure and unreliable connectivity Lack of digital health curriculum and health education content for local languages and cultures Poor support and maintenance practice of ICT infrastructure Non compliance to national and international regulations: data management, security & privacy

Appendix C: Responsibilities and Outcome Goals by Workstream

Organisational Formation and Management Workstream – Responsibilities and Outcome Goals

Region Responsibilities	OUTCOME GOALS BY PHASE OF IMPLEMENTATION		
	Plan	**Develop**	**Institutionalise**
Set up the appropriate entity and structures to lead and manage the Initiative, including the execution of responsibilities contained within the other eight workstreams; provide strategic organisational direction, and guide the management of governance structures, advisors, and fundraising	Organisation established with appropriate governance and legal structure	Operational and project management structures in place to manage the execution of Initiative and activities	Organisation is fully functioning. Structures are in place to systematise repeated activities and practices
Review and update partner relationships to support the Initiative	Identify sustainable partners across public-private continuum for the long-term	Partnership structures and agreements in place, set up to avoid dependence on a single partner for specific roles	Partnerships are fully functioning, agreements and governance structures are systematised and being used to engage additional partners
Build human capacity to support the Initiative	Changes needed to staff identified	Recruitment and training of staff complete	Staff is fully able to support the Initiative. Processes for recruiting and training staff are systematised
Develop operational and management structures to manage rollout and M&E of the Initiative and its implementations	Changes needed to operational and management structures identified	Operational and project management structures in place to manage the execution and evaluation of Initiative and activities	Structures are in place to systematise repeated activities and practices across the Initiative and implementations. Evidence of impact is collected on routine basis from each workstream
Manage and pursue strategic financial partnerships throughout the life of the Initiative	Define a long-term financing strategy for the initiative and value proposition for all involved	Financing mechanisms and structures are set up in ways that create incentives for all those involved	Financing is pursued in a sustainable and coordinated way, using evidence gathered from implementations to support and inform investments

Appendix C: Responsibilities and Outcome Goals by Workstream

Health Programs Workstream – Responsibilities and Outcome Goals

Region Responsibilities	OUTCOME GOALS BY PHASE OF IMPLEMENTATION			Partner State Responsibilities
	Plan	**Develop**	**Institutionalise**	
Analyse health program data and platform usage and performance to identify areas for improvement and standardisation of care	Identify indicators of health programs to be tracked to determine health program performance	Build analytical processes and team to analyse data through consultation with Partner States	Institutionalise process for disseminating evidence and driving action to improve and standardise quality of health programs	Utilise regional cloud platforms to implement health platforms Work with region to improve health programs based on evidence from science cloud
Drive regional and cross-border program implementations	Identify key health program implementations and the associated enabling environment components required for success	Address the critical enabling environment components required for successful regional and cross-border implementations	Collect feedback from health programs to inform enhancement of enabling environment	Support EAC regional and cross-border implementations Share information on implementations to build evidence base
Support of country-specific program implementations	Identify key health program implementations to support and the associated enabling environment components required for success	Address the critical enabling environment components required for successful regional and cross-border implementations	Collect feedback from health programs to inform enhancement of enabling environment	Share information on country-specific programs that would benefit from regional support and building of evidence base
Design innovative implementations with transformational technologies (e.g., blockchain, GIS, precision health applications, and automated data mining)	Integrate assessment of technology landscape into implementation plan	Routinely assess technology landscape and actively integrate transformational technologies into select health program test implementations	Standardise process for collecting and disseminating evidence from transformational technology implementations to actively inform regional health program implementations	Support and enable innovation and new technologies for health Provide feedback on innovative implementations to build evidence base

Appendix C: Responsibilities and Outcome Goals by Workstream

Infrastructure Workstream – Responsibilities and Outcome Goals

Region Responsibilities	OUTCOME GOALS BY PHASE OF IMPLEMENTATION			Partner State Responsibilities
	Plan	**Develop**	**Institutionalise**	
Identify, build, and host common technology components on a regional digital health cloud (e.g., data dictionary and terminology management service, training and knowledge management platform, facility registry, unique ID registries) to enable timely information sharing and access to health data and eliminate existing data siloes	Key needs for regional cloud identified and assessment of commonalities and countries conducted	Key functional requirements for regional cloud are identified; Processes for scaling up infrastructure up and down infrastructure as needed are in place	A regional cloud is in place with processes and resources dedicated to routine monitoring for performance and use	Agree on information to be uploaded to the digital health regional cloud Revisit national ICT strategies and guidelines Provide an enabling framework that allows for the regional cloud Share up-to-date information with region Adopt and use of regionally hosted components Set aside resources for maintenance of platform in national budgets
Provide knowledge repository platform for digital health training and eLearning, including health worker training on digital tools	Needs for repository platform and existing platforms that can be used for digital health training and eLearning identified and documented; survey of assets that can be leveraged across countries conducted	Platform is built and content is uploaded onto repository for use by health workers	A fully functional knowledge repository on digital health tools is available to health workers and maintained by a designated body	Contribute to the development and use of platform through resources and content contributions Approve content Make digital health training a continuing professional development and education (CPD/CPE) requirement
Provide regional tech support for digital health systems (e.g., a regional call centre to support use of digital tool software and content)	Needs for regional tech support are identified and documented; survey of assets that can be leveraged across countries conducted	Requirements for regional tech support are identified, decisions on where to host are made, and support system is defined and developed	Regional tech support across identified digital health systems is available to EAC countries to support use of digital tools; established processes and published services level agreements are in place	Use and adopt system Contribute resources and content

Appendix C: Responsibilities and Outcome Goals by Workstream

Services and Applications Workstream – Responsibilities and Outcome Goals

Region Responsibilities	Plan	OUTCOME GOALS BY PHASE OF IMPLEMENTATION		Partner State Responsibilities
		Develop	**Institutionalise**	
Coordination of regional population health surveys and research	Agreement between countries that region will perform regional population health surveys	Definition of requirements and build of regional platform to collect and store survey data	Region routinely performs regional population health surveys and research on behalf of countries as a service	Adopt regional indicators, terminology, and surveys
Provide monitoring and evaluation, quality assurance protocols, and data analytics services (both human and algorithm-based) across use categories (e.g., ensure drug quality in supply chain, ensure high quality in patient and surveillance data)	Agreement between countries on monitoring and evaluation, quality assurance protocols, and data analytics services needed in the region; identification of existing services and applications in the region and gaps	Quality assurance and M&E protocols and guidelines and necessary platforms are developed for priority use categories.	M&E and data analytics services are provided for countries for expanded set of use categories and are in line with quality assurance protocols.	Adopt and comply with common protocols, legislation, and standards
Dissemination of public health messages to health workers through digital tools (e.g., SMS)	Agreement between countries on when and how to disseminate public health information to health workers; identification of existing services and applications in the region and gaps	Systems to disseminate public health information to health workers are put in place. Health workers in connected areas are trained and able to receive public health information.	Health workers in public facilities across the region receive public health messages; private-sector facilities are aware of the service and able to sign up.	Agree on topics for public health messages to health workers and base messages off common templates Develop a regional framework and rollout strategy of public health messages to health workers
Provide message translations to suit different communities in different countries based on language and customs	Agreement on how messages need to be tailored by country to account for different languages and customs; identification of existing services and applications in the region and gaps	Systems to disseminate public health messages are put in place and communities in target locations receive messages.	Public health messages are disseminated and are customised and tailored to account for different languages and cultures.	Agree on topics for public health messages and base messages off common templates Develop a regional framework and rollout strategy of public health messages

Appendix C: Responsibilities and Outcome Goals by Workstream

Leadership and Governance Workstream – Responsibilities and Outcome Goals

Region Responsibilities	OUTCOME GOALS BY PHASE OF IMPLEMENTATION			Partner State Responsibilities
	Plan	**Develop**	**Institutionalise**	
Coordinate use of logistical management, supply chain management, and procurement management systems	Various management systems across the region and key gaps identified and strategy for key implementations launched	Structures are in place to support access to and use of cross-border supply chain data and commodities for key implementations	Widespread coordination of management systems within the region	Adopt regional indicators, terminology, Implement or upgrade (according to agreed standards) logistical, supply chain and procurement management systems to support regional coordination efforts Establish and advocate for frameworks, guidelines, and regulations that allow sharing and harmonisation of data Own all processes and management of supply chain procurement Coordinate country-specific procurement needs Contribute to development of regional and country guidelines, implement any relevant policies and comply with standards Adopt regionally supportive open source software
Negotiate collaborative partnerships with other entities in health or other sectors, such as development partners (e.g., WHO, CDC), academia, economic blocks for resource sharing and capacity building (e.g., technology transfer, technical support, training)	Parameters for region's role in negotiating collaborative partnership are identified and agreed to by all Partner States	Key partnerships are identified and negotiations have begun	Key partnerships with development partners, academics, and economic blocks are in place	Agree to shift from bilateral to regional partnership on per issue basis Develop and adhere to framework for partner collaboration Facilitate the acquisition of equipment to help access services (e.g., reduction of tax and other barriers) Approve partnerships negotiated through the EAC Coordinate agreed partner functions, develop PPP MoUs, and conduct M&E to monitor the framework
Ensure all roles integrate into existing EAC initiatives	Various EAC initiatives, roles, and gaps are identified	Alignment of various EAC initiatives across region	Co-planned regional activities take place	Integrate EAC initiatives into country strategies

Appendix C: Responsibilities and Outcome Goals by Workstream

Strategy and Investment Workstream – Responsibilities and Outcome Goals

Region Responsibilities	OUTCOME GOALS BY PHASE OF IMPLEMENTATION			Partner State Responsibilities
	Plan	**Develop**	**Institutionalise**	
Develop regional strategies and financing mechanisms for resource mobilization and telemedicine	Potential investment mechanisms are identified and strategy and business case for regional resource mobilization and telemedicine are developed	Investment for regional resource mobilization and telemedicine are approved by funder and funds released for implementation at demonstration sites	Regional solutions for resource mobilization and telemedicine are being implemented, data are being shared between the region and countries, and decisions are being made effectively based on that data	Share medium-term plans, health outcome priorities, digital health strategies Commit to use of commonly financed tools and resources Develop and implement national strategies for telemedicine, including infrastructure and resource mobilization Provide adequate infrastructure to support implementation.
Speak with one regional voice for negotiations on supply chain, data connectivity, and infrastructure costs	Needs and approach to negotiations on costs related to supply chain, data connectivity, and infrastructure is defined and integrated into implementation strategy	Data on supply chain, connectivity, and infrastructure needs starting to be compiled and used in negotiations with MNOs, suppliers, and infrastructure vendors	Data on supply chain, connectivity, and infrastructure needs are routinely compiled and used in negotiations with MNOs, infrastructure vendors, and suppliers	Agree to shift from bilateral to regional negotiations on per issue basis Commit to using negotiated goods and services and to sharing data on use
Demand aggregation for bulk purchasing (e.g., same diagnostics can facilitate bulk purchase of tests across the region)	Potential investment mechanisms are identified and strategy and business case for demand aggregation is developed and integrated into implementation strategy	Investments for regional demand aggregation are approved by funder and funds released for implementation at demonstration sites	Regional solutions for regional demand aggregation are implemented, data on purchase and usage of supplies and commodities are shared between region and countries, and procurement decisions made effectively based on that data	Negotiate with Partner States on standard diagnostic algorithms, Negotiate with suppliers and development partners on accepted standard diagnostics. Adhere to the harmonised regional protocol Apply regional standards and algorithms to country procurement
Develop an investment mechanism to expand communication infrastructure in areas with low connectivity (e.g., use of satellite services to boost connectivity)	Potential investment mechanisms are identified and strategy and business case to expand communication infrastructure in areas with low connectivity is developed and integrated into implementation strategy	Investment to expand communication infrastructure in areas with low connectivity is approved by funder and funds released for implementation at demonstration sites	Expanded communication infrastructure in areas with low connectivity is implemented	Assess needs that will inform strategy to expand communication infrastructures nationwide

Region Responsibilities	Plan	OUTCOME GOALS BY PHASE OF IMPLEMENTATION		Partner State Responsibilities
		Develop	Institutionalise	
Support work planning, budgeting and business modelling	Countries are able to plan, budget, and develop sustainable business models for digital health	Region begins providing support to countries so that they can plan, budget, and develop sustainable business models for digital health	Region provides ongoing support to countries so that they can plan, budget, and develop sustainable business models for digital health	Continue harmonisation efforts Develop work plans, budgeting, and business models to support EAC objectives in digital health
Negotiate use of common SMS short-codes with MNOs to share information among citizens of Partner States (SMS or USSD)	Common SMS short-codes are defined to support information sharing among citizens of Partner States	Common SMS codes are negotiated and in support of regional and country plans	Common SMS codes are implemented on an ongoing basis in support of regional and country plans	Advocate with regulatory authorities to provide frameworks and platforms to allow cross-border sharing of information and implement in accordance with regional agreement

Policy, Legislation, and Compliance Workstream – Responsibilities and Outcome Goals

Region Responsibilities	Plan	OUTCOME GOALS BY PHASE OF IMPLEMENTATION		Partner State Responsibilities
		Develop	Institutionalise	
Lead the formulation and harmonisation of policies, guidelines, protocols for data sharing and communication across program categories	Agreement by EAC Partner States on target policies, guidelines and protocols to harmonise based on demonstration implementation needs	Harmonised guidelines, policies and guidelines for a sub-set of "low hanging fruit" policies and protocols use categories in place	Regional implementation and adherence to harmonised guidelines, policies and protocols with rollout to other use categories	Develop in-country guidelines and protocols for data sharing between programs; Conduct the development and management of a common platform for program data sharing and communication; Ratify and integrate into country strategies
Create and promote regional policies, regulations, and best practices for data privacy, ownership, security, and sovereignty	Agreement by EAC Partner States on best practices for data privacy, ownership, security, and sovereignty based on demonstration implementation needs	Best practices for data privacy, ownership, security, and sovereignty for a sub-set of priority use categories in place	Regional adoption of policies, regulations and adherence to best practices for data privacy, ownership, security, and sovereignty	Implement mutually agreed policies, regulations, and best practices for data privacy, ownership, security, and sovereignty nationally
Develop a regional service delivery framework, including cross-border agreements	Gaps in regional service delivery are identified and documented, and agreement is made to create a regional framework	Service delivery framework and cross-border agreements for priority implementations put in place	Frameworks and cross-border agreements are implemented regionally	Develop and implement bilateral agreements for cross-border health service delivery
Set KPIs to support and monitor adoption of digital health systems by countries (e.g., establish service level agreement on timely retrieval of patient data)	KPIs to support and monitor adoption of digital health systems by countries are identified	Systems and processes to collect and share data are put into place for demonstration implementations	Performance data is collected routinely and feedback provided to Partner States	Adopt KPIs; Conduct national performance monitoring for relevant digital health systems
Establish a policy for managing public health emergencies (e.g., how to drive commitment of Partner States to mobilize resource in emergencies)	Agreement by EAC countries on how to tackle public health emergencies	Policy for how to handle public health emergencies developed for use in demonstration implementations	Implementation and adherence to regional policy across Partner States with support provided to countries who need it	Develop an emergency plan; Implement the EAC policy; Promote collaborations and partnerships for public health events and emergencies

Appendix C: Responsibilities and Outcome Goals by Workstream

Workforce Workstream – Responsibilities and Outcome Goals

Region Responsibilities	OUTCOME GOALS BY PHASE OF IMPLEMENTATION			Partner State Responsibilities
	Plan	Develop	Institutionalise	
Review existing digital health training and harmonise across countries to apply minimum standards in teaching curricula (including use of digital tools and ICT, data sharing and security), entry criteria, credentialing, and licensure, and align with current work by East African qualification framework	Minimum standards and guidelines to facilitate resources sharing for demonstration implementations identified	Standards developed and alignment of country curriculum to credentials across the region to improve resource allocation and allow health workers to move freely from one country to another	Full and common recognition of healthcare credentials across the region to improve resource allocation and allow health workers to move freely from one country to another	Agree on credentials per health subject independent of health worker cadre Develop, review, and update in-country training curricula to align with harmonised regional digital health curriculum. Mutually recognise certification for training
Harmonise performance monitoring mechanisms, reporting, evaluation, and accreditation for health workers, teachers, researchers, training institutions, and research institutions (including private institutions)	Minimum standards and guidelines for performance monitoring mechanisms, reporting, evaluation identified	Alignment of country curricula to minimum standards and recommended guidelines	Full and common recognition of healthcare credentials across the region to improve resource allocation and allow health workers to move freely from one country to another	Agree on regional performance indicators of human resources Conduct performance monitoring Provide up-to-date information to the region
Facilitate human resource sharing across countries	Implementation with human resource sharing component designed; roadblocks to human resources sharing across countries identified	Academic qualifications for health workers are aligned for specific use cases in support of demonstration implementations	Health workers move freely from one country to another based on demand	Create bilateral agreements and protocols to facilitate sharing of human resource for health Share health workers with disease specializations Provide agreed recognition of equivalent academic qualifications Collect, maintain, and share human resource data

Appendix C: Responsibilities and Outcome Goals by Workstream

Harmonisation, Standards, and Interoperability Workstream – Responsibilities and Outcome Goals

Region Responsibilities	OUTCOME GOALS BY PHASE OF IMPLEMENTATION			Partner State Responsibilities
	Plan	**Develop**	**Institutionalise**	
Develop and promote regional principles on data sharing (e.g., based on FAIR principles) and digital tool design (e.g., mobile first)	Agreement reached on priorities and needs for digital tools design and sharing and digital tool design, identified principles and gaps	Prioritised principles on data sharing and digital tools design are developed for use in target implementations	Regional principles on data sharing and digital tool design are in place and used	Commit to drafting policies or regulations. Pass legislation based on regional guidelines
Support and promote unique IDs for patients, health workers, facilities, drugs, etc., and link EAC passport system to medical services	Agreement reached on needs and parameters for unique IDs for patients, health workers, facilities, and drugs	Unique IDs are harmonised for priority areas in target implementations	Unique IDs are used for identification of patients, health workers, facilities and drugs across the region	Adopt or translate standards. Adopt common middleware. Link with national ID implementations
Harmonise and champion best practices for interoperability, data sharing, and integration in digital health and other sectors	Agreement reached on needs and parameters for best practices for interoperability, data sharing, and integration in digital health	Best practices are developed for priority areas for use in target implementations	Best practices for interoperability, data sharing, and integration are in place and used regionally	Agree on regional reference architecture. Adopt best practices and middleware
Create minimum data set for diagnostic algorithms and clinical referral guidelines	Agreement reached on priorities and parameters for clinical referral guidelines and diagnostic algorithms	Prioritised clinical referral guidelines and requirements for diagnostic algorithms developed for use in target implementations	Set of agreed diagnostic algorithms developed and used regionally	Review and implement clinical referral guidelines against national guidelines on case-by-case basis. Align exist tools. Adopt WHO nomenclature and terminology

Appendix D: Preliminary List of Skills Required for Each of the Digital REACH Initiative Workstreams

Digital REACH Workstream	Key Skills Needed
Organizationa Formation and Management	-Leadership - Strategy - Project Management - Stakeholder Management - Coordination and Facilitation - Resource Mobilisation - Financial Mobilisation - Monitoring and evaulation
Health Programs	- Project Management
Infrastructure	- Solution Design - Systems Architecture and Systems Integration
Servers and Applications	- Solution Design - Systems Architecture and Systems Integration
Leadership and Governance	- Advocacy - Leadership - Strategy Development - Coordination and Facilitation
Strategy and Investment	- Strategy Development - Negotiation - Stakeholder Management
Legislation, Policy and Compliance	- Policy-making - Advocacy
Workforce	- Capacity Building - Solution Design - System Integration
Harmonization, Standards, and Interoperability	- Solution Design - Standards Development - System Integration

Appendix E: Example Implementation Project: East Africa Open Science Cloud for Health (EAOSCH)

THE EAST AFRICA OPEN SCIENCE CLOUD FOR HEALTH (EAOSCH)

The East Africa Open Science Cloud for Health (EAOSCH) is a technology-driven interoperable HIS for real-time storing, capturing, analysing and retrieving health data on common, remote servers (i.e., in the cloud). This system will enable users to analyse, access and use health data for health services across the region, providing views into health systems governance from the perspective of global changes in demographics, mobility, and migration of EAC populations.

The EAOSCH will help to strengthen the ongoing analyses of health science data to achieve lasting systems transformation through innovation, governance, and sustainable financing. The effective use of data will result in improved access, quality, and effectiveness of health service delivery in the EAC region, especially in low-income, rural communities, and post-conflict areas, and among vulnerable groups such as the elderly and children.

Key benefits of EAOSCH are that it will strengthen the regional health infrastructure on data production and consumption. It will harness the fast-advancing ICT to:

- Create a real-time regional data warehouse for capturing, storing, retrieving, analyzing, and managing national and regional health in East Africa

- Examine the social dynamics of access and utilization of health services, including health systems governance, from the perspective of global changes in demographics, mobility, migration, and technology.

- Strengthen the continuous and ongoing analyses of health science data to achieve lasting systems transformation through innovation, governance and sustainable financing, and resulting into improved access, quality, and effectiveness of health service delivery in the EAC region.

- Promote and facilitate accessibility, sustainability, predictability, effectiveness, and quality of healthcare services in low-income, rural communities, and post-conflict areas as well as in vulnerable groups such as the elderly, and children in EAC region

- Serve as the regional knowledge repository platform for digital health training and eLearning, including health worker training on digital tools

- Disseminate tailored and timely public health messages to health workers and EAC citizens through digital tools, e.g. alerts on outbreaks

YEAR 1 EAOSCH IMPLEMENTATION

During year 1 the EAHRC plans to develop, test, and refine an interoperable HIS in ten cross-border sites. This will include a pilot test of standardised digital HIV/TB workflows, algorithms, and protocols in selected cross-border learning sites. This will allow real-time data collection at the Cross-border Health Unit (CBHU) on:

- TB patients (diagnostics, treatment, eDOT for adherence, cohort, MTB Subtypes, MDRTB, etc.)

- HIV patients (diagnostics, circulating HIV subtypes, trends of VL, CD4, clinical parameters, hotspots, and contacts, analytics, digital health for preparedness, detection and response to disease outbreaks)
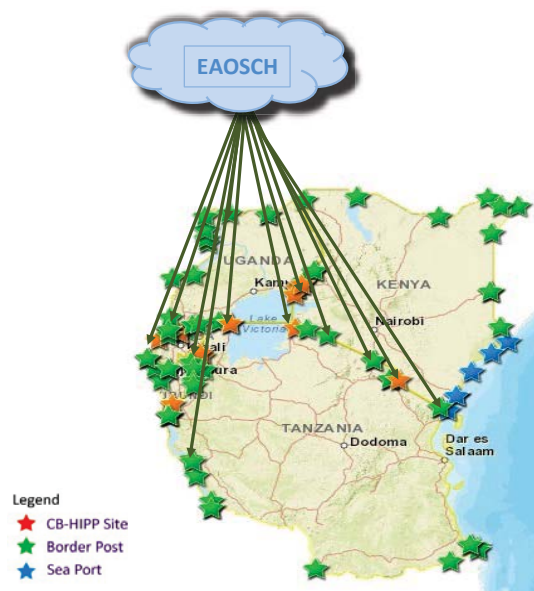
- Digital Health for preparedness, detection and response to disease outbreaks (continuous surveillance, real-time uploading to the cloud for analytics of features of disease outbreaks, epidemics, and pandemics, trends of AMR, one-health related issues, continuous data analytics, and briefs)
- Remittance and domestic financing

EAOSCH data will complement and guide the delivery of health services by District Health Officers and the Ministries of Health. Capacity development plans feature a cost-effective model of training with at least five PhD students, and publications.

EAOSCH ARCHITECTURE

The EAOSCH will allow real-time data on diagnostics, treatment adherence, and resources. The system will interconnect data on services from facilities and communities within selected areas in each Partner State and across the EAC. It will provide

- Accurate, efficient diagnostics and real-time data linkage to the national and regional HIS. Peripheral centres will be linked to the central one.
- Real-time treatment compliance monitoring. Data will be captured through ICT using mobile phones and pillbox with electronic devices to monitor real-time treatment compliance (i.e., an electronic directly observed therapy). The data will be linked to national or regional HMIS. This will improve the effectiveness of treatment regimen, reduce drug resistance, reduce work load to health workers, and allow rapid detection of disease outbreaks and epidemics.
- A regional database on key areas in health
- Linkage through the EAHRC portal to cloud services to support analytics, direct access to the data, privacy and security of the data